Received Social Support and Well-being among Survivors of Natural Disaster

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ABSTRACT

The idea that receiving social support in the aftermath of disaster is beneficial to survivors' psychological outcomes is widely accepted by both researchers and practitioners. However previous studies assessing the association between received social support and psychological outcomes have produced mixed results. One limitation of these studies is that they only assessed the quantity of support received, but not its quality. However, current evidences suggested that receiving social support is not always beneficial, this can lead to both positive and negative consequences.

This research was intended to examine the effects of postdisaster received social support on psychological outcomes, and to explore the determinants of recipients' perception of social support interactions. In the context of a longitudinal mixed method design, three studies were conducted among survivors of the Lushan earthquake in China: a longitudinal quantitative study examining the impact of post-disaster received social support on posttraumatic stress symptoms and psychological distress; a longitudinal quantitative analysis examining the impact of post-disaster social support on posttraumatic growth; and a qualitative study describing survivors' experiences of receiving post disaster social support, and exploring what matters to recipients in their evaluation of these experiences.

A convenience sample of Lushan earthquake survivors was invited to complete a questionnaire 7 months after the earthquake (n =199) and was followed up 31 months later (n =161). Face-to-face semi-structured interviews were conducted by the author among a sub-group of participants (n =11) in the follow-up survey.

This thesis found that greater quality of social support received 7 months after disaster predicted lower levels of posttraumatic stress symptoms and psychological distress two years later, however quantity of received social support was not significant in predicting these two outcomes. The association between quantity of received social support and PTG was moderated by the quality of received social support. Specifically, for survivors who received high quality of post-disaster social support, greater amounts of support received facilitated their posttraumatic growth. However, for those survivors who received poor quality of post-disaster support, greater quantity of support impeded PTG.

Social support recipients cared about features related to outcomes, interaction, provider and management. First, recipients cared about features of the outcomes of social support interactions; that is, whether the support that was received fulfilled their needs, and also whether distribution of support was equal and fair. Second, they cared about whether the interaction goes smoothly and easily; whether the interaction was initiated by providers; whether the interaction was public and therefore witnessed by others; whether they were treated with dignity in the interaction; and whether they had opportunities to reciprocate. Third, characteristics of help providers, including whether they sincerely wanted to help them, and what they devoted in order to provide assistance, also matter. Lastly, the efficacy and appropriateness regarding the management of disaster relief resources was concerned by recipients.

THESIS DECLARATION

I declare that:

1. The thesis comprises only my own work, except where due acknowledgment has been made in the text of the thesis to all other material used

2. The length of the thesis is less than 10,000 words, excluding footnotes, appendices, acknowledgments, synopsis, table of contents and list of illustrations

Fanhong Shang

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PREFACE

The following two papers were finished in collaborations with several co-authors, and I contributed 70% to each of them.

1. Shang, F., Kaniasty, K., Cowlishaw, S., Wade, D., Ma, H., & Forbes, D. (2019). Social support following a natural disaster: A longitudinal study of survivors of the 2013 Lushan earthquake in China. *Psychiatry Research*, *273*, 641–646. https://doi.org/10.1016/J.PSYCHRES.2019.01.085

2. Shang, F., Kaniasty, K., Cowlishaw, S., Wade, D., Ma, H., & Forbes, D. (2020, January 2). The Impact of Received Social Support on Posttraumatic Growth After Disaster: The Importance of Both Support Quantity and Quality. Psychological Trauma: Theory, Research, Practice, and Policy. Advance online publication. http://dx.doi.org/10.1037/tra0000541

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First and foremost, I want to thank all the participants of the project. I want to say that, they not only took part in this project, they actually have participated in my life. I spent one month in total for the two waves of data collection, during which I lived in the disaster area and heard so many stories from the participants. This experience has impacted me deeply, my understanding about the world, about human nature and about myself have changed dramatically after the data collection. I got my heart broken by the participants tried to cheated me, I also was moved by the participants who still wanted to help people after they were hurt by the ones they helped. I cried so many times, both during the data collection and during the data analysis for qualitative interview. I still remember the day when I left the disaster area after the second wave data collection, I told myself I will never go back again, I would stay away from disaster areas my whole life. But now, I change my mind, I want to visit the participants again as a friend, say hello and thank you to them. Thank them for what I have learned from them, and most importantly thank them for motivating me to insist. The reason which stopped me from giving up during my suffering days is that I think have a responsibility for the participants. I can't waste their efforts for this study, because I know how hard and challenging it is for them to survivor in the aftermath of a disaster. I have to share what I learned from them to a broad audience, so their experiences and achievements can be valued by more people.

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LIST OF ABBREVIATIONS

CSS	The Crisis Support Scale
DHARD	Dissatisfaction with Help Received and Aid Distribution
GHQ	General Health Questionnaire
GHQ-12	the 12-item General Health Questionnaire
ISEL	The Interpersonal Support Evaluation List
ISSB	The Inventory of Social Supportive Behaviours
IPSS	the Inventory of Post-Disaster Social Support
NGO	Non-governmental organisation
RSS	Received social support
SSE	Social support effectiveness
SSE-Q	Social Support Effectiveness-Questionnaire
PCL-C	the PTSD Checklist-Civilian Version
PTG	Posttraumatic growth
PTSD	Posttraumatic stress disorder
VIF	Variance inflation factor

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Chapter 1 Introduction

Experiencing a disaster may exacerbate pre-disaster burdens while creating yet an entirely new set of challenges and obstacles for survivors to overcome. There is overwhelming evidence that disasters can lead to a range of posttraumatic and stress-related mental health problems. Concurrently, considerable help is mobilised both from external sources and the survivors themselves to aid those affected. The question as to whether received social support postdisaster is beneficial to survivors' mental health is deemed extremely significant by governments, organisations providing care for disaster survivors, researchers and practitioners.

This study focuses on the role of postdisaster received social support, especially on what effect this help may have on the psychological consequences of survivors. In order to provide a background to this topic, this introduction brings together a range of bodies of literature. To begin with, the definition of social support is briefly introduced (1.1), the distinctions between different facets and types of social support are then described (1.1.1, 1.1.2), followed by the explanation of why this dissertation focuses on received social support. Second, studies examining the association between received social support postdisaster psychological consequences are reviewed (1.2). Third, evidences are reviewed to demonstrate that receiving social support can lead to both positive and negative consequences (1.3). Fourth, theoretical and empirical attempts to address what kinds of social support received are likely to produce positive outcomes are outlined (1.4). Finally, the limitations of the previous studies are briefly summarized an outline of how the gaps identified in this review can be addressed in the proposed study (1.5).

1.1 Social support

Social support is defined as "social interactions that provide individuals with actual assistance and embed them into a web of social relationships perceived to be loving, caring,

and readily available in times of need" (Kaniasty & Norris, 2009). This definition addresses three facets of social support: social embeddedness, perceived social support and received social support (Kaniasty & Norris, 2009). As social support is a broad concept which is insufficiently specific to be useful as a research concept, distinctions between different facets and types of social support are discussed below. To begin with, the three facets addressed in the definition of social support were compared, then followed by a brief introduction of the different functional types of social support.

1.1.1 Distinctions between social embeddedness, perceived social support and received social support

Social embeddedness is defined as the connectedness people have to significant others (Barrera, 1986). It emphasises the depth and strength of relational ties between the individual and each member of the social network. Studies measuring social embeddedness often focus on the size and structure of someone's social network. For example, participants may be asked to report their marital status, their participation in community organisations and the presence of relatives and friends. One of the representative instruments used to assess social embeddedness is the Social Network Index developed by Cohen and his colleagues, examples of the items are: 'how many fellow students or teachers do you talk to at least once every 2 weeks', and 'how many close friends do you have'(Cohen, Doyle, & Skoner, 1997). This approach of measuring social support shares the assumption that the existing social network can provide social support to participants when they need it.

Perceived social support also termed as "perceived support" or "perceived available support", is defined as the cognitive appraisal of being reliably connected to others (Barrera, 1986), and refers to the perception of support believed to be available if needed (Dunkel-Schetter & Bennett, 1990; p. 267). The Interpersonal Support Evaluation List (ISEL; Sheldon Cohen, Mermelstein, Kamarck, & Hoberman, 1985) is one of the most popular instruments

used to measure received social support and consists of 40 items describing statements concerning the perceived availability of potential social resources (e.g., there are several people that I trust to help solve my problems; If I needed help fixing an appliance or repairing my car, there is someone who would help me). Participants are asked to whether these statements are true for them on a 4-point scale (definitely false, probably false, probably true, definitely true). The ISEL assesses the perceived availability of four separate functions of social support (appraisal, tangible, self-esteem and belonging; for introduction with respect to functional types please refer to 1.1.2).

Received social support also refers to enacted support, objective support and actual support, and is defined as the help that is actually received. It refers to support taking place in interpersonal transactions or exchanges, may include both nonverbal and verbal behaviours (Dunkel-Schetter & Bennett, 1990; p. 269). It should be noted that the actions referred as 'help' or 'support' in this definition only describe the attempts which the provider has made in order to help, but does not necessarily mean these behaviours would be perceived as helpful or supportive by the recipients. In fact, received social support can lead to both positive and negative consequences (see 1.3 for further detail). Similar to perceived social support, received social support scales can also cover different functional types, such as informational support, emotional support and instrumental support (see 1.1.2). As this dissertation is focused on received social support, and I developed two scales to assess it in this study, the pre-existing measurement of received social support will be introduced in a separate section with more detail (see 1.2.3).

1.1.2 Differentiating functional types of social support

Different types of received social support can be identified according to the content of function of this help. A widely accepted classification is developed by Cohen, in which five types of social support are distinguished (Sheldon Cohen, Underwood, & Gottlieb, 2000).

Firstly, emotional support refers to help like “listen sympathetically” and “provide indications of caring and acceptance”. Secondly, instrumental support means practical help; examples here include “assisting with transportation, helping with household chores and child care, and providing tangible aid such as bringing tools or lending money”. Thirdly, help that can provide knowledge useful for solving problems is called informational support. Fourthly, companionship support involves the availability of people with whom one can participate in social and leisure activities (e.g. trips, parties, going to movies or museums, or sporting events or hiking). The final type of support is called feedback, validation, or social comparison; it refers to the function of providing information about the appropriateness or normativeness of behaviour.

In summary, the conceptual distinction between social embeddedness, perceived social support and received social support have been outlined here. Specifically, social embeddedness focuses on the existence of social relationships, perceived social support attempts to capture individuals’ confidence in obtaining help when they need it, and received social support addresses the actual support attempts received in interpersonal transactions or exchanges. In addition, distinctions between these different facets of support have been supported by empirical studies, with each facet found to contribute uniquely to psychological outcomes (Dunkel-Schetter & Bennett, 1990; Guilaran, Terte, Kaniasty, & Stephens, 2018; Kaniasty & Norris, 2009). Both perceived social support and received social support may take on different functional types such as emotional support and informational support. Though received social support is the concept that corresponds best with our intuitive opinions of social support, it is less frequently studied than other constructs especially perceived social support. In my view, the predominant focus on perceived social support runs contrary to the interest in social support as a malleable resource for psychosocial intervention programs. Some researchers have thus called for an increased emphasis on received social

support to better inform the development of support-based interventions (Guilaran et al., 2018; Kaniasty & Norris, 2009). In response to this exhortation, this dissertation focuses on received social support.

1.2 The effect of postdisaster received social support on psychological consequences

A considerable number of disaster studies have examined the association between social support and mental health. However, the concept of social support is sometimes used inaccurately, for example failing to elucidate what kind of social is being referred to, i.e., support received social support or perceived social support (e.g., King et al., 2006). Another issue is the disparity between an intended evaluated concept and that which is actually measured. For example, one study claimed to measure perceived support, but both items describing received social support and perceived social support were included in their self-developed questionnaire (Laffaye et al., 2008). In addition, the scales used in some studies measured more than one facet of social support (Ren et al., 2015; Zhang et al., 2017), which led to results that are difficult to interpret. To ensure validity, only studies that actually measured received social support in a disaster context will be reviewed.

This section will be organized in the following sequence. First, the current evidence for an association between received social support and mental health problems in a disaster context is summarized (1.2.1), followed by that of received social support and positive psychological changes in the same context (1.2.2). Second, as the results reviewed in sections 1.2.1 and 1.2.2 were largely influenced by the measurement of received social support, the scales used in these studies are reviewed (1.2.3). Third, justifications are discussed for further studies to examine if received social support is beneficial to disaster survivors' well-being (1.2.4). Last, as the current research was focused on earthquake survivors in China, the

current evidence and measurement of received social support and well-being among these Chinese samples is specified (1.2.5).

1.2.1 Received social support and mental health problems in the disaster context

One focus of studies that have examined the effect of postdisaster received social support is to explore whether it can reduce the risk of stress-related mental health problems, most commonly post-traumatic stress disorder (PTSD; Cerda et al., 2013; Hussain et al., 2013; Lowe et al., 2015), depression (Cerda et al., 2013; Lowe et al., 2015; Shiotani, 2014), and psychological distress (Koyama et al., 2014; Norris & Kaniasty, 1996). The cross-sectional and longitudinal association between received social support and these mental health problems will be reviewed separately.

Received social support and PTSD. The cross-sectional association between received social support and PTSD has been examined in several disaster contexts, including the 2010 Haiti earthquake, the 2004 Indian Ocean tsunami, the 2015 Formosa Fun Coast Water Park explosion, the 2001 Volendam New Year's fire, and the 2008 Wenchuan earthquake. Four of these studies reported a significant negative association between received social support and posttraumatic stress (Arnberg, Hultman, Michel, & Lundin, 2012; Cerda et al., 2013; Dekovic, Koning, Stams, & Buist, 2008; Hussain et al., 2013; Su, 2018; Wahlström, Michélsen, Schulman, & Backheden, 2013), while one study reported a non-significant association (Hou et al., 2014). The longitudinal association between received social support and PTSD was only assessed in two of these studies. A study of a sample of Norwegian survivors of the 2004 tsunami found that received support failed to predict improvements in posttraumatic stress symptoms between 6 to 24 months (Hussain et al., 2013). A three-wave longitudinal study conducted among survivors of Hurricane Ike found that the significant longitudinal association between received social support and posttraumatic stress symptoms

was only limited to emotional support, and did not include informational and instrumental support (Platt, Lowe, Galea, Norris, & Koenen, 2016).

Received social support and depression. All of the studies that have examined the link between received social support and depression in the disaster context were cross-sectional and produced inconsistent results. Cerda and colleagues (2013) found that low-level social support received 2-4 months after the Haiti earthquake was linked to a higher risk of major depressive disorders. Similarly, three studies conducted in China also reported a significant negative association between received social support and depression (Huang, Tan, & Liu, 2016; Huang & Wong, 2014; Su, 2018). A study of Chinese flood survivors examined both the direct and the indirect associations between received social support and depression, and reported a marginally significant direct association and significant indirect association (Zhen, Quan, & Zhou, 2018). However, there was a contrasting finding in a study of victims of the Great East Japan Earthquake. In that study, the receipt of "psychological encouragement" was positively correlated with depression measured half a year after the earthquake (Shiotani, 2014).

Received social support and psychological distress. The cross-sectional association between received social support and psychological distress has been confirmed by several studies. For example, a cross-sectional study conducted in the context of the 2011 Great East Japan Earthquake found that survivors who reported the absence of social support had a higher risk of psychological distress (Koyama et al., 2014). Similarly, two studies of the 2004 Indian Ocean tsunami also found that psychological distress was negatively linked to received social support (Arnberg et al., 2012; Wahlström et al., 2013). As for the longitudinal association between received social support and psychological distress, inconsistent results were produced. In a longitudinal study of survivors of Hurricane Hugo and Hurricane Andrew, help received within two months postdisaster was found to alleviate distress two

years after the disasters through perceived support (Norris & Kaniasty, 1996). However, the longitudinal association between received support and psychological distress was reported to be non-significant in a study conducted among survivors of the Jupiter cruise ship disaster (Steve Joseph, Andrews, Williams, & Yule, 1992).

1.2.2 Received social support and positive psychological changes in the disaster context

After struggling with disaster, many people have not only survived, but have experienced positive changes that go beyond of pre-disaster status in some areas. Very few studies have examined the association between received social support and positive psychological changes in the context of disasters. One way in which positive post-trauma adjustment has been studied is through the construct of post-traumatic growth (PTG). PTG is described as positive psychological growth in the aftermath of trauma and is conceptualised as growth in any of five areas: appreciation of life; meaningfulness of interpersonal relations; sense of personal strength; sense of new possibilities/change priorities; and spiritual growth (Tedeschi & Calhoun, 1996). Survivors may also experience other positive changes that are not covered by PTG, such as an improved belief in the benevolence of people (Kaniasty, 2012).

Only three studies have examined received social support and PTG in the disaster context, and they were all cross-sectional and produced mixed results. One study sampled survivors of the 2015 Formosa Fun Coast Water Park explosion showed that received social support predicted PTG significantly (Su, Chow, Yen, & Chuang, 2020). One study conducted 14 months after the Hurricane Katrina among survivors living with HIV found that received support did not predict overall PTG, and was only positively correlated with one PTG dimension-relating to others (Cieslak et al., 2009a). However, another study found that only one dimension of received social support (received informational support) predicted PTG positively. The other two dimensions (received emotional support and received instrumental

support) did not predict PTG (Hou et al., 2014). In fact, studies examining the association between received social support and PTG in other stress contexts (mainly suffering from health issues) also produced mixed results (Hill & Watkins, 2017; Kamen et al., 2016; Nenova, DuHamel, Zemon, Rini, & Redd, 2013; Rzeszutek & Gruszczyńska, 2018; Schroevers, Helgeson, Sanderman, & Ranchor, 2010; Schulz & Mohamed, 2004).

As for other positive psychological changes, beliefs in the benevolence of people were assessed with a longitudinal study of the survivors of the 1997 Poland flood. In this study, Kaniasty (2012) found that participants who received more social support maintained a greater belief in the benevolence of people than those who reported receiving less help. In addition, people who were more satisfied with the help they received and the aid distribution reported greater levels of belief in benevolence (Kaniasty, 2012).

1.2.3 Measurement of received social support in the disaster context

The most widely used instrument for received social support in the disaster context is the Inventory of Postdisaster Social Support (IPSS) which was specifically developed for disaster contexts, followed by the Crisis Support Scale (CSS) which can be used in a variety of trauma context including disaster. Aside from these two scales, context-free instruments (Huang & Wong, 2014), instruments that initially developed for context irrelevant to disaster(Warner, Gutiérrez-Doña, Villegas Angulo, & Schwarzer, 2015) and self-developed scales (Dekovic et al., 2008; Koyama et al., 2014) were also used in some studies. Though the content covered by those scales varied largely, they can be categorized into two groups: instruments that simply measured the quantity of received social support and instruments that includes items that reflected the quality of received support. Most of the instruments belong to the former group, an excellent example being the IPSS, while only two scales belong to the latter group: the CSS and the Dissatisfaction with Help Received and Aid Distribution

(DHRAD). These three scales are introduced below, and the items used to measure the quantity and quality of received social support are compared in Table 1.1.

Table 1.1

Examples of Instruments That Have Been Used to Measure Received Social Support in the Disaster Context

Instruments	Quantity of received support	Quality of received support
IPSS	36 items; e.g., “how often, between the first day of flood and the middle of September, did family members give, loan or offer you money?”	0 item.
CSS	5 items; e.g., "whenever you wanted to talk, how often was there someone willing to listen just after the disaster?"	1 item. “do people you expect to be supportive make you feel worse at any time just after the disaster?’’
DHRAD	2 items; e.g., “in general, I believe that I received an adequate amount of help and aid”	9 items; e.g., “aid and help were distributed justly and fairly”

Note. IPSS = The Inventory of Postdisaster Social Support; CSS = The Crisis Support Scale; DHRAD = Dissatisfaction with Help Received and Aid Distribution.

The items that measures quality of received social support in DHRAD are not at individual level.

The Inventory of Postdisaster Social Support (IPSS; Kaniasty and Norris, 2000; Norris et al., 2001) was designed for assessing the frequency with which 12 different supportive behaviours were received from family, friends, and outsiders in the disaster context. The total scale comprised 36 items. Three types of received support were assessed: emotional (three items), informational (three items), and tangible (six items) support. Respondents were asked to estimate how often they received different types of help within a clearly established and carefully explained timeframe, these helping acts did not have to be directly related to the disaster. For example, one question of the scale used in a 1997 Poland flood study asked, 'How often, between the first day of flood and the middle of September, did family members give, loan or offer you money? Regardless of the reason, did this happen . . . never [scored 1], once or twice [scored 2], a few times [scored 3], or many times [scored 4]?' (Kaniasty, 2012).

The confirmatory factor analyses indicated that the conceptually derived three-factor model which differentiated emotional, informational, and tangible support provided an adequate fit (F. H. Norris et al., 2001). This scale and its adapted versions have been used in a range of disaster context such as flood, earthquake and hurricane, and reported good internal reliability (α ranged from 0.84-0.95) (Akbar & Aldrich, 2018; Cerda et al., 2013; Cieslak et al., 2009b; Hou et al., 2014; Kaniasty, 2012; Kaniasty & Norris, 2000; Lowe et al., 2015; F. H. Norris, Baker, Murphy, & Kaniasty, 2005; Platt et al., 2016; Zhen et al., 2018).

The Crisis Support Scale (CSS; Joseph, Andrews, Williams, & Yule, 1992) is a self-report scale developed to measure received support in the context of traumatic events, including disaster. Respondents are asked to think of those family members and friends that they have turned to for help, advice, and support following the event, and then to rate each of the support questions on a seven-point scale ranging from 'never' (1) to 'always' (7). The initial version comprises seven items with one item assessing the satisfaction with the support they received, however, this satisfaction item was suggested to be employed separately as it

was concerned with perceptions of support rather than the support actually received (Steve Joseph et al., 1992). Thus, most studies used the six-item version which consists of five items measuring positive support response (the availability of others, contact with other survivors, confiding in others, emotional support and practical support; e.g., 'whenever you wanted to talk, how often was there someone willing to listen just after the disaster') and one item measuring negative response ('do people you expect to be supportive make you feel worse at any time just after the disaster?'). The items can be used to measure support received within a three-month timeframe, either retrospectively (from the event to three months following the event) and/or at the present time (from three months ago to the survey time).

The CSS has been used in several studies in disaster contexts including ships sinking, tsunamis, and explosions, and were found to have adequate internal reliability (α ranged from 0.67 to 0.80; Arnberg, Hultman, Michel, & Lundin, 2012; Joseph, Yule, Williams, & Hodgkinson, 1994; Joseph et al., 1992; Su, 2018; Su, Chow, Yen, & Chuang, 2020) (Wahlström et al., 2013). The validity of this scale was not reported.

Dissatisfaction with Help Received and Aid Distribution (DHRAD; Kaniasty, 2012). This scale was created to assess respondents' evaluations of the limitations and liabilities of postdisaster social support processes. It consists of two parts: two items ask about the adequacy of help the participants personally receive (e.g., 'in general, I believe that I received an adequate amount of help and aid'); and nine items ask about the process of disaster aid distribution in general (e.g., 'Aid and help were distributed justly and fairly', 'Many people received help and aid even though they were not entitled to it', 'The process of distribution of aid and help caused conflicts, disagreements, and displeasure'). The answers were scored on a 4-point scale (1=definitely agree, 2=agree, 3=disagree, and 4=definitely disagree), and a higher score indicated greater dissatisfaction. This scale was initially developed to be used among survivors of the 1997 Poland flood but has not been used in any other studies. The

internal reliability coefficient for this scale was .84. The validity of this scale was not reported.

While these instruments have improved our understanding of received social support in the disaster context, they have limitations. The IPSS measures the frequency of selected help behaviours, but cannot provide any information related to the quality of these help behaviours. Higher scores on the IPSS just indicate that more help was received, but do not necessarily mean that better help was received. The features that determine the quality of the received social support, such as whether the support matched participants' needs, whether the support was provided in time, and whether the support was distributed fairly, are not captured in this scale. Thus, the validity of the IPSS is limited. The CSS shares the same limitation, though it includes one item measuring the negative social support response, which is relevant to the quality of received social support. The Dissatisfaction with Help Received and Aid Distribution scale is better in regards to this aspect, as it includes items assessing the process of aid distribution, which captures some features that reflect the quality of support (e.g., the fairness of the distribution). However, these aid distribution items were designed to reflect the general situation of the distribution process, not the personal received support at the individual level. For example, the item 'the process of distribution of aid and help caused conflicts, disagreements, and displeasure' cannot tell whether a given participant was personally involved in these conflicts or disagreements. Moreover, some of the aforementioned features (e.g., timeliness, needs matching) are not considered in this scale either.

1.2.4 Summary and discussion

In summary, some studies reported that received social support was negatively related to mental health problems (Cerda et al., 2013; Dekovic et al., 2008; Hussain et al., 2013; Su, 2018), and/or positively related to positive psychological changes (Su et al., 2020), indicating

a positive association between received social support and disaster survivors' well-being. However, the positive association between received social support and well-being in some studies was found to be limited to a certain kind of social support (Hou et al., 2014; Platt et al., 2016). There were also studies reporting that received social support was not related or was even negatively related to well-being (Hou et al., 2014; Shiotani, 2014).

Except for these inconsistent findings, there are at least two reasons that further studies are needed to examine whether received social support is beneficial to disaster survivors' well-being. First, most of the previous studies assessing the association between received social support and well-being in disaster context were cross-sectional, which cannot draw causal inference. The cross-sectional association between received social support and well-being may either be due to social causation (social support is an antecedent of well-being) or social selection (individuals with poor well-being are selected out of supportive social relationships) (Kaniasty & Norris, 2008; Platt et al., 2016). Thus, more longitudinal studies are needed. Second, as can be seen from the last section (1.2.3), the quality of received social support was either totally ignored, or was only considered partially in the instruments used to measure received social support in previous studies. As a result, the previous evidence hardly reflected the real relationship between received social support and well-being, but rather, reflected the relationship between the amount of received social support and well-being. To better understand the relation between received social support and well-being, further studies with a joint consideration of quantity and quality of received help are needed.

1.2.5 Received social support and well-being in the disaster context in China

A large number of disaster studies conducted in China have examined social support, however, received social support remains underexamined. The most commonly used instrument for measuring social support in the disaster context in China is the Social Support Self-Rating Scale (SSRS; Xiao, 1994), which is an integrated scale measuring multiply social

support constructs, and only two of its total 10 items are relevant to received social support. While a few studies have measured received social support among Chinese disaster survivor populations, it seems that even the authors of these papers did not distinguish received social support from other social support constructs. Some of these studies used the broad term 'social support' instead of the accurate term 'received social support' (Chen et al., 2014; Huang et al., 2016; Huang & Wong, 2014). Even worse, some studies used perceived social support to refer to the received social support that was actually measured (Hou et al., 2014; Su, 2018; Su et al., 2020).

In total, six studies were found to have examined the relationship between received social support and mental health among disaster survivors in China, and all of them were cross-sectional studies. The association between received social support and depression was examined in four studies of survivors of the Wenchuan earthquake (Huang & Wong, 2014), the Lushan earthquake (Huang et al., 2016), the 2016 Wuhu flood (Zhen et al., 2018) and the 2015 Formosa Fun Coast Water Park explosion (Su, 2018), and produced quite consistent results. Three studies reported a significant negative association between received social support and depression (Huang et al., 2016; Huang & Wong, 2014; Su, 2018), while one study found a marginally significant direct association, and a significant indirect association through several paths between them (Zhen et al., 2018). Two studies examined the association between received social support and PTSD, but produced inconsistent results. A study of the 2015 Formosa Fun Coast Water Park explosion found that received social support significantly and negatively predicted PTSD (Su, 2018), while a study that sampled teachers who survived the Wenchuan earthquake reported a non-significant prediction (Hou et al., 2014). Similarly, two studies that assessed the link between received social support and PTG also produced inconsistent results. One showed that received social support significantly predicted PTG (Su et al., 2020). However, the other study found that only one dimension of

received social support (received informational support) predicted PTG positively, the other two dimensions (received emotional support and received instrumental support) did not predict PTG (Hou et al., 2014).

The Chinese version of three different instruments were used to measure received social support in these studies: The Crisis Support Scale (CSS; Su, 2018; Su et al., 2020), the Inventory of Postdisaster Social Support (IPSS; Hou et al., 2014; Zhen et al., 2018) and the Social Support Questionnaire for Transactions (SSQT; Huang et al., 2016; Huang & Wong, 2014). The Chinese version of the CSS and the IPSS retained all the items of the original version, and no new items were added. Thus, they shared the same limitation as the original version, that is, they could not reflect the quality of the received social support. Similar to the IPSS, the original version of the SSQT measured the frequency of selected supportive interactions, and consisted of five subscales: Social Companionship, Daily Emotional Support, Problem-oriented Emotional Support, Daily Instrumental Support, and the Problem-oriented Instrumental Support (Suurmeijer et al., 1995). The version that has been used for Chinese disaster survivors only consisted of two subscales: Daily Emotional Support (five items, e.g., 'does it ever happen to you that people sympathize with you?'), and Daily Instrumental Support (four items, e.g., 'does it ever happen to you that people lend you small amounts of money?'). Total scores of these two subscales were computed to measure received social support (Huang & Wong, 2014) (Huang et al., 2016). The internal reliability of this two-subscale version was high ($\alpha = 0.91$) but this scale also could not reflect the quality of the received social support.

In summary, very few studies have examined the links between received social support and mental health in disaster contexts in China, and all of the available studies were cross-sectional and produced inconsistent results. In addition, no instrument is available to measure

both the quantity and quality of received social support for Chinese disaster survivor populations.

1.3 Receiving social support can lead to both positive and negative consequences

Although there is substantial research indicating that social support is positively linked with mental health (Cerda et al., 2013; Hussain et al., 2013; Kaniasty, 2012), other studies found negligible or even negative associations with these indices (Lowe, Chan, & Rhodes, 2010; Shiotani, 2014). For example, a study of elderly people with difficulties in daily activities (care recipients) and their spouses (caregivers) found that nearly 40% of care recipients reported some emotional distress in response to the help received (Newsom & Schulz, 1998). Such findings are consistent with studies indicating that recipients of social support are not always satisfied with the help they receive, and that these attempts to help can be viewed as a mixture of both supportive and unsupportive behaviours (Evans, Pistrang, & Billings, 2013; Grange, Matsuyama, Ingram, Lyckholm, & Smith, 2008; Martin, Davis, Baron, Suls, & Blanchard, 1994; Toller, 2011).

Social support is not always beneficial, help behaviours with good intentions can sometimes have unintended negative consequences. Previous studies have shown that recipients sometimes experienced a range of negative reactions to social support. For example, a quantitative study showed that older women with osteoarthritis experienced incompetence in the receipt of the husband's instrumental support and felt powerless (Matire, Stephens, Druley, & Wojno, 2002). Similarly, a qualitative study conducted among gay men with AIDS found that the participants felt hurt or upset, displeased, and/or uncomfortable after receiving some support attempts (Hays, Magee, & Chauncey, 1994). The negative reactions to the receipt of social support reported in other previous studies included but were

not limited to frustration (Grange et al., 2008), conflicts and complaints (Ibañez et al., 2003), annoyance, anxiety, disappointment, loss of control, and weakness (Palant & Himmel, 2019).

1.4. What kinds of social support received are likely to produce positive outcomes?

The literature reviewed in the previous section demonstrated that receiving social support does not always lead to positive outcomes, thus it is important to understand why some forms of social support produce positive results for the recipients, while others do not. As not many studies in disaster context have explored this topic, current theory and evidence on this topic are firstly reviewed in a broad context which include experimental studies and nonexperimental studies conducted among people with health issues (e.g., eating disorder, pregnancy; see 1.4.1). Following this the evidence in disaster context are summarised and discussed (1.4.2).

1.4.1 Evidence in a broad context

One of the early theoretical attempts to address this issue is the optimal matching theory (Cutrona & Russell, 1990), which suggest that effectiveness of social support can be determined by the matching between stressful events and support types, with specific kinds of stressful events best matched to certain support types. According to this theory, the controllability of a stressor is the most important dimension in determining which type of social support is needed. People facing controllable stressors (e.g., transition to parenthood) may benefit most from support that fosters problem-focused coping (e.g., information, advice, actual assistance), whereas people facing an uncontrollable stressor (e.g., the death of a loved one) may benefit most from support that foster emotion-focused coping (e.g., expressions of caring, concern, empathy, and reassurance). This theory focuses on the content of received social support, especially the functional types of the support received. However, this theory is challenged by the studies which found functional types of social support are not

robust in predicting the beneficial effect of received social support (Dilly, 2006; Green-Hamann & Sherblom, 2014). In addition, recent studies examining this theory found that the appropriateness of social support is not only affected by the type of social support. For example, Gray (2014) examined the social support communication in unplanned pregnancy and found that, except for the matching between support type and stressor, other elements of support, such as source of support, timing, and message strategies used also mattered (Gray, 2014).

A variety of other features of social support that may contribute to its consequences have also been examined. For example, the invisibility of support was investigated by Bolger and Amarel with three experiments (Bolger & Amarel, 2007). Invisible support is operationalized as the support that either outside of recipients' awareness or within their awareness but with sufficient subtlety that they do not interpret it as support. They found that invisible support was effective in lowering emotional reactivity to a significant stressor, while visible support was either ineffective or it exacerbated reactivity. This study indicated that the effectiveness of social support was influenced by the manner of which it is delivered. Similarly, another study also found that different consequences were produced by the support with different ways of obtain (solicited or unsolicited). This study found that both European American and Asian Americans reporting higher evaluations of the support provider when the support they received was unsolicited (Mojaverian & Kim, 2013). In addition, the support stance, or the tone and spirit in which support is offered may also matters. A study examined the support satisfaction in adults with eating disorders found that, the stance used when offering support is vital to the care of individuals with eating disorders. Patients were more satisfied with the support provided in higher concerned and lower directive approach, expressions of caring were most critical for younger patients, whereas not being criticized or told what to do was most significant for older patients (Geller, Iyar, Srikameswaran, Zelichowska, & Dunn, 2017)

In summary, it seems that the consequence of receiving social support may be determined by multiple features, covering what is provided, when it is provided and how it is provided. A multidimensional framework has been developed by Rini and Dunkel Schetter (2010) to understand what contributes to support effectiveness. The Social Support Effectiveness framework proposes that the effectiveness of support will be maximised when both its quantity and various features of its quality match the needs of the recipient. In this model, social support effectiveness is seen as a function of a combination of factors, features of support attempts that are theorised to underlie its effectiveness including: match for their needs in terms of their amount and type, not being difficult to obtain, being skilfully delivered, and not negatively influencing their self-concept (Rini & Dunkel Schetter, 2010). This theory though impressive, still does not cover all the features that have been found to impact the consequences of receiving social support, for example, the feature of solicited and unsolicited support identified earlier (Mojaverian & Kim, 2013).

1.4.2 Evidence in the disaster context

As can be seen from the previous review (1.2), existing studies of postdisaster social support have examined associations with mental health, but have not considered the characteristics of support that may lead to positive or negative consequences. There are several qualitative studies examining survivors' experiences of receiving social support which is a little bit related to this topic (Forbes, Jones, & Reupert, 2012; Heid, Schug, Cartwright, & Pruchno, 2017; Ibañez et al., 2003) ever they only described what support is received, and did not go deeper to explore features of support may impact its consequences. However, the degree to which specific help behaviours are perceived as helpful vary by context or by the recipient. For example, a mixed method study found that certain supports received by sexual assault victims, such as taking control and distraction, were sometimes perceived negatively and other times perceived positively by the participants (Filipas &

Ullman, 2001). Hence, a simple description of what support is received is limited in its value in informing what kinds of support are likely to produce positive consequences for recipients. The author of the current thesis believes that studies that explore in-depth the features of support may assist us in better understanding the factors that drive the heterogeneity of what is perceived positively and negatively by disaster survivors.

It should be noted that the context of the aforementioned studies (1.4.1) is very different from disaster. Disaster is associated with unique features, including widespread difficulties for most people in affected areas, and thus larger numbers of survivors requiring aid. Furthermore, there is often mobilisation of social support both from survivors' existing social networks and also from strangers (including government agencies) in the form of disaster relief. This is different from people with health issues, for them, the main source of social support is from their existing social network, such as families and friends. Thus, it remains currently unclear whether these features are also salient for survivors in postdisaster contexts.

1.5 Summary

In summary, it is widely accepted that social support plays an important role in postdisaster mental health and a considerable number of studies have examined the association between received help and mental health in the disaster context. Despite these efforts, the nature and implications of social support received in the aftermath of disaster are not fully understood.

First, as demonstrated in the previous sections (1.2), current evidence on the psychological consequences of receiving postdisaster help were largely focused on whether this help can alleviate disorders. Very few studies are available on whether received help can promote survivors' positive changes. This thesis will add evidence on this question with a longitudinal study (Study 2) examining the association between received social support and survivors' posttraumatic growth. Second, previous studies which examined the association

between received social support and psychological consequences suffered from the limitation that quality of received social support was not measured properly. To provide stronger evidence, both quality and quantity of received social support will be measured in the current thesis (Study 1 and Study 2). Given that no scale is available for measuring quality of received social support in the disaster context, a self-developed scale will be used. Similarly, quantity of received social support will be measured with a scale modelled on the IPSS to suit Chinese population. Last, it is not clear on what kinds of social support are likely to lead to positive consequences in the disaster context. To address this gap, a qualitative study will be conducted (Study 3).

Aims and research questions of the three studies are listed below.

Study 1

Aim: Examine the effect of post disaster received social support on posttraumatic stress symptoms and psychological distress.

Research questions:

(1) Does quantity of social support received in the aftermath of disaster predict change in posttraumatic stress symptoms over time?

(2) Does quality of social support received in the aftermath of disaster predict change in posttraumatic stress symptoms over time?

(3) Is the association between quantity of support received and posttraumatic stress symptoms moderated by quality of social support?

(4) Does quantity of social support received in the aftermath of disaster predict change in psychological distress over time?

(5) Does quality of social support received in the aftermath of disaster predict change in psychological distress over time?

(6) Is the association between quantity of support received and psychological distress

moderated by quality of social support?

Study 2

Aim: Examine the effect of postdisaster social support on posttraumatic growth

Research questions:

(7) Does quantity of social support received in the aftermath of disaster predict change in posttraumatic growth over time?

(8) Does quality of social support received in the aftermath of disaster predict change in posttraumatic growth over time?

(9) Is the association between quantity of support received and posttraumatic growth moderated by quality of social support?

Study 3

Aim: Explore the determinants of recipients' perceptions of social support interactions in the aftermath of a natural disaster.

Research question:

(10) What matters in forming recipients' perceptions of their social support interactions in the disaster context?

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Chapter 2 Method

Chapter 1 has introduced the aims and research questions of this thesis. This chapter will describe the methodology used.

2.1 Study sites

2.1.1 Background on the Lushan earthquake

On Saturday, 20 April 2013, a 7.0-magnitude earthquake hit Lushan County, Ya'an City, in southwest China's Sichuan province (see Figure 2.1). The most recent statistics on the earthquake indicate that it resulted in 196 deaths, two missing individuals and 14,785 injured survivors (General Office of the State Council, 2013). More than 2 million people were affected by the disaster, and infrastructure, including roads, bridges, electricity, digital communications, hydropower stations and reservoirs were disrupted (Information Office of the State Council, 2013). Private houses in the worst-hit areas were severely damaged, and almost 99 per cent of private houses in the epicentre collapsed. However, public buildings were not as badly damaged, including hospitals, which did not collapse. The total economic loss caused by the Lushan Earthquake was estimated to be ¥851.71 hundred million (J. Yang, Chen, Liu & Zheng, 2014).

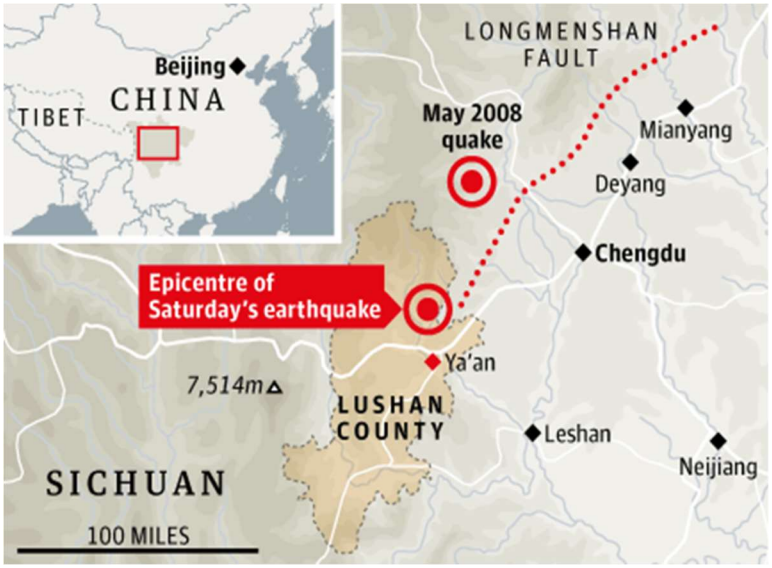


Figure 2.1. Location of Lushan earthquake.

2.1.2 Characteristics of the affected communities

Ya'an City is a prefectural-level city, located about 115 kilometres from Chengdu, the capital city of Sichuan province. It consists of two districts and six counties, including Lushan County, the epicentre of the earthquake. Ninety-four per cent of the Ya'an City region is mountainous. The city has a population of 1,530,000; however, due to a lack of farmland and less-developed industry, many of the local residents migrate from their hometowns to work. Ya'an City has been affected by several earthquakes, including the Wenchuan earthquake in 2008, in which 33 people died, two people went missing and 1,351 people were injured. The Lushan earthquake killed 176 people in Ya'an City and injured 12,030, and 995 of them were severely injured (China Foundation for Poverty Alleviation, 2013; Information Office of the State Council, 2013). Specifically, the participants were recruited from four rural towns in Ya'an City, three of them have a population around 12,000, and one has a population about 19,000. The local hospitals in Ya'an City did not collapse in the earthquake, thus the residents had access to health service in the aftermath of the earthquake. In addition, the injured people can also be treated at Chengdu.

2.1.3 Disaster response

The disaster reduction and relief system in China is featured with central leadership, departmental responsibility and disaster administration at different levels, and is a major responsibility of local government (Zou & Yuan, 2010). The response of the Lushan earthquake followed the top–down model characterised by strong government control and weak participation by non-governmental organisations (NGOs) and affected communities (Y. Chen, Zhang, Tadikamalla & Zhou, 2019; Lu & Xu, 2014). In response to the Lushan earthquake, the government controlled large amounts of resources and set rules and regulations. According to Chinese Premier Keqiang Li, the disaster response for the Lushan earthquake was led and implemented by the Sichuan provincial government, while the central government departments'

main roles were support, guarantee and coordination (Information Office of the State Council, 2013). Soldiers and members of the military, armed police and paramilitary reserve forces played a major role in the Lushan earthquake disaster response, with more than 18,000 people involved in response operations (Sichuan News, 2013).

The response to the Lushan earthquake was fast. The China Earthquake Administration launched a first-grade emergency response within 20 minutes following the earthquake, while the first medical team arrived in Ya'an City in three hours and the first rescue team arrived at the epicentre in Lushan County just three hours after the earthquake. Relief goods first arrived to the epicentre in eight hours (Lu & Xu, 2014), and within 10 hours, Chinese Premier Keqiang Li had arrived at the epicentre to direct and coordinate rescue work. In the first 12 hours following the earthquake, the local government had activated and dispatched nearly 30,000 professional rescue staff comprising medical aid, electrical and communication repair workers, firefighters, police forces and engineering technicians to the earthquake area (J. Yang et al., 2014). In addition, the communication and power supply systems and main road between the affected townships were all restored on the day following the earthquake.

A variety of aid was provided to the affected people. For example, on the day following the earthquake, the Chinese government earmarked ¥1 billion (about 160 million dollars) for disaster relief funding. According to the Ministry of Civil Affairs, every citizen in the quake-hit region was to receive a subsidy of ¥10 and 0.5 kg of rice per day for six months. A subsidy of ¥230 was to be provided to every relocated individual, while those who lost their family were to receive ¥5000 (The Communist News, 2013). Moreover, the government paid for the medical expenses of the injured. As of 25 April 2013, 295,000 people had been relocated, while 69,000 tents, 217,000 quilts, 15,000 clothes, 10,000 folding beds and 2,351 tons of food and water were delivered to the affected area (Information Office of the State Council, 2013).

Despite the significant efforts made to aid the affected population, some problems became exposed during the disaster response. First, relief resources were unevenly distributed between affected areas, with some remote villages and villages unreported by the media receiving less aid than other areas. Second, some policies were not implemented strictly; for example, some urban residents did not receive the subsidy of ¥10 and 0.5 kg of rice per day. Third, the coordination and communication was poor between organisations such as government, non-government, non-profit and others (Y. Chen et al., 2019). Last, the disaster relief was impaired by the corruption among government officials, as evidenced by the head of Ya'an City receiving a 16-year sentence for corruption (Xinhua News Agency, 2015).

2.2 Study design

This thesis is part of a longitudinal study (hereafter called project) examining received social support and wellbeing among survivors of the Lushan earthquake. The project tested the effect of received social support and perceived social support on a variety of psychosocial consequences, including perceived post-disaster community cohesion, satisfaction with life, flourishing, post-traumatic stress symptoms, psychological distress and post-traumatic growth (see Appendix C). As the current research was focused on received social support, the results related to perceived social support was not reported. And due to time limitations, only three of the outcome measures were analysed and reported (i.e., post-traumatic stress symptoms, psychological distress and post-traumatic growth).

This thesis is a mixed-methods longitudinal study focused on received social support in a nature disaster. It consists of two longitudinal quantitative studies (Study 1 and Study 2) examining the effect of received social support on both positive and negative psychological consequences (i.e., post-traumatic stress symptoms, psychological distress and post-traumatic growth) in a disaster context. The thesis also comprises one qualitative study (Study 3)

exploring what features of social support matter in disaster survivors' evaluation of social support receiving experiences.

2.3 Participants and procedure

The first survey (T1) was conducted seven months after the disaster (see Figure 2.2). Participants were recruited from four towns: two from the worst-hit area, Taiping and Longmen, and two from areas affected less severely, Shangli town and Zhongli town (see Figure 2.3). Convenience sampling was used in each town, as participants were recruited during a free influenza vaccination program for children aged 3 to 6 and for the elderly aged over 60 in the entire geographical area that was affected by the earthquake. The elderly who came for the injection and the parents of the children who came for the injection were approached and asked if they would like to participate in the study. Nurses providing the vaccination service were also invited to participate in the study. Specifically, people were eligible for inclusion into the study if they were 18 years of age or older and were in the disaster area when the earthquake occurred. To improve sample representation, one person only from each family was included into the study and any additional family members were excluded.

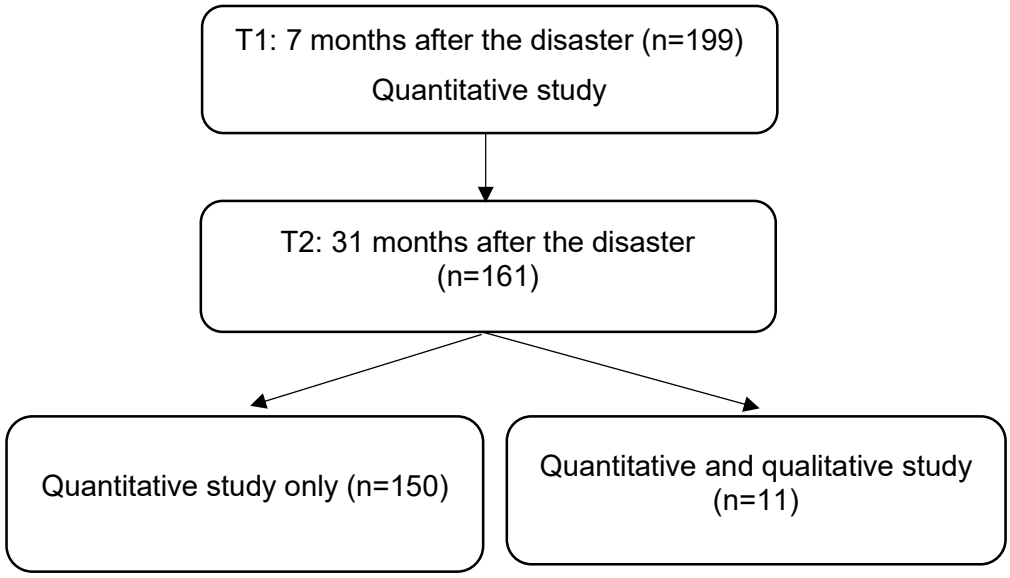


Figure 2.2. Flow of participants through the study.

For eligible and consenting participants, the survey was conducted in the meeting rooms of the hospitals where they were receiving their injections. All participants were interviewed face-to-face by trained interviewers. Participants were interviewed when they were free—some participants were interviewed during the waiting time for their injection, others were interviewed after they or their children had received the injection and the nurses were interviewed at lunchtime).

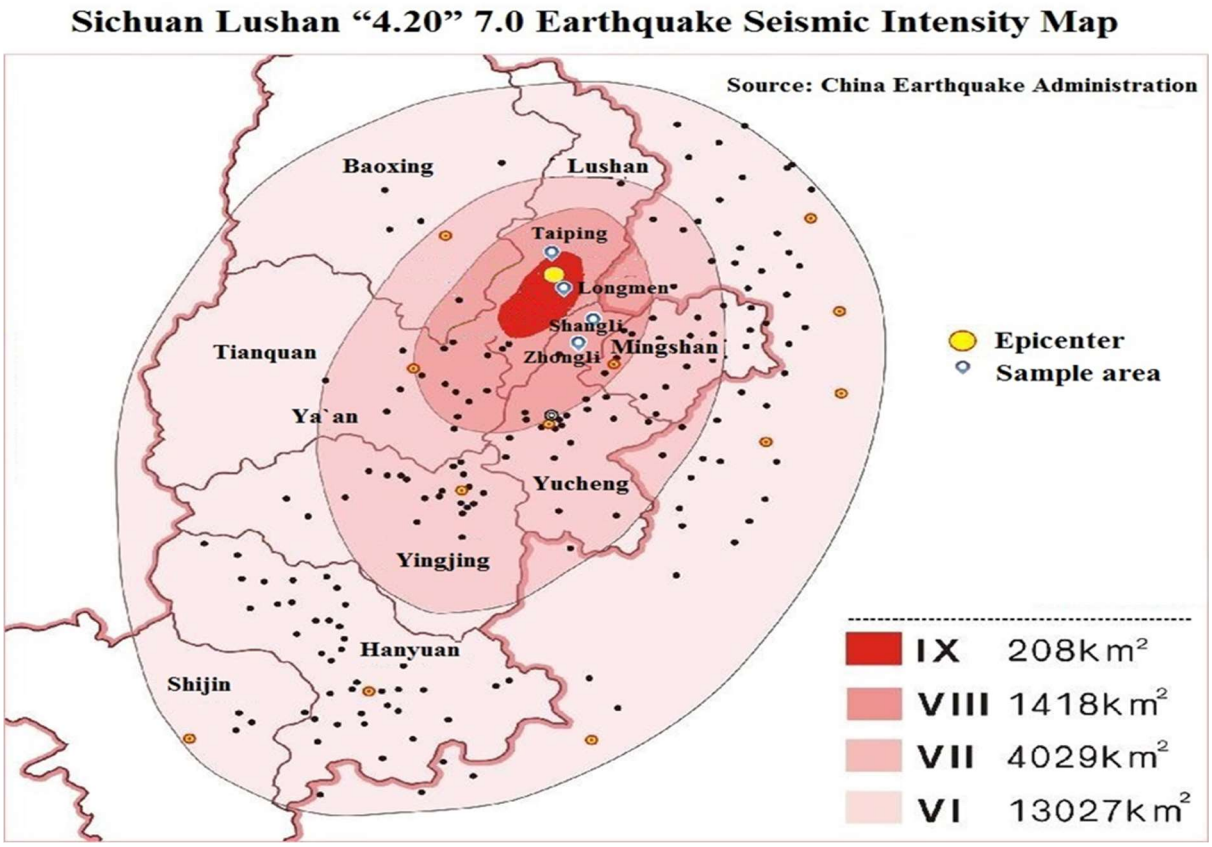


Figure 2.3. Sample areas located in seismic intensity map.

The follow-up survey was conducted two years later, 31 months following the earthquake (T2). All participants from the T1 survey were invited via telephone to participate in the follow-up survey before the fieldwork for the study began. Those participants who changed their phone numbers were contacted with help of participants from the same villages. Specifically, participants who came to the follow-up survey were asked whether they were aware of the contact information of other participants if they were from the same village. Only the names and gender of the missing participants were provided in the inquiry, with all other information kept confidential. Thirty-eight people were lost at follow-up (i.e., 19% attrition rate), amounting to 161 completed interviews. The participants were interviewed face-to-face in their homes or at appropriate locales near their residences. Seven respondents (4%) could not meet in person and were interviewed via telephone.

The qualitative component of the project involved interviews conducted with a subgroup of participants from the T2 survey. These participants were intended to reflect an intensity sample that 'consists of information-rich cases that manifest the phenomenon of interest intensely (but not extremely)' (Patton, 2002, p. 234). Participants were selected for inclusion into the qualitative study based on their responses on the scale of quality of received social support reported at T2. Specifically, participants who reported receiving both high quality support, and those reported receiving low quality of support were both considered to be included; on condition that they could express themselves clearly, and could provide rich information on received social support were invited for the interview. Sampling continued until saturation was achieved, whereby no new information or themes emerged from additional interviews.

Face-to-face semi-structured interviews were conducted by the researcher, beginning with what the participant was doing when the earthquake happened. Participants were then asked to provide examples of their experiences of receiving social support in the aftermath of the earthquake, including both positive and negative experiences and to describe their judgement or feelings about these with reasons. Specific questions and probes included, 'What kinds of help did you receive after the earthquake?', 'How did you feel when you received that help?', 'Were you satisfied with what you received?', 'Why were you are satisfied (or not satisfied)?', 'What moved you most?', 'What was most useful for you?' and 'What could have been improved from your perspective?'

2.4 Ethic issues

The research and ethics committees of Peking University Institute of Mental Health (reference number: 201,531) and The University of Melbourne (reference number: 1,544,838) approved the study. All participants interviewed face-to-face provided written, informed

consent to participate in the study, and participants interviewed by phone provided oral, informed consent.

2.5 Measures

All the questionnaires were written in Mandarin, and were read out by trained interviewers. Participants' responses were recorded by the interviewers.

2.5.1 Demographic variables and covariates

The demographic variables of gender, age (in years), nationality, religion, education (in years), occupation and marital status were assessed.

Covariates. A range of potential covariates of mental health and social support were measured at T1 or T2. Family economic status was measured at T2 using a single-item six-point scale asking participants to rate their family economic status considering their current needs and financial responsibilities (1=very poor to 6=prosperous; Mean=2.80; SD=0.87). Negative life events were also assessed at T2 using a 13-item checklist referencing events that occurred within the past year of the follow-up survey, or earlier if those events still affected participants' lives (Li, Michael & Zhang, 2008). The checklist was developed especially for Chinese populations, can be used both for urban and rural populations and is suitable for people with low education. It has been used in suicide research in China and was reported to have good validity (Li, Michael & Zhang, 2008). The checklist covers (1) love or marriage issues, (2) fertility issues, (3) conflicts with a partner, (4) conflicts with other family members, (5) conflicts with people outside family, (6) conflicts among family members but not involving the participant, (7) illness or serious injury to self, (8) economic issues, (9) work or study issues, (10) serious illness or death of family members or close friends, (11) being physically abused, (12) being sexually abused and (13) other negative life events. The items were combined to derive an index of the total number of negative life events (Range=0–13; Mean=1.40; SD=1.47).

2.5.2 Disaster exposure

Experiences of the disaster were assessed using two indices measured at T1.

Disaster trauma. The first index measured earthquake trauma exposure with five self-developed items. Scores ranged between 0 to 5 based on answers to questions about participants' experiences during and after the earthquake: (1) being injured, (2) being trapped in the rubble, (3) death of a family member/other close person, (4) injury to a family member/other close person and (5) whether there were things that made the participant feel guilt or regret. Answers were recoded as '0' (No) and '1' (Yes) (Mean=0.56; SD=0.52).

Material losses. The second index measured material losses using a self-developed five-item Likert scale that asked about (1) damage to the apartment/home, (2) income/financial losses, (3) employment-related stoppages/job loss, (4) getting into financial debt due to reconstruction needs and (5) the extent to which material losses were more (or less) severe compared to other survivors. Responses to these items ranged between 0 to 2 and were combined to form a total score (Mean=5.76; SD=2.61).

2.5.3 Received social support

Quantity of received social support. Quantity of received social support was assessed at T1 using an instrument modelled on the Inventory of Post-Disaster Social Support (IPSS; Norris, Murphy, Kaniasty, Perilla & Ortis, 2001; Shang et al., 2019). The original IPSS assessed three types of received social support: tangible support, emotional support and informational support. To make the revised version culturally adapted to the sample of the current study, several changes were made to the original version. First, three items assessed companionship support (the availability of people with whom participants could participate in social and leisure activities; e.g., 'How often were you invited a party or group events?') were added. This is because China is a highly collectivist culture in which people value group activities and the company of others. A study conducted among survivors of the Wenchuan

earthquake, which struck the same province as Lushan earthquake, found that participation in recreational group activities was beneficial to survivors' mental health (Huang & Wong, 2013). Second, the items of the original IPSS that used to assess tangible support, emotional support, and informational support were also revised or replaced to fit the local context. For example, 'comfort you with a hug or another sign of affection' was changed to 'comfort you with facial expressions or body language, such as hold your hands or pat you on your shoulder'.

Compared with the original IPSS, a further difference for the revised version was that the source of support was not specified. In other words, the social support acts referenced by the scale could have been provided by anyone. This was because this thesis was focused on the total amount of the help received rather than from where the support came. The revised version consisted of 14 items measuring four types of support received (see Appendix B): tangible support (five items), emotional support (three items), informational support (three items) and companionship support (three items). Participants were asked to report the frequency of the listed social support acts received in the seven-month period since the earthquake (until the day of the T1 assessment), and were advised the support did not have to be related directly to the disaster experience. They were asked to offer their answers on a four-point Likert-type scale (i.e., 'How often you were provided with place to stay or be helped with housing repairs?', where 1=almost never, 2=rarely, 3=often and 4=very often). The scale was developed in Mandarin and reviewed by those who spoke the target sample's dialect, but was piloted due to time and economic considerations. A higher score on this scale indicated more received social support (Mean=30.04; SD=7.85), and its internal consistency reliability coefficient was 0.87.

Quality of received social support. The quality of received social support was measured at T2 with a 12-item scale developed by the current researchers that covered multiple features of the content and distribution of social support (see Appendix B). The scale was administered at T2. However, participants were asked to retrospectively repost on social support they

received in the first seven months following the earthquake for consistency in the assessment timeframes between the reports on the quantity and quality of received social support.

The scale was developed referencing two sources: (1) information collected by a piloted questionnaire that was used in T1 and (2) the items used in relevant scales. The piloted questionnaire consisted of six items, each on a five-point scale, addressing features of help received: matching by help amount, fairness of help amount, skilfulness, needs matching, timeliness and easiness. The questionnaire also included two open-ended questions asking the most wanted help and the most useful received help. Except for the information obtained through the piloted questionnaire, the development of the current scale was also inspired by two previous scales: the Social Support Effectiveness Questionnaire (SSE-Q; Rini et al., 2006; Rini & Dunkel Schetter, 2010) and the Dissatisfaction with Help Received and Aid Distribution (DHRAD; Kaniasty, 2012). In total, seven facets of received social support were measured in the current scale: adequacy, easiness, needs matching, skilfulness, timeliness, fairness and conflicts encountered while receiving aid. The overlap of the facets measured in the current scale and the ones measured in the piloted questionnaire, SSE-Q and DHRAD are presented in Table 2.1. Specifically, five facets that were addressed in the SSE-Q (i.e., adequacy, easiness, needs matching and skilfulness) and two facets that were addressed in the DHRAD were also measured in our scale (i.e., adequacy, fairness, and conflicts encountered while receiving aid).

Items were scored on a five-point response scale (i.e., 1=never, 2=seldom/rarely, 3=sometimes, 4=often and 5=very often), with scores ranging between 12 and 60. Questions in the scale referred to the adequacy of the amount of support received (two items, e.g., ‘The help you received match the amount of aid that you needed?’ and ‘That is, the amount of aid was not too little or too much, it was just right’), ease of obtaining this support (three items, e.g., ‘Getting the help you needed was just too difficult to accomplish’), the extent to which aid matched their needs (two items, e.g., ‘The help you received matched in terms of what you

needed, that is, the type of help you received was what you wanted, it was what you needed'), skilfulness with which it was provided (one item, i.e., 'The help you received from others was provided skilfully and sensitively, that is, in such a way that you did not feel uncomfortable for needing it'), perceived fairness (one item, i.e., 'You were treated unfairly'), timeliness of provision (one item, i.e., 'The help you needed arrived too late for it to be useful') and presence of conflicts while receiving support (two items, e.g., 'Involved in conflicts or disagreements in the process of receiving post-disaster aid'). The internal reliability of this scale was 0.75. Higher scores indicating greater quality of received social support (Mean=44.55; SD=7.23).

Table 2.1

The Overlap Between the Self-developed Quality of Received Social Support Scale and the Reference Scales

Quality of RSS	Piloted questionnaires	SSE-Q	DHRAD
Adequacy	Matching by amount	Matching by amount	Adequacy
Needs matching	Needs matching	Matching by type	
Timeliness	Timeliness		
Fairness	fairness of amount		Fairness
Easiness	Easiness	Ease of mobilising	
Skilfulness	Skilfulness	Skilfulness	
Conflicts			Conflicts

Note. RSS=Received social support; SSE-Q=Social Support Effectiveness Questionnaire; DHRAD=Dissatisfaction with Help Received and Aid Distribution.

2.5.4 Psychological consequences

Psychological distress. Psychological distress was measured using the Chinese version of 12-item General Health Questionnaire (GHQ-12; Xiao, Bi, Bu & Yan, 1993) at T1 and T2. The GHQ-12 is a widely used instrument assessing common mental health problems of depression, anxiety, somatic symptoms and social withdrawal. The present study used the original scoring method (Goldberg & Williams, 1988), with possible scores ranging between 0 to 12, where higher values indicated relatively severe psychological distress. The Chinese version of the GHQ-12 was reported to have good reliability and validity (Xiao et al., 1993), and has been used in studies conducted in disaster settings in China (Yuan et al., 2013; Xiaobo Zhou et al., 2015). The GHQ-12 scores evidenced good Cronbach's internal reliability coefficients at both times in this study (T1 α=0.84; T2 α=0.83).

Post-traumatic stress symptoms. Post-traumatic stress symptoms were assessed at T1 and T2 using the Chinese version of the PTSD Checklist-Civilian scale (PCL-C; Weathers, Litz, Herman, Huska & Keane, 1993; X. Yang, Yang, Liu & Yang, 2007). The PCL-C consists of 17 items that correspond to symptoms of PTSD as described in DSM-IV. Participants reported how much they had been bothered by each symptom in the last month, with responses ranging from not at all (1) to extremely (5). A severity score was calculated as the sum of raw scores, with values ranging between 17 and 85. The Chinese version of the PCL-C demonstrated good reliability and validity (X. Yang et al., 2007), and has been used broadly among Chinese disaster survivors (Hu, Xu, & Liu, 2018). The internal reliability coefficients of the PCL-C scores in this study were excellent (T1 α=0.93; T2 α=0.92).

Post-traumatic growth. Post-traumatic growth was examined with the Chinese version of the Post Traumatic Growth Inventory (PTGI), which was adapted for Chinese language and culture (Tedeschi & Calhoun, 1996; Zhou, Wu, An & Chen, 2014). The original 21-item scale includes five factors: new possibilities, relating to others, personal strength, spiritual change

and appreciation of life (Tedeschi & Calhoun, 1996). Considering cultural differences and the psychological status of disaster survivors, Zhou et al. (2014) added an additional item ('I have a better understanding of the existence of uncontrollable power') following their interviews with survivors of the 2008 Wenchuan earthquake. Responses were scored on a six-point scale ranging from 'no change' (0) to 'a great change' (5), with total scores ranging between 0 and 110. The Chinese version of the PTGI has been used in several studies conducted among Wenchuan earthquake survivors in China, and demonstrated good internal reliability and construct validity (Chen, Zhang & Cheng, 2018). The internal reliability coefficients of the scores on this 22-item PTGI were excellent (T1 α=0.91; T2 α=0.92).

2.6 Data analysis

As each study details its data analysis process, this section will summarise them briefly.

2.6.1 Data analysis of Study 1 and Study 2

All statistical analysis of the quantitative results was conducted using SPSS (version 25). Hierarchical multiple regression was used to test the research questions. A multicollinearity diagnosis was conducted before the hierarchical multiple regression in each study. Multicollinearity refers to a situation in which two or more explanatory variables in a multiple regression model are highly linearly related. The main problem caused by multicollinearity includes unstable and biased standard errors, leading to unstable p-values for assessing the statistical significance of predictors, resulting in unrealistic and untenable interpretations. There are two popular ways to measure multicollinearity: compute a coefficient of multiple determination for each independent variable, or compute a variance inflation factor (VIF) for each independent variable. If pairwise correlations exceed 0.7 or the VIF exceeds 10 then there is a problem with multicollinearity (Dormann et al., 2013). In the current study, a correlation matrix and VIF were calculated to test multicollinearity.

2.6.2 Data analysis of Study 3

Interviews were recorded by the first author and transcribed verbatim by two undergraduate students who lived in the disaster-affected area and were proficient with the local dialect. Computer-based qualitative data management software (NVivo 12) was then used to organize the data which was analysed in accordance with principles of inductive thematic analysis, which refers to a data-driven 'method for identifying, analysing and reporting patterns (themes) within data' (Braun & Clarke, 2006; p.79).

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Chapter 3 Social support following a natural disaster: A longitudinal study of survivors of the 2013 Lushan earthquake in China

Abstract

The idea that social support post-disaster is beneficial to survivors' mental health is widely accepted by both researchers and practitioners. However previous social support studies are mainly focused on perceived social support, and the limited received social support studies have produced mixed results. In this study we modelled the influence of both quantity and quality of received social support on long-term mental health outcomes in a longitudinal study of 2013 Lushan earthquake survivors in China. Survivors were invited to complete a questionnaire interview 7 months after the earthquake and were followed up 31 months later (n =161). Hierarchical regression analyses that controlled for disaster exposure variables showed that greater quality of social support received 7 months after disaster predicted lower levels of posttraumatic stress symptoms and psychological distress two years later, however quantity of received social support was not significant in predicting these two outcomes. These results remained robust when controlled for gender, negative life events and family financial status. The findings of this study suggest that what appears to be critical in the process of supporting disaster survivors is the quality, not necessarily the quantity, of support provided.

Keywords: Trauma; earthquake; posttraumatic stress; psychological distress

1. Introduction

Each year millions of people are affected by disasters resulting from both natural hazards and human activities. There is substantial evidence that disasters can lead to a range of mental health problems, such as posttraumatic stress disorder (PTSD), depression and anxiety (Bonanno et al., 2010; Cofini et al., 2015; Gigantesco et al., 2013;Kokai et al., 2004; Liang et al., 2019; Minardi et al., 2016; Norris et al., 2002; Xu et al., 2018). It has been generally assumed that post-disaster social support may buffer these negative consequences, however studies investigating the association between social support and mental health in the aftermath of disaster have produced inconsistent results. This inconsistency is partly due to the complex construct of social support (Kaniasty and Norris, 2004) with studies focusing on social support measuring received support (actual receipt of help; e.g., Cerda et al., 2013), social embeddedness (quality and type of relationships with others; Wyndol and Duane, 1985), perceived support (the belief that help would be available if needed; e.g. , Chan et al., 2015; Chang et al., 2014; Cherry et al., 2015; Feder et al., 2013; Ward et al., 2018), or a mixture of the above (Ren et al., 2015; Zhang et al., 2017).

Compared with other facets of social support, received social support is less frequently addressed in disaster studies and the pattern of the findings observed when relevant measures are included have been mixed. For example, a small number of relevant studies have suggested a beneficial role of actual support received on psychological well-being in disaster context (e.g., Cerda et al., 2013; Deković et al., 2008; Hussain et al.,2013; Norris and Kaniasty, 1996), while other studies have revealed no effects, or worse, documented positive associations between received support and increased mental health problems (e.g., Lowe et al., 2015; Morgan et al., 1995; Shiotani, 2014).

One key limitation of these prior disaster studies is that the social support instruments typically used assessed only the quantity (or frequency) of social support received. It may be

that other features of received social support also matter, such as what type of support is provided and when and how it is delivered, as well as other dimensions related to the broader concept of quality of received support. For example, one qualitative study found that except for insufficiency of aid, survivors also complained about support that was distributed unfairly, or in a delayed or conditional manner (Ibañez et al., 2003).

The concept of quality of received social support is the foundation of the social support effectiveness model (SSE, Rini and Dunkel Schetter, 2010; Rini et al., 2006), which was initially developed to improve understanding of the effectiveness of support received by pregnant women from their partners. The SSE model encompassed dimensions of both quantity and quality, and identified five features which underlie the effectiveness of received social support: needs matching in quantity, needs matching in type, the skilfulness /sensitivity of support delivering, the ease of obtaining support, and the extent to which received help might negatively influence recipients' self-concept. The SSE model provides a solid theoretical framework for assessing the effectiveness of social support but does not address all features important for support received in disaster context where substantial social support is provided by government or other organizations through intensive disaster aid distribution. In this context, research also suggests that dissatisfaction with aid distribution (such as unfairness or lack of transparency) predicts lower levels of subsequent social psychological well-being (Kaniasty, 2012). Thus, characteristics of the disaster aid distribution such as justice and fairness should also be considered in evaluating quality of received social support in disaster context.

The aim of this study was to examine the influences of both quantity and quality of received social support on mental health outcomes in a longitudinal study of earthquake survivors in China. It was conducted in the aftermath of a 7.0 magnitude earthquake that severely devastated Lushan County, Sichuan Province, China. The Lushan earthquake, which

struck on April 20, 2013, affected close to 2 million people and resulted in 196 deaths, 21 missing individuals, and more than 13,000 injured survivors.

2. Methods

2.1 Participants and procedure

The first survey (T1) was conducted 7 months after the disaster. Participants were recruited from four towns, two from the worst-hit disaster areas and two from less severely affected areas. Convenience sampling was used in each town and participants were recruited during a free influenza vaccination program for the entire geographical area that was affected by the earthquake. Individuals 18 years of age and older and who were at the disaster area when the earthquake occurred were invited to participate. A total of n = 199 survivors were recruited at the first survey. The respondents were interviewed face to face at meeting rooms of the hospitals where free influenza vaccination program was conducted.

The follow-up survey was conducted two years later, 31 months following the earthquake (T2). All the respondents participating at the first survey were invited via telephone before the study's entrance into the field. Those respondents who changed their phone numbers were contacted with help of local residents. Thirty-eight people were lost at the follow-up (i.e., 19% attrition rate), amounting to 161 completed interviews. The participants were interviewed face-to-face in their homes or at appropriate locales near their residences. Seven respondents (4%) could not be met in person and were interviewed via a telephone.

The research and ethics committees of Peking University Institute of Mental Health (reference number: 201531) and The University of Melbourne (reference number: 1544838) approved the study and all participants interviewed face-to-face were provided written

informed consent to participate in the study, for those interviewed by phone oral informed consent was used instead.

2.2 Measures

2.2.1 Mental health

Posttraumatic stress symptoms were assessed at both times of data collection (T1 - 7 months, and T2 - 31 months after the earthquake) using the PTSD Checklist-Civilian Version (PCL-C; Weathers et al., 1991). The PCL-C consists of 17 items that correspond to symptoms of PTSD as described in DSM-IV. Participants reported how much they have been bothered by each symptom in the last month, with responses ranging from *not at all* (1) to *extremely* (5). A severity score can be calculated as the sum of raw scores, with values ranging from 17-85. The internal reliability coefficients of the PCL-C scores in this study were excellent (T1 $\alpha = 0.93$; T2 $\alpha = 0.92$).

Psychological distress was measured using the 12-item General Health Questionnaire (GHQ-12; Cheng et al., 1990) at 7 months and 31 months after the earthquake (T1 & T2). The GHQ-12 is a widely used instrument assessing common mental health problems of depression, anxiety, somatic symptoms and social withdrawal. The present study used the original scoring method (Goldberg and Williams, 1988), with possible scores ranging from 0 to 12, where higher values indicate relatively severe psychological distress. The GHQ-12 scores evidenced good Cronbach's internal reliability coefficients at both times in this study (T1 $\alpha = 0.84$; T2 $\alpha = 0.83$).

2.2.2. Quantity of received social support

Quantity of received social support was assessed using an instrument modelled on the Inventory of Post-Disaster Social Support (IPSS, Kaniasty and Norris, 2000; Norris et al., 2001). The scale included 14 items that asked how often different types of support were received since the earthquake (until the day of interviews), and were scored on a 4-point scale

(1 = *almost never*, 2 = *rarely*, 3 = *often*, 4 = *very often*), with values ranging from 14-56. This scale was administered at the first survey, and assessed social support received in the 7-month period since the earthquake. Instructions explained that helping acts referenced in the measure could have been provided by anyone in their social network (i.e., the source of support was not specified), and did not have to be related directly to the disaster. Items addressed four types of support received: tangible support (5 items, e.g., "offered or provided place to stay or helped you repair your house"); emotional support (3 items, e.g., "was comforted with physical affection"); informational support (3 items, e.g., "was helped with understanding a situation"); and companionship support (3 items, e.g., "was invited to have fun together"). The internal consistency reliability of this scale was .87, with higher scores indicating greater amounts of received social support (*Mean* = 30.04; *SD* = 7.85).

2.2.3. Quality of received social support

The quality of received social support was measured using a scale that was developed for this study and covered multiple features of the content and distribution of social support. These included facets which were drawn from Rini and Dunkel Schetter's SSE model (Rini and Dunkel Schetter, 2010; Rini et al., 2006), and addressed the quantity, easiness, needs matching and skilfulness of received support. Additional facets addressed the fairness, timeliness and conflicts encountered while receiving aid, and were based on studies of receiving social support in the context of disaster aid distribution (e.g., Kaniasty, 2012).

The scale comprised of 12 items which were scored on a 5-point response scale (1 = *never*, 2 = *seldom/rarely*, 3 = *sometimes*, 4 = *often*, 5 = *very often*), with a range of total (sum) values between 12 and 60. The questions referred to the adequacy of the amount of support received (2-items, e.g., "…the amount of help you received after the earthquake was not enough for your needs), ease of obtaining this support (3-items , e.g., "…getting the help you needed was just too difficult to accomplish"), the extent to which aid matched their

needs (2-items, e.g., "…the help you received matched in terms of what you needed, that is, the type of help you received was what you wanted, it was what you needed"), skilfulness with which it was provided (one item, "…the help you received from others was provided skilfully and sensitively, that is, in such a way that you did not feel uncomfortable for needing it"), perceived fairness (one item, "…you were treated unfairly"), timeliness of provision (one item, "…the help you needed arrived too late for it to be useful"), and presence of conflicts while receiving support (2-items, e.g., "…involved in conflicts or disagreements in the process of receiving post-disaster aid"). This scale was administered at the follow-up survey, but the participants were asked to retrospectively appraise the quality of support received in the first 7 months after the earthquake. Hence, the measurements of both the quality and the quantity of received social support referenced the same timeframe of disaster aftermath. The internal reliability of this scale was .75, with higher scores indicating greater quality of received social support (*Mean* = 44.55; *SD* = 7.23).

2.2.4. Disaster exposure

The experience of disaster was assessed with two indices administered at the first survey time point (7 months after the earthquake). The index of earthquake trauma exposure, scored from 0 to 5, was based on answers to five questions: (1) being injured, (2) being trapped in the rubble, (3) death of a family member/other close person, (4) injury to a family member/other close person, and (5) whether there were things that made you feel guilt or regret. Answers were recoded as "0" (No) and "1" (Yes) (*Mean* = 0.56; *SD* = 0.52).

The second index of disaster exposure, a measure of material losses, was comprised of five items that asked respondents to appraise their earthquake losses in terms of: (1) damage to their apartment/home; (2) income/financial losses; (3) employment-related stoppages/job loss; (4) getting into financial debt due to reconstruction needs; and (5) the extent to which material losses were more (or less) severe as compared to other survivors.

Responses to these items ranged from 0 to 2, and were aggregated into a sum score representing an assessment of material losses (*Mean* = 5.76; *SD* = 2.61).

2.2.5. Covariates

Two covariates of mental health and social support used in additional analyses were collected at the follow-up survey (31 months after the earthquake). Family financial status was assessed using a single-item 6-point scale, asking participants to rate their financial situation considering the context of their current needs and financial responsibilities (1= very poor, 6 = prosperous; *Mean* = 2.80; *SD* = 0.87). Negative life events were assessed using a 13-item checklist (Li et al., 2008), referencing events that occurred within the past year of the follow-up survey, or earlier if they still had an impact on the participants' lives. The checklist covered: (1) Love or marriage issues; (2) Fertility issues; (3) Conflicts with a partner; (4) Conflicts with other family members; (5) Conflicts with people outside of family; (6) Conflicts among family members but not involving the respondent; (7) Illness or serious injury to self; (8) Economic issues; (9) Work or study issues; (10) Serious illness or death of family members or close friends; (11) Being physically abused; (12) Being sexually abused; and (13) Other negative life events. The items were combined into an index of total number of negative life events (range 0 - 13; *Mean* = 1.40; *SD* =1.47).

2.3. Data analysis

The unique influences of quantity and quality of received social support on posttraumatic stress symptoms and psychological distress, respectively, were examined using hierarchical multiple regression analyses in SPSS version 25. Posttraumatic stress and psychological distress symptoms, measured at 31 months after the earthquake, were the outcome variables in two separate models which utilized the same sets of predictors. Predictor variables were entered in a series of stages. The mental health scores, posttraumatic stress or psychological distress symptoms, collected at 7 months after the earthquake (T1)

were specified in the initial stage to estimate stability effects. Second, measures of disaster exposure were subsequently entered to account for their share of the variance in the outcome variables. Measures of quantity of received social support and quality of received social support were then specified in the third and fourth stages, respectively, in order to examine the unique influences of these variables. Finally, the interaction between quantity and quality of received social support were entered in a fifth stage to estimate potential moderation effects (i.e., to examine whether the influence of quantity of received social support on post-disaster mental health varied by the quality of received social support). The constituent variables for interactions were centred before the interaction terms were computed as their cross-products (Aiken et al., 1991). Subsequent analyses also examined whether results from the aforementioned models differed when the equations included gender, negative life events and family financial situation as control variables.

3. Results

3.1. Sample

The follow-up sample (n = 161) was predominantly female (n = 108, 67%), aged between 20 and 76 years old (*Mean* = 41.61, *SD* = 12), and the participants completed 8.8 years of education on average (*SD* = 3.95; range: 0 – 18 years).

The non-responders of the follow-up survey were not significantly different from the remaining participants in terms of age (t_{197} =1.31, p = 0.19), years of education (t_{197} =-0.91, p = 0.36), and gender (x^2_{199} =0.59, p = 0.44), baseline PTSD (t_{197} =0.46, p = 0.31), and baseline GHQ (t_{197} =-0.22, p = 0.42). However, the participants who did not complete the follow-up survey suffered lower material losses than the completers (t_{197} =-2.67, p = 0.058), experienced less earthquake trauma (t_{197} = -2.27, p < 0.001), and received less social support (t_{197} =-1.58, p = 0.04).

3.2. Mental health change

Paired t-tests indicated that PCL-C scores declined significantly from 7 months after the earthquake (M = 34.25, SD = 12.29) to 31 months after the earthquake (M = 29.98, SD = 11.64), t (160) = 5.01, p < 0 .001), for the sample as a whole. Likewise, GHQ scores declined significantly between 7 months (M = 4.10, SD = 3.07) and 31 months following the earthquake (M = 2.57, SD = 2.77), t (160) = 6.73, p < 0. 001.These findings indicate improvements in survivors' mental health over time.

3.3. Regression analyses

Results from the regression models of both posttraumatic stress symptoms and psychological distress are shown in Table 3.1. Tests to examine if the data met the assumption of collinearity indicated that multicollinearity was not a concern (T1 PCL-C, VIF=1.31; Earthquake trauma, VIF=1.11; Material losses, VIF=1.22; Support quantity, VIF=1.22; Support quality, VIF=1.30; Interaction, VIF=1.06). The final model of posttraumatic stress scores as the outcome variable with five predictor variables and an interaction explained 42.2% of the variance in symptoms assessed 31 months after Lushan Earthquake, *adjusted* R^2 = .400, F(6, 153) = 18.65, p < .001. Posttraumatic stress symptoms 7 months after the earthquake (Step 1) accounted for 35.3% of the variance in PCL-C scores, F(1, 158) = 86.07, p < .001, indicating rank-order stability in posttraumatic stress symptoms over time. Earthquake trauma and material losses entered at Step 2 explained an additional 5.2% of the variance in PCL-C scores, above the stability effect, F(2, 156) = 6.76, p = .002, and suggested that survivors who experienced greater disaster exposure reported more symptoms of posttraumatic stress.

Later stages of the hierarchical regression revealed that quantity of received social support (Step 3) did not uniquely predict posttraumatic stress symptoms 31 months after the earthquake, when controlling for stability effects and disaster exposure. In contrast, quality of

received social support (Step 4) was significantly associated with change in posttraumatic stress and accounted for an additional 1.8% of the variance (above and beyond other predictors including the quantity of received social support), $F(1, 154) = 4.78$, $p = .03$. This suggests that survivors reporting greater quality of support received after the disaster exhibited greater reductions in posttraumatic stress symptoms over time. The interaction between quantity of received social support and quality of received social support did not account significantly for PCL-C scores assessed at 31 months after the earthquake. Follow-up regression analyses that included additional control variables (gender, negative life events and family financial status) showed that the effect of quality of received social support on posttraumatic stress symptoms was slightly reduced, yet it was still marginally significant ($\beta = - .141$, $p = .058$), and the nature of the association was substantively unchanged.

In terms of the psychological distress symptoms prediction model, tests for multicollinearity indicated that a very low level of multicollinearity was present (T1 GHQ, VIF=1.24; Earthquake trauma, VIF=1.08; Material losses, VIF=1.19; Support quantity, VIF=1.24; Support quality, VIF=1.29; Interaction, VIF=1.05), and the assumption of multicollinearity was deemed to have been met. The final model of psychological distress symptoms with five predictors and an interaction explained a total of 34.3% of the variance in GHQ-12 scores assessed at 31 months after the earthquake, adjusted $R^2 = .317$, $F(6, 153) = 13.30$, $p < .001$. GHQ-12 scores assessed at 7 months after the earthquake were significantly related to GHQ-12 scores assessed at 31 months after the earthquake, $\Delta R^2 = .271$, $F(1, 158) = 58.82$, $p < .001$. Earthquake trauma and material losses did not significantly explain the variance in the outcome variable, $\Delta R^2 = .008$, $F(2, 156) = 0.85$, $p = .43$.

Quantity of received social support (Step 3) was not found to significantly predict psychological distress 31 months after the earthquake, $\Delta R^2 = .000$, $F(1, 155) = 0.003$, $p = .96$. In contrast, quality of received social support (Step 4) was a significant predictor and

accounted for an additional 6.0% of the variance in GHQ-12 scores assessed at 31 months after the earthquake, $F(1, 154) = 6.34$, $p < .001$. Survivors receiving social support of higher quality reported reduced levels of psychological distress over time. The interaction of quantity of received social support and quality of received social support (Step 5) was not statistically significant. Follow-up regression analyses that included additional control variables indicated that the effect of quality of received social support on psychological distress was slightly reduced but remained statistically significant ($\beta = -.182$, $p = .018$).

4. Discussion

This study examined the prospective relationships involving two most important dimensions of received social support and mental health in the aftermath of a major earthquake in China. The results indicated that higher levels of quality, but not quantity, of social support received by earthquake victims within the first 7 months following the disaster predicted lower levels of posttraumatic stress symptoms and psychological distress assessed 31 months after the earthquake. These effects of quality of received social support were observed when accounting for mental health 7 months following the disaster (and thus stability effects), disaster exposure, and the quantity of received social support. Substantively the same findings were observed when control variables - gender, negative life events, and family financial status - were included in the equations.

To the best of our knowledge, this is the first theoretically based study that has explicitly assessed quality of received social support in a disaster context, by measuring both quantity and quality of received social support. This study can therefore provide a greater understanding of the impact of received social support on post-disaster mental health. That is, rather than “how much” of support is received, the key ingredients of the beneficial function of support receipt on psychological health are the ease of access to it, its adequately meeting the needs of the recipients, skilfulness and sensitivity of its delivery, and fairness and

timeliness of received provisions. Several of these key dimensions have been noted in previous disaster research (Kaniasty and Norris, 2009; Kaniasty, 2012).

Our findings are partly congruent with results reported by Rini and her colleagues (2011), who found that hematopoietic stem cell transplant survivors reported less mental health problems when they received more effective partner support (i.e., main effect of support quality). On the other hand, however, the potential moderating function of quality of social support in the link between support quantity and mental health, stipulated by the Social Support Effectiveness model (SSE, Rini and Dunkel Schetter, 2010), was not supported by the current findings. Rini et al. (2011) found that when received support was appraised as effective, the quantity of support received by trauma survivors was not associated with distress. Interestingly in their study, when partner support was ineffective, receiving greater quantities of support predicted elevated distress (i.e., support quantity by quality interaction). It has to be recognized that the two studies examined different stressors (community disaster versus personal illness), assessed different sources of support (help from all sources versus help from a partner), as well as were conducted in different cultural contexts (China versus USA). More studies are needed to explore the potentially complex associations involving quantity and quality of received social support and diverse indicators of mental health over time for survivors of different types of stressful and traumatic events.

The quality of social support received in the first 7 months after an earthquake served a unique protective function for survivors' mental health 31 months after the event. This finding offers clear implications for researchers, practitioners, disaster relief agencies and governmental institutions. What appears to be critical in the process of supporting disaster survivors is the quality, not just the quantity, of support provided. Typically, the first responders and disaster relief agencies attempt to distribute support quickly and fairly, but things may not occur as intended due to bureaucratic processes and pace and formality of the

relief system. Disappointments, frustrations, and even conflicts are common in the aftermath of disasters, partly due to the fact that even generous aid may be distributed in ways that undermine its effectiveness (Kaniasty, 2012; Kaniasty and Norris, 2009). This observation applies also to informal support networks such as relatives, friends, and personal acquaintances. Much can be done to improve the manner of support delivery to survivors. Distributing adequate amount of aid in a timely, sensitive, nonthreatening and respectful way is critical for survivors' subsequent psychological and social well-being. Disaster aid distribution strategies should be carefully designed to be fair, transparent, and readily accessible to all affected. It is also important for practitioners to monitor disagreements and conflicts that may surface during the aid distribution processes, and to deal with them timely and confidently. More studies are needed to further examine which facets of the effectiveness of received social support are most beneficial in protecting survivors' mental health.

Major methodological limitations of the study should also be noted. The external validity of the findings are limited by unique characteristics of the sample; for example, it is a convenience sample, respondents were predominately women who were recruited from community clinics offering influenza vaccinations. It is unlikely that this sample was representative of all survivors of the Lushan earthquake, or victims of other disasters in China. Like all longitudinal studies, the current sample was further affected by sample attrition; the drop-out participants reported lower material losses than completers, experienced less earthquake trauma, and received less social support. A few participants had to be interviewed by telephone. Our measures of quantity and quality of received support effectiveness, although modelled on empirically established instruments, had not been validated prior to data collections. Although not unusual for social support appraisals, both the quantity and the quality of received support were assessed without referencing the source of provisions (e.g., family, friends, and people outside respondents' immediate support

circle). The source distinctions are important for social support theory and interventions. Most importantly, however, the two dimensions of received social support were assessed at different times of data collection, whereby the quantity of received support was measured at 7 months after the earthquake, while the quality of support was measured at 31 months after the earthquake (2 years later). Nevertheless, the participants in both cases were asked to reflect retrospectively on help they received in the first 7 months after the earthquake.

In conclusion, this study demonstrated the protective function of quality of social support received in the first 7 months after an earthquake for survivors' posttraumatic stress symptoms and psychological distress assessed 31 months after the event. Quantity of received social support, on the other hand, was not found to be a significant predictor for posttraumatic stress symptoms and psychological distress. These findings indicate that what appears to be critical in the process of supporting disaster survivors is the quality, not necessarily the quantity, of support provided.

Conflicts of interest

None declared.

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Table 3.1

Predicting Posttraumatic stress symptoms and Psychological distress 31 months after 2013 Lushan Earthquake: Summary of Multiple Hierarchical Regression Analysis

	T2 PTSD				T2 GHQ			
	Hierarchical Model[a]			Final Model[b]	Hierarchical Model[a]			Final Model[b]
Predictors	β	t	ΔR^2	β	β	t	ΔR^2	β
Step 1-T1 PTSD/GHQ	.59	9.28***	.353***	.46***	.52	7.67***	.271***	.45***
Step 2			.052**				.008	
Earthquake trauma	.17	2.71**		.18**	.07	0.94		.08
Material losses	.15	2.14*		.13^{+}	.05	0.74		.02
Step 3 - Quantity of received social support	-.01	-0.17	.000	.04	.004	0.05	.000	.08
Step 4 - Quality of received social support	-.15	-2.19*	.018*	-.15*	-.27	-3.75***	.060***	-.26***
Step 5 - Quantity X Quality	-.008	-0.12	.000	-.008	.06	0.88	.003	.06

Note. $N = 161$. $^{+}$ $p \leq .06$, * $p \leq .05$, ** $p \leq .01$, *** $p \leq .001$.

[a] The entries are standardized (β) regression coefficients and corresponding t-values obtained when the variables was first entered, and R^2 changes for each block of the multiple hierarchical regressions equation. [b] The entries are standardized (β) regression coefficients obtained in the final block of the multiple regression equation when all predictor variables were entered.

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Chapter 4 The impact of received social support on posttraumatic growth after disaster: The importance of both support quantity and quality

Abstract

Objective: Few studies have investigated the relationship between received social support (actual help received) and posttraumatic growth (PTG), and these studies only focussed on the quantity of support received. This study examined the joint implications of both the quantity and quality of post-disaster received social support for PTG. ***Method:*** Data were collected from Lushan earthquake (China, 2013) survivors at seven (n =199) and 31 months after the earthquake (n =161). The main effects of quantity and quality of received support, and the interaction between support quantity and support quality, were examined using hierarchical multiple regression analyses controlling for the extent of disaster exposure, post-disaster negative life events and sociodemographic factors. ***Results:*** Neither quantity nor quality of received social support exerted significant main effects on posttraumatic growth. However, the influence of the amount of received social support on PTG was moderated by the quality of received social support. Among survivors who appraised the post-disaster social support they received as higher in quality, greater amounts of received support were associated with more subsequent posttraumatic growth. Among those survivors who appraised the post-disaster social support they received as lower in quality, greater quantity of received support was associated with lower levels of reported posttraumatic growth. ***Conclusion:*** This study calls attention to the importance of enhancing the quality of help provided to disaster survivors because simply "more" support is not necessarily better.

Clinical Impact Statement

This study shows that receiving efficacious social support following potentially traumatic events may promote emergence of psychological benefits and advantageous transformations. Receiving help from others may facilitate posttraumatic growth but it is its quality that matters the most. Received social support that does not adequately meet survivors' specific needs, that is not delivered skilfully, and/or in a timely fashion, could be potentially disadvantageous for the experience of posttraumatic growth. Thus, both informal and formal post-disaster relief efforts and interventions should aim to enhance the quality of social support delivered, along with their attention to the adequacy of the amount of help offered.

Keywords: Disaster; posttraumatic growth; received social support; quality of help

The potential adverse mental health consequences of exposure to traumatic events are well documented, with the most common conditions reported being posttraumatic stress disorder (PTSD), depression, and broader anxiety disorders and substance use disorders (e.g., Bonanno, Brewin, Kaniasty, & LaGreaca, 2010; Bryant et al., 2014). However, it is increasingly recognized that those exposed can also experience positive changes that go beyond of pre-trauma status in some areas, which can include greater appreciation of life, spiritual changes, increased personal strength, identifying new possibilities, and improved interpersonal relations (Tedeschi & Calhoun, 2004). Such changes can be conceptualized in terms of posttraumatic growth (PTG, Tedeschi & Calhoun, 2004), which has been documented in the context of various traumatic circumstances including life-threatening physical illnesses (e.g., Rzeszutek & Gruszczyńska, 2018), sexual violence (e.g., Ulloa, Guzman, Salazar & Cala, 2016) and disasters (e.g., Bernstein & Pfefferbaum, 2018).

According to Tedeschi and Calhoun (2004), social support plays an important role in facilitating posttraumatic growth by providing a way to craft narratives "through the provision of new schemas related to growth, and the empathetic acceptance of disclosures about the traumatic event and about the growth-related themes" (p.12). Although there are large numbers of PTG studies examining the global construct of social support, generalizations based on these results should be made with caution because different facets of social support are typically assessed. Kaniasty and Norris (2009) identified three different facets of support: social embeddedness (frequency and types of relationships with others); received support (actual help received); and perceived support (the belief that help would be available if needed). Distinctions between the different facets of support have been identified by empirical studies, with each facet found to contribute uniquely to psychological outcomes (e.g., Guilaran, Terte, Kaniasty & Stephens, 2018; Kaniasty & Norris, 2009). As almost customary in the stress and coping research area, perceived social support has been the main social support facet investigated in PTG studies (e.g., Du et al.,

2018; Dursun, Steger, Bentele & Schulenberg, 2016; Leppma et al., 2018; Sattler, Assanangkornchai, Moller, Kesavatana-Dohrs, & Graham, 2014). However, this primary focus on perceived social support runs contrary to the interest in social support as a malleable resource for psychosocial intervention programs. Researchers have thus called for an increased emphasis on received social support to better inform the development of support-based interventions (Dunkel-Schetter & Bennett, 1990; Kaniasty & Norris, 2009).

The limited number of studies that have investigated the relationship between received social support (actual help received) and PTG have produced mixed results. Two studies reported that received social support was a significant predictor of positive psychological changes among people living with HIV (Rzeszutek, Oniszczenko, & Firlag-Burkacka, 2017) and cancer patients (Schulz & Mohamed, 2004). However, two studies of Hurricane Katrina survivors living with HIV and ovarian cancer patients found that received support did not predict overall PTG, and it was only positively correlated with one PTG dimension ("relating to others") (Cieslak, et al., 2009; Hill & Watkins, 2017). Investigations examining specific functional subtypes of received social support (e.g. informational support, emotional support, instrumental support, etc.) have also produced inconsistent results. For example, received emotional support was found to be a significant predictor of PTG in one cross-sectional study (Kamen et al., 2016) and in one longitudinal investigation (Schroevers, Helgeson, Sanderman, & Ranchor, 2010). In contrast, another cross-sectional study of stem cell transplant patients found that emotional support received from partners did not predict PTG, whereas received instrumental support was related to PTG (Nenova, DuHamel, Zemon, Rini, & Redd, 2013). It is worth noting that only one of the aforementioned studies was conducted in the disaster context (Cieslak, et al., 2009).

Importantly, these studies have all focussed on the quantity or amount of support received, and have not considered other features of support attempts, such as what type of support is provided or when and how it is delivered. Social support with different features may vary largely in its effects.

In fact, social support investigations have reported on occasion that received social support may also lead to negative unintended outcomes for recipients such as a sense of embarrassment, resentment, concerns about reciprocity, low self-esteem, feelings of dependency or incompetence (e.g., Dunkel-Schetter & Bennett, 1990; Newsom, 1999; Ullman & Filipas, 2001). Thus at times, receiving support could appear to be a "mixed blessing" (Gleason, Iida, Shrout, & Bolger, 2008; Mcclure et al., 2014). The recognition of potential liabilities of actual exchanges of social support has led to a pressing need for more complex considerations of both its quantity and quality. Rini and Dunkel Schetter (2010) have proposed a social support effectiveness model which delineated five characteristics of effective received social support that can inform the conceptualization and measurement of support quality. These features include: (1) the extent to which received help matches needs in quantity; (2) the extent to which received help matches needs in type; (3) the skilfulness/sensitivity of support delivery; (4) the easiness of obtaining support; and (5) the extent to which received help is free of negative emotional liabilities for the recipients.

Our research has previously demonstrated the importance of quality of post-disaster received social support among earthquake survivors where greater quality of social support received predicted lower levels of posttraumatic stress symptoms and psychological distress (Shang et al., 2019). As a next step, the current analyses of these longitudinal data considered the joint implications of both quantity and quality of post-disaster received social support for PTG. Specifically, this investigation sought to: 1) examine whether the quantity of social support received in the aftermath of disaster would predict change in PTG over time; 2) evaluate whether the quality of social support received in the aftermath of disaster would predict PTG; and 3) assess a joint effect of both characteristics of post-disaster help receipt, whereby the influence of quantity of support received on PTG would be conditional on the quality of social support received.

These objectives were addressed in a longitudinal model that examined change in PTG over time, controlling for key covariates reflecting socio-demographic factors (gender, education), the

extent of disaster exposure (experience of trauma, material losses), and survivors' post-disaster life context (financial status, negative life events).

Method

Participants and Procedure

This longitudinal study was conducted in the aftermath of a 7.0 magnitude earthquake that severely devastated Lushan County, Sichuan Province, China. The Lushan earthquake, which struck on April 20, 2013, affected close to 2 million people and resulted in 196 deaths, 21 missing individuals, and more than 13,000 injured survivors.

The first assessment (T1) for this study was conducted seven months after the disaster. Participants were recruited from four towns, two from the worst-hit disaster areas and two from less severely affected settings. Convenience samples of people aged 18 years or older were recruited in each site during a free influenza vaccination program that was offered to the entire geographical area affected by the earthquake. In total, 212 people were approached to take part in the study; two people declined because of lack of time, one person did not finish the whole survey due to a sudden emergency, while another 10 people were excluded because they were not in the disaster area during the earthquake. All the 199 participants who completed the first wave of the data collection (T1) were interviewed face-to-face with a questionnaire administered by trained interviewers. The participants received minor monetary compensation as a token of appreciation for their time. Research procedures were reviewed and approved by ethics committees (Peking University, China; University of Melbourne, Australia), and the study was conducted in accordance with the ethical criteria for social research.

The sample was followed-up two years later which was 31 months after the earthquake, and 161 people (80.9% response rate) completed this second assessment which mainly involved face-to-face interviews (7 participants were interviewed via telephone). The T2 responders were

predominantly female (*n* = 108, 67%), aged from 20 to 76 years (*Mean* = 41.61, *SD* = 12), and with an average of 8.8 years of completed education (*SD* = 3.95; range: 0 -18 years).

Measures

Posttraumatic Growth (PTG)

PTG was assessed with the Chinese version of the Posttraumatic Growth Inventory (Tedeschi & Calhoun, 1996), which was adapted for Chinese language and culture by Chen and colleagues (Chen, Zhang, & Cheng, 2018). The original 21-item scale includes five factors: new possibilities, relating to others, personal strength, spiritual change, and appreciation of life (Tedeschi & Calhoun, 1996). Considering cultural differences and the psychological status of disaster survivors, Chen and colleagues added an additional item ("I have a better understanding of the existence of uncontrollable power.") following their interviews with survivors of the 2008 Wenchuan earthquake. Responses were scored on a 6-point scale ranging from "no change" (= 0) to "a great change" (= 5), with total scores ranging from 0 to 110. This 22-item Chinese version demonstrated robust psychometric properties in both reliability and validity (Chen et al., 2018). The internal reliability coefficients of the scores of this scale in the present study were also high (T1 α = 0.91; T2 α = 0.92).

Quantity of Received Social Support

Amount of received social support was measured at T1 using an instrument modelled on the Inventory of Post-Disaster Social Support (Norris, Murphy, Kaniasty, Perilla, & Ortis, 2001; Shang et al., 2019). The assessment involved 14 items measuring the frequency of specific social support acts received in the seven-month period since the earthquake. The social support acts referenced by the scale could have been provided by anyone (i.e., the source of support was not specified), and did not have to be related directly to the disaster experience (e.g. "How often you were provided with place to stay or be helped with housing repairs"). Respondents were asked to offer their answers on a 4-point Likert-type scale (1 = almost never, 2 = rarely, 3 = often, 4 = very often). Four types of

support received were assessed: tangible support (5 items), emotional support (3 items), informational support (3 items), and companionship support (3 items). A higher score of this scale indicated greater quantities of received social support, and its internal consistency reliability coefficient was 0.87.

Quality of received social support

The quality of received social support was measured at T2 with a 12-item scale developed by the authors that covered multiple features of the content and distribution of social support (Shang et al., 2019). The scale was administered at T2 but the participants were asked to retrospectively report on social support received in the first seven months following the earthquake. That way, the assessment time-frames for the reports of the quantity and quality of received social support were consistent.

The scale addressed seven dimensions of support delivery: adequacy, easiness, needs matching and skilfulness of received support (based on the SSE model; Rini & Dunkel Schetter, 2010), as well as fairness, timeliness and conflicts encountered while receiving aid. These additional dimensions were developed by the authors based on previous post-disaster social support studies (e.g., Kaniasty, 2012). Items were scored on a 5-point response scale (1 = never, 2 = seldom/rarely, 3 = sometimes, 4 = often, 5 = very often), with total (summed) scores ranging from 12 to 60. By way of illustration, questions referenced the adequacy of the amount of support received (2 items, e.g., "…the help you received match the amount of aid that you needed? That is, the amount of aid was not too little or too much, it was just right"), ease of obtaining support (3 items, e.g., "…getting the help you needed was just too difficult to accomplish"), the extent to which aid matched their needs (2 items, e.g., "…the help you received matched in terms of what you needed, that is, the type of help you received was what you wanted/needed"), skilfulness with which it was provided (1 item, "…the help you received from others was provided skilfully and sensitively, that is, in such a way that you did not feel uncomfortable for needing it"), perceived fairness (1 item, "…you were

treated unfairly"), timeliness of provision (1 item, "…the help you needed arrived too late for it to be useful"), and presence of conflicts while receiving support (2 items, e.g., "…involved in conflicts or disagreements in the process of receiving post-disaster aid"). The internal reliability of the score on this scale was 0.75, with higher scores indicating greater quality of received social support.

Disaster exposure

Disaster experience was assessed with two indices measured at T1. The first was an index of earthquake trauma exposure scored from 0 to 5, based on answers to five questions about experiences during and after the earthquake: (1) being injured, (2) being trapped in the rubble, (3) death of a family member/other close person, (4) injury to a family member/other close person, and (5) whether there were things that made you feel guilt or regret. Answers were recoded as "0" (No) and "1" (Yes). Sixty-one percent of respondents (n = 121) did not report any trauma, 27% (n = 53) experienced moderate trauma (scored 1), and 18% (n = 25) of them reported the experience of high trauma (scored 2 or above).

The second disaster exposure indicator appraised the level of material losses which were assessed with five Likert-scale items that asked about: (1) damage to the apartment/home; (2) income/financial losses; (3) employment-related stoppages/job loss; (4) getting into financial debt due to reconstruction needs; and (5) the extent to which material losses were more (or less) severe as compared to those experienced by other survivors. Responses to these items ranged from 0 to 2 (0 = low, 1 = moderate, 2 = high) and were combined to form a total score ranging from 0 to 10, with higher scores indicating greater material losses. Twenty-seven percent of respondents (n = 54) scored less than or equal to 4, 31% (n = 61) scored 5 or 6, 27% (n = 54) scored 7 or 8, and 15% of them (n = 20) scored 9 or 10.

Covariates

Sociodemographic characteristics included: gender, education in years of schooling, and current economic status. Family economic status was measured at T2 using a single-item asking participants to appraise their family's economic standing in relation to their current needs and financial responsibilities (1= very poor to 6 = prosperous).

Negative life events were assessed at T2 using a 13-item checklist (Li et al., 2008) referencing events that might have happened within the past year, or earlier if the respondents believed that a particular event still had an impact on their lives. They included: (1) love or marriage issues; (2) fertility issues; (3) conflicts with a partner; (4) conflicts with other family members; (5) conflicts with people outside of family; (6) conflicts among family members but not involving the respondent; (7) illness/serious injury to self; (8) economic issues; (9) work or study issues; (10) serious illness or death of family members or close friends; (11) physical abuse; (12) sexual abuse; and (13) other negative life events. The items were combined into an index of total number of negative life events (range 0 – 13).

Data analysis

The influences of the quantity and quality of received support on PTG were examined using hierarchical multiple regression analyses in SPSS version 25. The outcome variable was the PTGI total score assessed 31 months after the earthquake (T2). In the first step of the regression model, the T1 PTGI score was entered in order to estimate stability effects for PTG. The second step included gender and education. Next, both disaster exposure measures, earthquake trauma and material losses, were entered together to account for the impact of disaster experience on PTG. Step four included T2 negative life events and T2 family financial situation. Measures of quantity of received social support and quality of received social support were then entered in the fifth and sixth step, respectively. Finally, the interaction term (step 7) examined whether the influence of quantity of received social support varied by the quality of received social support. The constituent

variables were centred before the interaction term was computed as their cross-product (Aiken & West, 1991). The nature of the interaction effect was examined using PROCESS, a computational tool for path analysis–based moderation analysis through bootstrapping (Hayes & Andrew, 2013).

Results

Preliminary analyses

Missing data analyses showed that non-completers (n = 38) were not significantly different from the completers with respect to age, $t(197) = 1.31$, $p = .19$, years of education, $t(197) = -0.91$, $p = .36$, and gender, $\chi^2(1, N = 199) = 0.59$, $p = .44$. However, compared with the completers, the participants lost to follow-up at T2 experienced less material earthquake losses, $t(197) = -2.67$, $p = .058$, experienced less earthquake trauma, $t(197) = -2.27$, $p < .001$, and received less social support, $t(197) = -1.58$, $p = .04$.

Gender comparisons were conducted on scores of T1 PTG, T2 PTG, quantity of received social support, and quality of received social support. The difference between women (*Mean* = 52.51, *SD* = 20.18) and men (*Mean* = 47.06, *SD* = 20.00) in T1 PTG total scores were marginally significant; $t(197) = 1.81$, $p = .07$. There were no mean differences by gender on the scores of T2 PTG, quantity of received social support, and quality of received social support. Correlations of all variables and their descriptive statistics are presented in Table 4.1, with the independent variables not highly correlated with each other, Variance Inflation Factor (VIF) values indicated that the data did not present multicollinearity issues. Other assumptions of hierarchical regression analysis were also tested and no violations were found.

Regression analyses

The results of the hierarchical regression analysis are summarized in Table 4.2. All nine predictor variables and one interaction explained a total of 26.2% of the variance in PTG assessed 31 months after Lushan Earthquake, *adjusted* $R^2 = .212$, $F(10, 149) = 5.29$, $p < .001$. T1 PTG accounted for 3.8% of the variance in T2 posttraumatic growth scores, $F(1, 158) = 6.25$, $p = .013$,

indicating rank-order stability over time. Gender and education (Step 2) together explained 7.9% of the variance in PTGI scores, $F(2, 156) = 6.98$, $p = .001$, with greater years of education being significantly associated with increased PTG. Disaster exposure indices entered in Step 3 accounted for an additional 6.2 % of the variance, $F(2, 154) = 5.85$, $p = .004$, with greater earthquake trauma significantly predicting greater levels of posttraumatic growth. At Step 4, T2 family financial status and negative life events made additional contributions, $\Delta R^2 = .052$, $F(2, 152) = 5.16$, $p = .007$, with better financial status being associated with higher posttraumatic growth sores. Quantity of received social support was not significantly related to T2 PTG (Step 5), $\Delta R^2 = .001$, $F(1, 151) = 0.28$, $p = .60$. Likewise, the quality of received social support (Step 6) did not make an significant contribution to explaining the variance in T2 PTG scores, $\Delta R^2 = .002$, $F(1, 150) = 0.43$, $p = .513$. However, the interaction between the quantity and quality of post-disaster received support reliably explained 2.7% of the variance in the outcome, $F(1, 149) = 5.38$, $p = .022$.

The nature of the interaction effect was examined using the PROCESS procedure for SPSS (Release 2.11; Hayes, 2013), which also revealed this effect to be significantly significant, $F(1, 149) = 4.66$, $p = .032$. PROCESS was also used to calculate simple slopes and to plot the interaction, which is displayed in Figure 4.1. Among survivors who received high quality support (one standard deviation above the mean), there was evidence that support quantity was positively associated with more PTG ($\beta = .47$), whereas among survivors reporting receiving low quality support (one standard deviation below the mean) there was evidence that support quantity was negatively associated with PTG ($\beta = -.48$).

Discussion

This longitudinal study investigated the influence of received social support on PTG in the aftermath of a devastating natural disaster in China. Specifically, we examined whether both quantity and quality of social support received in the first seven month after the 2013 Lushan earthquake would predict survivors' posttraumatic growth at 31 months (T2) after the disaster,

controlling for survivors' posttraumatic growth at seven months (T1), disaster exposure, family financial status, negative life events, gender and education. Neither the quantity nor quality of received social support exerted significant main effects on posttraumatic growth. However, the joint effect of these two variables explained a significant portion of variance in changes in PTG scores. The association between the quantity of received social support and PTG was moderated by the quality of received social support. Simply put, among survivors who received high quality social support, greater amounts of support received appeared to facilitate their posttraumatic growth, whereas among survivors who reported receiving poorer quality social support, greater amounts of post-disaster support were associated with lower PTG scores.

The pattern of the quantity by quality of received support interaction is consistent with the postulates of the social support effectiveness model (SSE, Rini & Dunkel Schetter, 2010). Rini and colleagues (Rini et al., 2011) in their investigation of psychological distress among hematopoietic stem cell transplant survivors found no discernible effect of received support amount on distress for survivors who were recipients of effective (i.e., high quality) partner support, as they exhibited better psychological health regardless of the quantity of support received. However, when partner support was evaluated as ineffective (i.e., low quality), receiving a greater amount of support was associated with elevated psychological distress. Notwithstanding different contexts and outcome measures, the converging results of Rini and colleagues' research and our own investigation underscore the importance of recognising that the effect of quantity of received social support may be conditional on the quality of received social support. Prior studies investigating the influence of received social support on posttraumatic growth present mixed findings (Cieslak, et al., 2009, Kamen et al., 2016; Nenova et al., 2013; Rzeszutek et al., 2017; Schroevers et al., 2010; Schulz & Mohamed, 2004). The current results suggest that such inconsistencies may be accounted for, in part, by variability in quality of received social support. That is, the expected association between

greater amounts of received support and higher levels of PTG may be more likely to be observed in contexts where levels of quality of received social support are also high.

The present findings are also congruent with investigations reporting that receiving social support may be a "mixed blessing" (e.g., Burke & Goren, 2014; Gleason et al., 2008; Mcclure et al., 2014). Indeed, the pattern of the observed interaction between the quantity by quality of received support indicated that low-quality support had an adverse effect on PTG. Complicated reactions of recipients to aid have featured prominently in the threat-to-self-esteem model (Fisher, Nadler, & Whitcher-Alagna, 1982), stipulating that receiving aid (i.e., social support) contains a mixture of positive and negative self-relevant messages. On the one hand, support may be threatening in that it implies an inferiority-superiority relationship between recipient and providers and clashes with values of self-reliance and independence. On the other hand, support may be supportive in that it may communicate caring and concern, and it provides instrumental benefits (e.g., tangible resources, information, new perspectives). Thus, whether a particular instance of support receipt is predominantly threatening or supportive may be determined by characteristics of the transaction such as the way in which support is provided, the type of support given and attributes of support providers. Accordingly, low-quality support (e.g., which is difficult to obtain, or provided insensitively) may amplify self-threating elements that are inherent in receiving support, and consequently inhibit emergence of positive outcomes. It seems imperative that both quantity and quality of social support received should be considered in future investigations examining the effectiveness of enacted social support (Rini & Dunkel Schetter, 2010).

The current findings offer some practical implications for the development of post-disaster intervention efforts. Evidence suggests that disasters and other potentially traumatic events, along with obvious adverse mental health consequences, may bring about opportunities for positive life changes. Providing efficacious social support to survivors can not only counteract negative psychological burdens of disaster exposure, but also promote emergence of advantageous

psychological adaptations and transformations. In the context of providing assistance and support to trauma survivors, it seems that "more" is not necessarily better. Most importantly, help which does not adequately meet specific needs, or is not delivered skilfully or in a timely fashion, could inadvertently be inefficient, if not simply disadvantageous for posttraumatic growth. Given that disaster relief is a long and complex process, pernicious blends of disappointments, frustrations, and even conflicts are likely to be common. Thus, existing aid distribution programs and interventions should aim to enhance the quality of support they deliver, along with their attention to the sheer amount of help they offer.

Strengths and Limitations

This study has two notable methodological strengths. First, to the best of our knowledge, this is the first study examining post-disaster social support and PTG that has considered both the quantity and quality of received support. That is, rather than only assessing "how much" support was received, our measurement instruments also asked about effectiveness-related features of support receipt such as ease of access, adequacy in meeting needs, skilfulness and sensitivity of delivery, and fairness and timeliness of received provisions. Second, the longitudinal design of this research enabled analyses to control for earlier levels of posttraumatic growth, and thus offered a more complex analytical framework than those presented by cross-sectional studies.

However, methodological limitations of the study should be noted. Firstly, the external validity of the findings is limited by the unique characteristics of the sample - the respondents were predominately women who were recruited from community clinics offering influenza vaccinations. It is unlikely that this sample was representative of all survivors of the Lushan earthquake, or survivors of other disasters in China. Secondly, the two broad dimensions of received social support were assessed at different time points, whereby the quantity of received support was measured at T1, while the quality of support was measured at T2 (2 years later), and the participants were asked to recall and appraise help they received in the timeframe of the first seven months after the event.

Finally, the study's measures of quantity and quality of received support effectiveness, although modelled on empirically established instruments, had not been validated in post-disaster contexts.

Conclusions

The present study demonstrated the moderating role of the quality of received social support in the relationship between the quantity of received social support and PTG among Lushan earthquake survivors. Specifically, among survivors who appraised the post-disaster social support they received as higher quality, greater amounts of received support were associated with more subsequent posttraumatic growth. However, among survivors who appraised the post-disaster support they received as lower in quality, greater quantity of received support was associated with lower levels of reported posttraumatic growth. These findings indicate that both quantity and quality of support received in the aftermath of disaster are critical for understanding survivors' posttraumatic growth and psychological recovery.

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Table 4.1

Intercorrelations Among Variables in PTG Regression Model

	1	2	3	4	5	6	7	8	9	Mean	SD
1. Gender [a]	-	-	-	-	-	-	-	-	-	-	-
2. Education	.07	-	-	-	-	-	-	-	-	8.80	4.07
3.T2 Family financial status	.09	.48**	-	-	-	-	-	-	-	2.80	0.87
4. T2 Negative life events	.01	-.22**	-.38**	-	-	-	-	-	-	1.40	1.47
5. Earthquake trauma	.00	-.07	-.01	-.01	-	-	-	-	-	0.56	0.52
6. Material losses	-.04	-.33**	-.34**	.17*	.20**	-	-	-	-	5.76	2.61
7. Quantity of RSS	-.07	.15*	.22**	-.21**	.08	-.18*	-	-	-	30.04	7.85
8. Quality of RSS	.00	.38**	.41**	-.34**	-.01	-.22**	.38**	-	-	44.55	7.23
9. T1 PTG	-.13	-.06	-.01	.11	-.01	.12	-.01	-.10	-	50.65	20.23
10. T2 PTG	.00	.26**	.32**	-.21**	.22**	-.05	.13	.21**	.20*	53.96	21.87

Note. $N = 161$. * $p \leq .05$, ** $p \leq .01$.

[a] 0 = female, 1 = male.

Table 4.2

Predicting Posttraumatic Growth 31 months after 2013 Lushan Earthquake

	T2 PTG			
	Hierarchical Model[a]			Full Model[b]
Predictors	β	t	ΔR^2	β
Step 1 - T1 PTG	.20	2.50*	.038*	.21**
Step 2			.079***	
Gender	.02	0.25		.002
Education	.28	3.71***		.20*
Step 3			.062**	
Earthquake trauma	.26	3.42***		.25***
Material losses	-.04	-0.53		.02
Step 4			.052**	
T2 Family financial status	.21	2.35*		.20*
T2 Negative life events	-.10	-1.33		-.09
Step 5 - Quantity of received social support	.04	0.53	.001	-.002
Step 6 - Quality of received social support	.06	0.66	.002	.08
Step 7 - Quantity X Quality	.17	2.32*	.027*	.17*

Note. $N = 161$. * $p \leq .05$, ** $p \leq .01$, *** $p \leq .001$.

[a] The entries are standardized (β) regression coefficients and corresponding t-values obtained when the variables was first entered, and R^2 changes for each block of the multiple hierarchical regressions equation.

[b] The entries are standardized (β) regression coefficients obtained in the final block of the multiple regression equation when all predictor variables were entered.

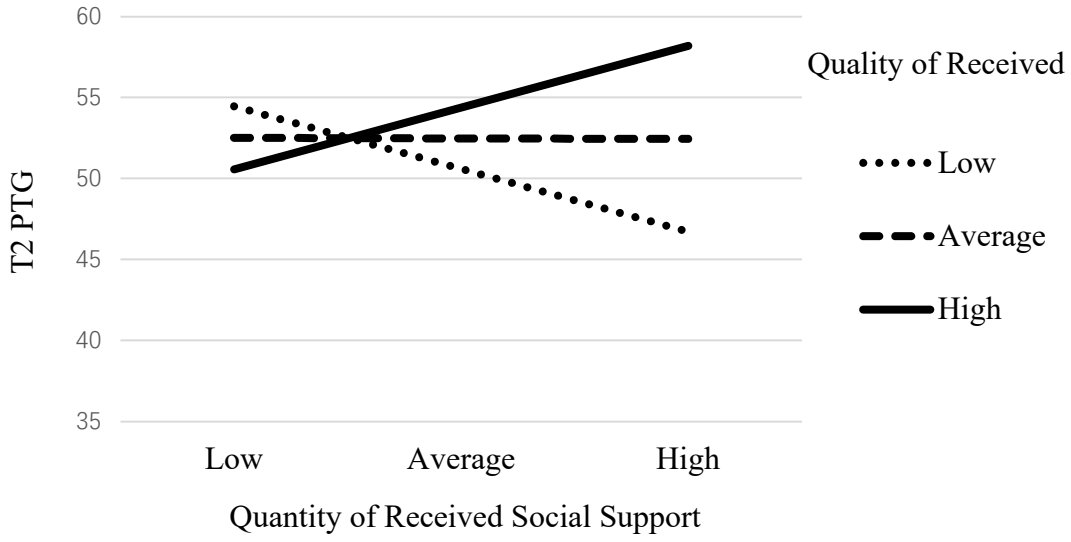


Figure 4.1. Interaction between the quantity of received social support and quality of received social support predicting survivors' posttraumatic growth. T2 = time 2; PTG = posttraumatic growth.

Chapter 5 Interpreting recipients' perceptions of post-disaster social support interactions: What factors matter?

Abstract

This study aimed to explore the determinants of recipients' perceptions of social support interactions in the aftermath of a natural disaster. Semi-structure interview was conducted among 11 people affected by Lushan earthquake, and transcripts were analysed using thematic analysis approach. In total, seven themes describing the features of postdisaster social support interactions were extracted. These themes indicated that recipients cared about features related to outcomes, interaction, provider and management. First, recipients cared about features of the outcomes of social support interactions; that is, whether the support that was received fulfilled their needs, and also whether distribution of support was equal and fair. Second, they cared about whether the interaction goes smoothly and easily; whether the interaction is initiated by providers; whether the interaction is public and therefore witnessed by others; whether they are treated with dignity in the interaction; and whether they have opportunities to reciprocate. Third, characteristics of help providers, including whether they sincerely wanted to help them, and what they have devoted in order to provide assistance, also matter. Last, the efficacy and appropriateness regarding the management of disaster relief resources is concerned by recipients.

Key words: Social support; disaster; qualitative study; help recipients

1. Introduction

Social support can refer generally to social interactions that provide assistance or embed individuals in a network of relationships that are experienced as caring and readily available in times of need (Hobfoll, 1988, p. 121). Although there is substantial research which

indicates that received social support (actual receipt of help) is linked with improved mental health (Cerda et al., 2013; Hussain, Weisaeth, & Heir, 2013; Kaniasty, 2012), there are other studies finding negligible or even negative associations with these indices (Lowe, Joshi, Pietrzak, Galea, & Cerdá, 2015; Shiotani, 2014). For example, a study of elderly people with difficulties in daily activities (care recipients) and their spouses (care givers) found that nearly 40% of care recipients reported emotional distress in response to received help (Newsom & Schulz, 1998). Such findings are consistent with studies indicating that recipients are not always satisfied with the help they receive, and that attempts to help may comprise a mixture of both supportive and unsupportive behaviours (Evans, Pistrang, & Billings, 2013; Grange, Matsuyama, Ingram, Lyckholm, & Smith, 2008; Martin, Davis, Baron, Suls, & Blanchard, 1994; Toller, 2011). Help recipients may also experience a range of negative reactions to social support, including embarrassment, anger, resentment, concerns about reciprocity, feelings of weakness, low self-esteem, dependency and incompetence (Newsom, 1999).

It seems that the nature of social support interactions can vary widely, whereby some forms are better than others in terms of positive evaluations from recipients or benefits to their mental health, and it is important to understand factors that may lead to these variations. One early theoretical perspective on this issue was provided by optimal matching theory (Cutrona & Russell, 1990). This suggests that the outcomes of social support will depend on the degree of 'matching' between stressful events and the functional types of support. The theory posits that controllability of a stressor is the most important factor which determines the type of social support needed. People facing controllable stressors (e.g., transition to parenthood) are presumed to benefit most from support that fosters problem-focused coping (e.g., information, advice, actual assistance), while people facing an uncontrollable stressor (e.g., the death of a loved one) are expected to benefit most from support that promotes

emotion-focused coping (e.g., expressions of caring, concern, empathy, and reassurance). This theory thus focuses on the content of received social support; specifically, the functional type of support received. Studies testing optimal matching theory have produced inconsistent results (Cutrona & Suhr, 1994; Gray, 2014; Thrasher, Campbell, & Oates, 2004).

Recent studies have suggested that how the support is delivered may also influence the outcomes of social support. For example, Bolger and Amarel (2007) found that support provided in an 'invisible' manner (either outside of recipients' awareness, or within their awareness but delivered with sufficient subtlety that recipients do not view it as support) was more effective in lowering emotional reactivity to a stressor than 'visible' support. Further research has also demonstrated that t whether support received was solicited or unsolicited made additional differences to recipients, who tended to report higher evaluations of the support provider when the support was unsolicited (Mojaverian & Kim, 2013). Finally, the support stance, or the tone and spirit in which support is offered may also matter, with research indicating that people with eating disorders were more satisfied with support provided that was high in expressed caring, warmth, and affection, versus a relatively directive approach (e.g., telling the individual what to do, and/or providing a negative judgment or appraisal of the individual's behaviour or state) (Geller, Iyar, Srikameswaran, Zelichowska, & Dunn, 2017; Thrasher et al., 2004).

According to studies discussed above, the outcomes of social support may be determined by a multiplicity of features relating to what is provided and how it is provided. This is consistent with Rini and Schetter's (2010) Social Support Effectiveness (SSE) model, which contends that the effectiveness of support is maximised when both quantity of support and features of support quality match the needs of help recipients. Specific factors that are proposed to underlie effectiveness in the SSE model include: needs matching in terms of

amount and type, support being easy to obtain and skilfully delivered, and the avoidance of negative influences on the self-concept of help recipients (Rini & Dunkel Schetter, 2010).

None of the aforementioned studies have however been conducted in a post-disaster context. Relative to other types of trauma-affected or stressor-exposed populations, natural disasters are associated with a range of unique features. These include widespread difficulties for people in affected areas, and thus large numbers of people requiring aid, as well as the mobilisation of support from existing social networks and others outside of these networks including government agencies in the form of disaster relief. Prior studies of post-disaster social support have examined associations with mental health, but have not considered the characteristics of support that may promote either positive or negative consequences (Cerda et al., 2013; Cieslak et al., 2009; Dekovic, Koning, Stams, & Buist, 2008; Hussain et al., 2013; Kaniasty, 2012; Shiotani, 2014). There are several qualitative studies that have examined experiences of social support for disaster victims (Forbes, Jones, & Reupert, 2012; Heid, Schug, Cartwright, & Pruchno, 2017; Ibañez et al., 2003), but these mainly describe the kinds of support that were perceived as helpful by recipients. However, the degree to which specific help behaviours are perceived as helpful vary by context or by the recipient. For example, a mixed method study found that certain supports received by sexual assault victims, such as taking control and distraction, were sometimes perceived negatively and other times perceived positively by the participants (Filipas & Ullman, 2001). Hence, a simple description of what support is received is limited in its value in informing what kinds of support are likely to produce positive consequences for recipients. We believe that studies that explore in-depth the features of support may assist us in better understanding the factors that drive the heterogeneity of what is perceived as helpful by disaster survivors.

The broad aim of this study was to explore the determinants of recipients' perceptions of social support interactions in the aftermath of a natural disaster.

2. Methods

This study comprised part of a longitudinal mixed methods project assessing social support and mental health among people affected by the Lushan earthquake. The current study was conducted at the second wave of the project which was 31-months post-disaster. Further details of the survey component of the project can be found elsewhere (Shang et al., 2019). The whole project has been approved by the research and ethics committees of Peking University Institute of Mental Health (reference number: 201,531) and The University of Melbourne (reference number: 1,544,838).

2.1 Study setting and context

A 7.0-magnitude earthquake hit Lushan County of Ya'an City in southwest China's Sichuan Province on Saturday 20 April 2013 at 8:02 AM local time. The earthquake affected more than 2 million people, and resulted in 196 deaths, two missing individuals, and 14,785 injured survivors. The response of the Lushan earthquake followed a top-down approach, which characteristic of strong government control, weak participation by non-governmental organisations (NGOs) and the affected communities (Chen, Zhang, Tadikamalla, & Zhou, 2019; Lu & Xu, 2014). The disaster response lead by the Chinese government was timely and efficient, however, still suffered from some problems including the unbalanced distribution of disaster relief resources, poor implementation of policies, and the corruption of some officials.

The study was conducted in Ya'an City, which is a prefectural-level city consists of two districts and six counties including the Lushan County (the epicentre of the earthquake). In total 176 people in Ya'an City was killed in 2013 Lushan earthquake, and 12030 was injured.

Ya'an City was also affected by the 2008 Wenchuan earthquake, in which 33 people dead, and 1351 people injured. Ya'an City is a mountainous area (account for 94%), and many of the local residents have to work as migrant workers outside of their hometowns. The private houses in Ya'an City was severely damaged in Lushan earthquake, and near 99% of private houses in the epicentre collapsed. At the time of the current study was conducted (31 months after the earthquake), some residents have moved into their new houses constructed after the disaster, some was busy with reconstruction, and some still lived in the damaged houses or temporary housing due to lack of money. Like most Chinese people, Ya'an citizens concern for face and are reluctant to seek for help (Shen, 2011).

2.2 Participants and procedure

The participants of the current qualitative study was a sub-group of the 161 participants who were followed-up in a longitudinal mixed methods project (Shang et al., 2019). The 161 participants were interviewed with questionnaires measuring basic information, disaster exposure, quantity and quality of received social support, and mental health. Participants for the current study were selected for inclusion based on their responses on the scale of quality of received social support reported. These participants were intended to reflect an intensity sample, which "consists of information-rich cases that manifest the phenomenon of interest intensely (but not extremely)" (Patton, 2002, p.234). Specifically, participants who reported receiving high quality support, and those reported receiving low quality of support were both considered to be included; on condition that they could express themselves clearly, and could provide rich information on received social support were invited for the interview. Written informed consent was obtained before the interview. The participants received minor monetary compensation as a token of appreciation for their time. Sampling continued until

saturation was achieved, whereby no new information or themes emerged from additional interviews.

Face-to-face semi-structured interviews were conducted by the first author, and commenced with an initial question regarding what the participant was doing when the earthquake occurred. Subsequent questions then asked for examples of experiences of receiving social support in the aftermath of the earthquake, including both positive and negative experiences, and to describe their thoughts or feelings about these experiences. Specific questions included: what kinds of help did you receive after the earthquake; how did you feel when you received that help; were you satisfied with what you received; why were you are satisfied (or not satisfied); what moved you most; what was most useful for you; and what could have been improved from your perspective?

2.3 Reflexivity

The interviewer is a female Chinese Ph.D candidate, who speaks mandarin, can understand the local dialect, but cannot communicate in local dialect. All the participants remembered that they participated in the project two years ago, but they tend to have different speculations on the identity of the interviewer at the beginning of this follow-up data collection. They concerned about the relation between the interviewer and the government, some wished the interviewer could report the corruption of the local government to the central government, some worried that they would in trouble if they told the truth. Efforts were made to communicate to participants that the interviewer was just a student, and the interview was just for research, that any information they disclosed would be confidential. After learned that the interviewer was not related to the government, the participants tended to view the interviewer as an individual who came to help from outside of the disaster area. They thought the interviewer cared about them (came to see them 2 years after the first

survey), and had helped them (give them monetary compensation for the survey), and they were happy to share their experiences of social support interactions in the aftermath of the Lushan earthquake.

The interviewer was participated in psychological intervention in a fire explosion accident in China, and was passion about research and practice related to disaster mental health. She stayed in the Ya'an City for one week for the first wave data collection in 2013, and further stayed three weeks in 2015 for the current study. Though she was seen as a help provider by the participants, she also needed help during the data collection in disaster area. Due to these experiences, she had a fellow-feeling for the participants, which help her understand the data on the one hand, but brought risks of being too emotional involved in the research. Efforts were made to maintain empathic neutrality in the data collection and data analysis.

2.4 Data analysis

Interviews were recorded by the first author and transcribed verbatim by two undergraduate students who lived in the disaster-affected area and were proficient with the local dialect. Computer-based qualitative data management software (NVivo 12) was then used to organize the data which was analysed in accordance with principles of inductive thematic analysis, which refers to a data-driven "method for identifying, analysing and reporting patterns (themes) within data" (Braun & Clarke, 2006; p.79).First, participants' perceptions of social support interactions were identified, which included their feelings, attitudes and comments in relation to help providers, and their appraisals of the help received. Second, the broad features of social support described as leading to these perceptions were identified. For example, one participant described the unfair treatment he received during disaster relief goods distribution, and reported feeling angry about this. Thus, the feature

'fairness' was identified. In addition, facets or features of social support were extracted from participants' expressions about what kinds of support they want, and what they think is important for social support interactions. For example, one participant noted that for the government the most important thing is to be on time, thus "timeliness" was extracted. These features of social support were then grouped into broad thematic categories, which were then refined by identifying commonalities and differences among responses, with quotes selected to illustrate each category. The entire data analysis process was done in Chinese by the first authors, and was then translated into English for purposes of the current paper.

3. Results

3.1 Participants

There were n = 11 participants from four towns, including six males and five females with a mean age of 46.5 years (range: 29 to 66 years). Three participants reported 12 or more years of education (two participants reported 12 years of education, which is equivalent to high school completion in China; one reported 16 years of education which is a bachelor degree), while the remainder reported 9 years of education or less (four reported 9 years of education, that equates to completion of compulsory education including primary and middle school; four were below 9 years). Ten participants were married and one was widowed. Two participants were full-time employed (one in education and the other in the health sector), while the rest were farmers (n = 9). Three of the latter described additional employment: one owned a family business, one had a part-time job with the government, while one was a village official.

3.2 Determinants of recipients' perception of social support interactions

All narrative regarding support interactions were analysed, including exchanges that ended with the receipt of support, as well as those that did not lead to the receipt of support

(e.g., recipients sought help but failed, providers offered help which was refused), and seven themes were extracted. Two themes captured features of the outcomes of social support interaction: the extent to which the ultimate received support fulfilled needs of survivors (needs fulfilment); and the fairness of the ultimate received support in comparison with other survivors (equity and fairness). Two themes were relevant to the patterns of the interaction between recipients and providers: how support was obtained, for example, whether it was offered or requested, and easy to obtain (the process and manner of obtaining support); and whether recipients had the opportunity to reciprocate (potential for reciprocity). Two themes related to help providers: whether they really wanted to help survivors (the genuineness of providers' willingness to help), and the costs incurred while helping (the sacrifices made by providers in support attempts). And one theme regards how well resources were managed and used to benefit participants (management and utilisation of resources).

3.2.1 Needs fulfilment

A general theme that emerged across interviews was whether the resources received through social support interactions were appropriate to address the survivor's needs. People affected by disaster faced a variety of challenges in the aftermath of the earthquake, such as lack of shelter, clean water, electricity, and disrupted communication due to infrastructure damage. Several participants noted that it was important to ensure the availability of basic necessities:

> *In the aftermath of earthquake, one thing is the supplies, when the supplies are guaranteed, people will feel a sense of security" (male, 39, supermarket owner).*

The fulfilment of needs for basic services and necessities influenced views about social support received. That is, participants tended to report more positive feelings when their

needs were fulfilled, and negative feelings when their needs were unmet. Two quotes below illustrate the variation in feelings according to needs fulfilment:

> *I am grateful to the party [government]. The disaster relief supplies were provided quickly. There is lack of water, they delivered bottle water. Lack of oil, rice, clothes, they provided all of them. Generally speaking, the party is great, so many thanks to the party (female, 50, village official).*

> *I was so miserable. I didn't have clothes…didn't have food. Though I received rice…the problem is I don't have pots or stoves. I can't cook. I can't eat rice. So I have to take one bowl of porridge from the soldiers for my lunch and dinner every day, and have instant noodles for breakfast. I was angry (female, 50, farmer).*

The interviews also suggested three particular features of social support affected needs fulfilment, which were organised in terms of sub-themes relating to support adequacy, needs matching and timeliness.

Support adequacy: Participants' satisfaction with support was influenced by whether it was perceived as adequate to fulfil their needs. They tended to have positive perceptions of support that was sufficient for their needs, and criticism or complaints when support was either not provided at all or was inadequate. For example, several participants reported a shortage of drinking water, and a doctor complained that they did not have people to share their workload that had increased significantly since the disaster (and required them to work without opportunity for rest).

Needs matching: Another factor that affected perceptions of support interactions was whether the support matched the needs of survivors. Sometimes participants received support that was not suitable for them. For example, some participants received tents, quilts or clothes that were the wrong size. One participant was dissatisfied with their new house which was

built by government because it did not offer the facility to raise chickens and pigs, which was critical to self-sustenance:

> *The roads have been repaired, the environment of the community is good, but, the only shortage is there is no place for us to raise chicken and pigs, they didn't solve this actual issue for our farmers (female, 39, farmer).*

Timeliness: Participants also emphasized the importance of whether support was delivered in a timely manner. Sometimes support was too late to be useful, or would have been more useful if provided earlier. By way of illustration, one participant indicated that he received a first-aid 'bucket' twenty days after the earthquake, when it was no longer needed. He also suggested that psychological services were provided too late, and should have be made available immediately after the earthquake.

It should be noted that the receipt of support that was inadequate, or arrived late, or that provided a mismatch with the needs of survivors did not always lead to dissatisfaction or complaints. For example, several participants expressed their understanding of the limited funding provided by government for building reconstruction, given that as there were so many people affected by the disaster. Similarly, a participant who did not receive supplies until several days following the earthquake described understanding that the road to the village was destroyed by the earthquake, so supplies could be delivered immediately. It seems that support recipients did not expect all support transaction to be perfect, and that they understood that sometimes their wishes could not be fulfilled due to resource limitations or other constraints.

3.2.2 Equity and Fairness

Participants placed a great deal of importance on equity and fairness in the provision of support, with fairness described as 'the most important thing' by one participant (male, 29,

medical doctor). In contrast, the lack of fairness in aid distribution was identified as an important source of conflict following the disaster. For example, one participant described wanting to '*be treated like others, equally'* (female, 55, farmer), while another suggested that fairness was more important than the quantity of support for those affected by disaster:

> *If the government is fair, even if the number of steamed buns (a popular staple food in China) received by each person decreased from one to half, they will not complain, but if some of them received one, others received half, this will definitely be not proper (male, 29, medical doctor).*

Some participants expressed understanding that needs varied according to the nature and degree of loss, and that the distribution of additional support to those who were more severely affected was fair (for example, the government awarding reconstruction funding to participants based on the degree of house damage). However, if the distribution of support was perceived as depending on the personal characteristics or identities of participants, or personal relationships with help providers, then this was viewed as unfair. This can be illustrated by the following quote:

> *The village cadres were unfair in the distribution of disaster relief supplies, for example, they give more to their relatives…give less to the old and sick…give more to the ones closer to them (male, 29, medical doctor).*

Being treated differently because of household registration (rural or an urban resident) was also viewed as unfair. For example, one participant reported that he did not receive the *'10 RMB and half kilo rice per person'* because he was an urban resident, which made him unhappy. Similarly, a participant who operated a private kindergarten was dissatisfied that his school received less support than public schools.

3.2.3 The process and manner of obtaining support

Participants described in great detail the nature of interactions between help providers and recipients, and the manner in which support was provided. Several sub-themes emerged from interviews and were relevant to this theme, and to whether: (a) support was offered spontaneously; (b) whether support was easy to obtain; (c) support was delivered under public witness; and (d) recipients were treated with respect.

Unsolicited help: Participants' tend to view the support that was spontaneously offered by help providers more positively. For example, a female participant spoke about a particularly moving experience in which a soldier offered to take her goods out of the house, even though she refused due to safety concerns:

> *"I was moved deeply, very satisfied…I will remember this for my whole life, very grateful… I cried and said thank you so much" (female, 55, farmer).*

In addition, several participants reported that they were reluctant to seek for help, and accepting help that was offered by providers were easier for them.

Difficulty accessing support: Obtaining support was not always easy and several participants described having to approach many people until they received help they needed. This was described as embarrassing, and in in some situations participants felt neglected and that nobody cared about them, and reported being extremely angry about this. It seemed that that more difficult the process of obtaining support, the greater the negative emotions:

> *I approached them, but they didn't respond to me. I went to see the township chief, he sent me to village head, and then the village head sent me to group head. I was sent from one to another, it is still unsolved till today…Nobody cared about me, from the township level, to the village level, to the group level, they totally never cared about me, I was extremely angry. (female, 50, farmer)*

Public witness: The receipt of social support in public and in front of other people was described as uncomfortable for some participants. For example, a man admitted that he felt uncomfortable and guilty while standing in line waiting for disaster relief goods:

> *I'd like to accept what was gave to me, whether it was good or bad, but if he did not come to give me, but ask me to pick it myself, I don't like that, I think, a man, stand there in line, asking for something, you know, as a working age person, …, I feel uncomfortable, I don't like this my whole life, …, I feel guilty… (male, 60, farmer)*

Disrespect: Some participants reported negative reactions to hearing or becoming aware of the fact that help providers had been disrespectful. For example, a man reported that he was called "*troublemaker*" by several officials. Similarly, a woman reported that she was mocked when asking for help from the village official who indicated that her requirement was excessive and ridiculous.

3.2.4 Potential for reciprocity

Participants also spoke regularly about whether they had the opportunity to reciprocate support. It seemed easy and natural to accept help from providers when recipients could somehow pay this back, and thus where they 'helped each other'. In contrast, recipient described feeling uncomfortable and indebted when they wished to reciprocate but did not have the opportunity to do so. Several participants expressed that they would be more comfortable if providers had accepted their food as a way to express their gratefulness.

> *They didn't drink our water, didn't eat our food …, they are the ones did real kind thing for us, I will never forget them,…, I am grateful to them, but now, I even can't say thank you again to them, I don't know where they are, I don't have ways to pay back (female, 39, farmer).*

I raised pigs, so I want to kill one pig and send it to the army to improve their food, but the leader refused, I know that there are villagers killed their pig and sent it to them without permission, but they were paid with higher than the market price, so I can't kill the pig, if I did that it was like I forced them to buy my pig for higher price (male, 50, primary school teacher and private kindergarten owner).

These issues were raised mainly when help providers were disaster relief workers or volunteers, and seldom occurred when they were also individuals affected by disaster. In the case of the latter, survivors seemed to recognise future opportunities to reciprocity.

3.2.5 The genuineness of providers' willingness to help

Participants speculated on the genuineness of providers' willingness to help based on two aspects: whether the support attempts were primarily motivated by true concern or by providers' self-interest; whether providers suited the action to the word.

Participants recognised that help was provided for different reasons, and there were many comments relating to the perceptions of help providers and whether they really wanted to provide support. This included formal support involving disaster relief that was provided as part of occupational duties (e.g., by government officials, journalists and soldiers), as well as informal support that could be motivated by true concern for survivors, and other factors such as satisfying curiosity or earning a good reputation. The following quote captured this sense of different motivations for people visiting the disaster area:

People came for different reasons, some aimed to fish in troubled waters, wondering for free food; some came to visit, to see what earthquake looks like; the army were the ones to provide help sincerely; and the officials came because they worried about losing their position, they have to come… (male, 39)

Recipients described being grateful to people who helped out of sincere concern, and being less grateful or even unhappy with help that was provided mainly because of providers' self-interest (e.g., to benefit their career). Government officials were blamed frequently for this, with many participants suggesting that their main motivation for providing aid was to benefit their career; for example, which was reflected in catering for inspections of senior leaders, or for media coverage, rather than the needs of those affected by the disaster. Some participants also suggested that local officials provided more support to survivors who lived near main roads (because they were more likely be noticed by the public), while others argued that these local officials did not help until high-level officials came for inspection. This was illustrated by one participant's experience, who was angry that help was not provided until her shelter was criticized during an inspection of a high-level official.

> *The senior leader saw my place and said the shack was too ugly (covered by tarpaulin), and it was drawing attention because of its location. The senior leader told the group leader (local official) to rebuild this house for me because it was ugly. The group leader had to obey the order, then helped me with the house reconstruction…The government never asked me (about my needs) … They did not visit me after I was injured. I was angry all the time. Nobody cared about me, from the group leader, village leader to the township leader, they were never concerned about me (female, 50, farmer).*

Participants were also dissatisfied with providers who said one thing and did another, which was illustrated by the following quote.

> *What most dissatisfied me was some government officials, they came here and gave interviews, brought the journalists and exaggerated what they would do for this place. They said they must change this place to a certain extent two years*

later. The result? After less than two months, all these were demonstrated to be nonsense (male, 42, farmer).

Due to those officials who did not act in accordance with their words, people affected by the disaster lost trust in government, even worse, some even did not trust other people who came to help.

3.2.6 The sacrifices made by providers in support attempts

Participants regularly emphasised the sacrifices and difficulties that providers overcame, and the risks they faced and opportunity costs from providing support. Providers often encountered conditions involving poor food and accommodation, long working hours, and sometimes even risk to their personal safety. Some of the support providers were also affected by the disaster, such that giving help meant reduced opportunities to help themselves and their families.

They had to climbed mountains to arrive here, clothes became wet, no place to live due to the collapse, seeing them in this situation I nearly cried, (they were) too pity, not only we were suffering, they were suffering together with us, they sat there the whole night, it was cold (female, 55, farmer).

The soldiers offered to take our belongings back from the house, I even didn't dare to do so, they risk their lives, I was moved,…, there is a man I remembered very clearly,…, he said he would go up into the house alone to check out the situation first, he stopped the ones who wanted to go up together because it was dangerous (female, 32, farmer)

Our village head was very responsible, his father-in-law died in the earthquake, he did not have time for that, he was busy with organizing villagers to save lives (female, 32, farmer).

The hardships and sacrifices of help providers were highly valued by the recipients regardless of the final outcome.

3.2.7 Management and Utilisation of Resources

In the aftermath of the earthquake, both formal and informal relief efforts (e.g., from volunteers, donations, state-funded relief supplies and disaster relief troops) produced labour and supplies that were potentially available for those affected. In contrast with other 'one-to-one' social support exchanges, participants usually did not receive these resources directly from the donor, versus local government and organizations (e.g., schools and charities) which were responsible for coordinating and managing these resources. In this context, participants often reported dissatisfaction when they felt that they could have obtained more benefit but did not due to poor management and utilisation of these resources. Specially, social support was perceived negatively in the following circumstances: when informal donations were rejected by government; the resources received by local government were not all delivered to those affected by disaster; and when labour and supplies were not used efficiently.

First, participants described wanting all potential resources to be accepted and used. By way of illustration, one male participant was resentful because informal donations which intended to give directly to the participants were prohibited by the government (the government asked the donors to donate through them):

> *I am not satisfied with the government, there were people who wanted to donate money, the government stopped them. They drive those people away, but they were not capable to solve the difficulties alone. I even grabbed the collar of district government officials and wanted to hit him, but stopped by aged villagers, I was angry and violent (male, 42, farmer).*

Second, participants complained that disaster relief goods and funding were not fully distributed; for example, some participants suggested that a proportion of money was misappropriated by government, while some disaster relief goods were thought to have been kept in government branches and then began to rot in storage, and part of disaster relief resources were given to the people not affected by the disaster.

Third, participants were dissatisfied with support when they thought that labour and supplies were not used efficiently, and they would have benefited more if they had been used in other ways. For example, a medical doctor described having to spend a lot of time accompanying government officials for repetitive inspections even though they were not needed. Similarly, the workload of government officials increased partly because they had to take care of journalists. One participant was dissatisfied with the government efforts to refurbish her house because she thought the better way of doing this was to give the money directly to survivors:

> *If the government want to improve the house appearance, they should give the money to us, and we would decorate the house appearance well. They gave the money to the boss (of construction team), as a result, the boss earned money but the houses were not well decorated… The boss used low quality material, cheated money from the government, but we were not beneficial (female, 39, farmer).*

4. Discussion

The aim of this study was to identify what matters in forming recipients' perceptions of their social support interactions in the disaster context. In total, seven themes describing the features of post-disaster social support interactions were extracted. These have been organised into four dimensions: outcomes, interaction, provider and management. First, the outcome dimension addressed the outcomes of social support interactions and incorporated

two themes: ‘needs fulfilment’ and ‘equity and fairness’. Second, the interaction dimension addressed the patterns of interaction between recipients and providers, including the themes of ‘the process and manner of obtaining support’ and ‘potential for reciprocity’. Third, the provider dimension captured the features of those who provided help, encompassing ‘the genuineness of providers’ willingness to help’ and ‘the sacrifices made by providers in support attempts’. Last, the management dimension consisted of one theme, the ‘management and utilisation of resources’, which captured the efficacy and appropriateness of the management of disaster relief resources.

The outcome dimension. It is no surprise that participants care about the outcomes of their social support interactions; that is, what is finally received through the interaction. The two themes comprising the outcome dimension— ‘needs fulfilment’ and ‘equality and fairness’—correspond to the criteria used by recipients to appraise the social support received. ‘Needs fulfilment’ refers to the extent to which the received social support meet recipients’ needs, while ‘equality and fairness’ relates to how the support received compares with that received by others. Regarding needs fulfilment, in this study, this was associated with three sub-themes: support adequacy, needs matching and timeliness. This reflects recipients’ subjective evaluation of whether the social support they receive is of the right quantity and content and received in a timely manner. The significance of support quantity and needs matching has been recognised in a variety of contexts in which social support is needed (Cohen & Syme, 1985; Cutrona & Russell, 1990; Rini & Dunkel Schetter, 2010; Wolff & Agree, 2004), while the importance of support delivery timeliness has also been confirmed in a study conducted in the disaster context (Kasapoğlu, Ecevit, & Ecevit, 2004). The finding in the current study that disaster survivors also care about the equality and fairness of post-disaster social support provision is in line with previous literature

highlighting the importance of fairness in relief distribution (Anaya-Arenas, Ruiz, & Renaud, 2018).

The interaction dimension. The results suggested that participants' emotions may not link directly to what they receive (the outcome), but instead be related to their interaction experiences with potential providers. This is captured by two themes: 'the process and manner of obtaining support' (consists of four sub-themes: 'unsolicited help', 'difficulty accessing support', 'public witness' and 'disrespect') and 'potential for reciprocity'. Specifically, recipients' perceptions are influenced by whether the interaction goes smoothly and easily; whether the interaction is initiated by providers; whether the interaction is public and therefore witnessed by others (making the recipient vulnerable to feelings of shame and humiliation); whether recipients are treated with dignity in the interaction; and whether the recipients have opportunities to reciprocate. The current study found that recipients experienced negative emotions if accessing support proved difficult. This agrees with another qualitative study in the disaster context (Ibañez et al., 2003). The participants in the current study preferred the unsolicited, were reluctant to seek help and felt uncomfortable receiving help in public. Similar results were reported among older survivors of the Bam earthquake (Ardalan et al., 2010). Further, both the current study and a study conducted among persons with AIDS (Hays, Magee, & Chauncey, 1994) showed that it was important to treat recipients with respect. Last, participants described feeling more comfortable with support when they had the opportunity to reciprocate. This is consistent with prior research, which has found that recipients benefit from the potential for reciprocity in support transactions (Gleason, Iida, Bolger, & Shrout, 2003; Wolff & Agree, 2004).

The provider dimension. Recipients' perceptions of social support interactions appeared in this study to be heavily influenced by provider features. Specifically, recipients were concerned about two aspects: whether providers' support attempts are due to true

concern for the recipients, and what is devoted by providers to help. The former concern is captured by the theme 'the genuineness of providers' willingness to help' and the latter by 'the sacrifices made by providers in support attempts'. Different from the factors related to the outcome and interaction dimensions, those within the provider dimension have attracted little attention in previous studies. However, the participants in this study cared deeply about providers' sincerity and effort. Indeed, providers' sincere willingness to help was of consequence to recipients regardless of the outcome of the social support interaction, and providers' effort and sacrifice was valued by recipients even when this was not reflected in the actual support received. Considering these two aspects jointly, the awareness of the fact that there are people who really want to help and have tried hard to help seems to be important for help recipients.

The management dimension. A large proportion of participants' negative emotions and complaints related to the management of disaster relief resources. Participants' concern regarding the efficacy and appropriateness of the management and utilisation of disaster relief labour and supplies was described in the theme 'management and utilisation of resources'. In particular, the participants in this study reported dissatisfaction with the rejection of informal donations by government; resources received by local government not being fully delivered to those affected by the disaster; and labour and supplies not being used efficiently to benefit those affected. These issues can be linked to the top-down, 'command and control' style of response seen in the Lushan earthquake, in which the government held the power and responsibility to determine the response, and the citizens were largely excluded from decision-making, even on topics directly related to their interests (Chen et al., 2019; Lu & Xu, 2014). A similar response approach was taken to the 2008 Wenchuan earthquake, with large amounts of disaster relief resources managed by the Chinese government (Huang, Zhou, & Wei, 2011). Dissatisfaction with disaster management may be reduced by improving community

engagement in disaster relief efforts. Researchers have suggested that disaster risk management processes should shift from top-down to people-centred or 'shared responsibility' approaches, in which the power and responsibility for decision-making is shared among a variety of stakeholders, including the people in the disaster-affected communities (Howard, Agllias, Bevis, & Blakemore, 2017; Scolobig, Prior, Schröter, Jörin, & Patt, 2015).

Limitations

Several limitations to the current study should be noted. First, the study was conducted 31 months after the Lushan earthquake, and a large proportion of the social support interactions reported by the participants occurred in the first few months after the earthquake. Therefore, the participants' perceptions of these interactions reported at the time of interviewing may not be the same as when they first received the support. In other words, the participants' perceptions of their social support interactions may have been affected by the long-term course of disaster recovery. The cross-sectional design of the current study meant that this influence could not be identified. Second, as this study focused on recipients' perceptions of social support interactions, people affected by disaster were mainly treated as help recipients during interviewing. However, it should be noted that the population affected by the Lushan earthquake engaged actively in mutual assistance as well, their social support interactions as providers were not explored in this study. Last, the interviews were conducted in a local dialect and some information may have been lost when completing thematic analysis in Mandarin, with potentially further information lost when writing the results in English.

Implications and recommendations

This study has provided valuable evidence on the factors that determine whether specific social support interactions are perceived positively or negatively by people affected by a natural disaster. The results can thus inform disaster response, both at the individual and

management level. Individuals wanting to help disaster survivors should aim to provide help that is "needs matched" in timeliness, quantity and content (Rini & Dunkel Schetter, 2010). However, there is no need for self-blame if this cannot be achieved; recipients likely understand that support transactions are necessarily imperfect due to resource limitations and other constraints. Providers' sincere intention to help, and their efforts devoted to help, are usually valued by people affected by disasters regardless of the effectiveness of the help. Regarding how providers interact with help recipients, greater attention is needed. Specifically, it is recommended that providers offer help spontaneously, treat recipients with dignity and not refuse recipients' attempts to reciprocate (Wolff & Agree, 2004).

With regard to the management level, top priority should be given to promoting equity and fairness in disaster relief activities (Anaya-Arenas et al., 2018), as this issue is of particular concern for people affected by disasters. Actions should be taken to prevent favouritism among disaster relief personnel, and to identify and support groups that are often overlooked. It is also important to make social support easy to access by simplifying the requirements and processes for obtaining support. In addition, efforts should be made to improve community engagement in disaster response (Dickson & Bangpan, 2018; Pandey, 2019). This is of particular importance in countries that mainly rely on top-down approaches to disaster management. The findings of the current study showed that people in affected communities are willing and capable of participating in decision-making on topics related to their interests. As suggested by the Guidelines for Community Participation in Disaster Recovery, communities can be engaged in a variety of activities, such as needs assessment and recovery planning (UNDP, n.d.).

Generalisation of the findings and recommendations of the current study should be done with caution. The features important for social support interactions in a particular context may not be transferrable to other contexts. For example, while the 'management and

utilisation of resources' theme is of great importance in post-disaster contexts, it may be of little relevance in situations in which social support is exchanged 'one-on-one' (e.g., social support in couples). Similarly, whether help is offered (captured by the sub-theme 'unsolicited help') may vary in importance depending on cultural background. It may be less necessary to encourage people from individualistic cultures to provide unsolicited help, as one study suggested that the benefits of unsolicited help were only found among people with collectivistic cultures background (Mojaverian & Kim, 2013).

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Chapter 6 General discussion

The broad purpose of this doctoral thesis was to improve the understanding of the nature and implications of social support received in the aftermath of disaster. Specifically, the research was intended to improve understanding of how received social support following a natural disaster influenced psychological outcomes, and the factors that contributed to the help recipients' perceptions of social support interactions following disaster. In the context of a longitudinal mixed method design, three studies were conducted among survivors of the Lushan earthquake in China:

1. A longitudinal quantitative study examining the effect of postdisaster received social support on posttraumatic stress symptoms and psychological distress;
2. A longitudinal quantitative analysis examining the effect of postdisaster social support on posttraumatic growth; and
3. A qualitative study exploring determinants of recipients' perceptions of social support interactions.

This thesis was organised into a number of discrete chapters, as follows. Chapter 1 introduced the concept and measurement of received social support; reviewed current evidence regarding the effect of received social support postdisaster on psychological adjustment; reviewed current evidence regarding which kinds of social support are likely to produce positive outcomes; and summarised the limitations of previous studies which framed the research questions of this project. Chapter 2 then provided an overview of the research methods that were underlying the thesis. This was followed by a number of chapters which comprised discrete papers (either published or under review at the time this thesis was completed), including: a published peer reviewed paper examining the effect of postdisaster received social support on posttraumatic stress symptoms and psychological distress (Chapter

3); a published peer reviewed paper examining the effect of postdisaster social support on posttraumatic growth (Chapter 4); and an unpublished paper exploring determinants of recipients' perception of social support interactions (Chapter 5).

Each of the aforementioned papers provides a brief discussion of the specific findings, and the purpose this final chapter is to provide an integrative discussion of the outcomes of this project at a higher level which is organized in the following sequence. First, this chapter will provide an overview of the main findings of the thesis (6.1) with reference to the research questions. Second, an integrative discussion of these findings will be provided (6.2, 6.3), which will consider whether receiving social support can benefit disaster survivors (6.2), and under which conditions these support interactions are most likely to benefit recipients (6.3). Third, this chapter will consider the significance of the current study (6.4), and also provide recommendations for improving policy and practice in postdisaster contexts (6.5). Fourth, this chapter will summarise the strengths (6.6) and limitations of the current study (6.7), as well as suggestions for future are discussed (6.8). Finally, the key messages that follow from this thesis will be summarized (6.9).

6.1 Main findings

The main findings of the three papers described in this thesis, with regards to the relevant research questions, are summarised below.

Study 1 examined the association between social support received in the first seven months after the Lushan earthquake and two mental health dimensions measured 31 months after the disaster (posttraumatic stress symptoms and psychological distress). The analyses considered whether quantity and quality of received social support could predict these two outcomes, and whether associations between quantity of support and mental health were moderated by quality of support. The results indicated that when controlling for baseline

mental health (T1 posttraumatic stress symptoms/ T1 psychological distress) and disaster exposure, quantity of received social support did not uniquely predict either of these outcomes. Rather, greater quality of social support was found to predict lower levels of posttraumatic stress symptoms and psychological distress. The relations between quantity of support and the mental health outcomes were not found to be moderated by quality of support. These results were robust and remained consistent when controlling for the effects of gender, negative life events and family financial status.

Study 2 examined the association between social support received in the first 7 months after the Lushan earthquake and posttraumatic growth (PTG) measured 31 months after the disaster. These analyses considered whether quantity and quality of received social support could predict PTG over time, and also whether the association between quantity of support and PTG was moderated by the quality of support. The results indicated that neither quantity nor quality of received social support was found to exert significant main effects on PTG, when controlling for PTG at baseline, disaster exposure, family financial status, negative life events, gender and education. However, the influence of the amount of received social support on PTG was moderated by the quality of received social support. This is, among survivors who appraised the postdisaster support they received as higher in quality, greater amounts of received support were associated with increased subsequent PTG. In contrast, among survivors who appraised their postdisaster social support as lower in quality, greater quantity of received support was associated with lower levels of reported PTG.

It is noteworthy that the findings from statistical models of PTG in Study 2 were sensitive to the selection covariates. When only baseline PTG and disaster exposure were included in the analyses, the models suggested a non-significant main effect of received support quantity, a significant main effect of received support quality, and a non-significant interaction between support quantity and quality in the prediction of PTG. It is difficult to

ascertain the potential mechanisms that may underlie this change, and more studies are needed to understand how received social support quantity and the interaction between support quantity and support quality influence survivors' posttraumatic growth. Despite these inconsistencies, this study demonstrated that quality of received social support is an important factor and predictor of PTG.

Finally, Study 3 explored the determinants of recipients' perception of social support interactions using qualitative methods, and extracted seven themes that were organised into four dimensions:

1. The outcome dimension addressed the outcomes of social support interactions. This dimension incorporated two themes: 'needs fulfilment' and 'equity and fairness'.
2. The interaction dimension was relevant to the features of the interactive process involving recipients and providers. Two themes were included: 'the process and manner of obtaining support' and 'potential for reciprocity'.
3. The provider dimension addressed features of the people who provided help. There were two themes in this dimension: 'the genuineness of providers' willingness to help' and 'the sacrifices made by providers in support attempts'.
4. The management dimension consisted of one theme regarding the 'management and utilization of resources', which captured the efficacy and appropriateness regarding the management of disaster relief resources.

6.2 Receiving social support can benefit disaster survivors but with conditions

Although it is commonly held that receiving social support is beneficial to people affected by disasters, such findings have not always been confirmed in empirical studies. Previous studies that examined the influences of received social support in disaster context

focused mainly on the association between received social support and negative mental health outcomes commonly occurred following disaster such as posttraumatic stress symptoms (Su, 2018), depression(Zhen, Quan, & Zhou, 2018) and psychological distress(Koyama et al., 2014) . These studies have produced inconsistent findings, with some reporting that received social support is positively linked with mental health (Cerda et al., 2013; Hussain, Weisaeth, & Heir, 2013; Su, 2018), some finding that the positive associations only exist in some types of received social support (Platt, Lowe, Galea, Norris, & Koenen, 2016), some reporting non-significant associations (Hou et al., 2014) , and even one study suggesting that social support was negatively linked with mental health (Shiotani, 2014). Study 1 of the current thesis contributed to this evidence and found that quantity of support received in the first 7 months following an earthquake in China did not predict posttraumatic stress symptoms or psychological distress measures 31 months following the disaster. However, greater quality of received social support predicted lower posttraumatic stress symptoms and psychological distress. These findings suggest possible benefits of received social support following disaster in terms of reduce the risk of negative mental health outcomes is more likely to occur if the support received is of high quality.

In contrast with the aforementioned literature on the adverse mental health sequela of disasters, there are comparably few studies which have examined associations involving received social support and positive psychological outcomes such as posttraumatic growth (Hou et al., 2014) and beliefs in benevolence of people (Kaniasty, 2012). Inconsistent results were also reported in these studies (Hou et al., 2014; Su, Chow, Yen, & Chuang, 2020). On the basis of data obtained from a longitudinal quantitative design, Study 2 suggested that quantity and quality of social support received in the first 7 months following Lushan earthquake had an interactive effect on survivors' PTG measured 31 months after the disaster. This is, receiving greater amounts of social support could facilitate PTG when it was high in

quality, while receiving more support that was poor quality could conversely inhibit PTG. Thus, Study 2 demonstrated that the beneficial effect of received social support following disaster on survivors' posttraumatic growth was conditional on support quality.

Taken together, Study 1 and Study 2 highlight the likely benefits of high-quality social support received in the first several months after disaster for survivors' long-term mental health and well-being. That is, received social support can not only reduce the risk of posttraumatic stress symptoms and psychological distress, but also promote posttraumatic growth. Meanwhile, receiving poor quality of support may be harmful to survivors' well-being in the long-term. Receiving social support is beneficial to disaster survivors' long-term well-being on condition that the support received is of acceptable quality. Social support that is adequate, easy to obtain, needs matching, fair, in time, being skilfully provided and not accompanied with conflicts is psychologically beneficially to survivors.

The possible beneficial effects of receiving social support were also reflected in the narrative description of recipients' immediate reactions to help, as described in Study 3. In particular, this study suggested that participants experienced various positive emotions after receiving social support, such as feeling grateful, reassured, motivated to self-help, and having positive views of help providers more generally. However, in some circumstances receiving support was also implicated in negative experiences for survivors, and triggered feelings of anger, indebtedness, embarrassment, resentfulness and dissatisfaction. Moreover, recipients sometimes described losing trust in providers, and arguing with them or other help recipients. Study 3 suggests that survivors' immediate reactions to help were influenced by various features of support interactions, including: needs fulfilment, management and utilization of resources, the genuineness of providers' willingness to help, the sacrifices made by providers in support attempts, the process and manner of obtaining support, equity and fairness and potential for reciprocity.

In sum, all three studies in this thesis suggested that receiving social support was likely to benefit disaster survivors, but these benefits were conditional on other factors. Hence, it is important to know the conditions under which social support interactions is most likely to benefit recipients, which will be discussed in the following section.

6.3 Conditions under which social support interactions are most likely to benefit recipients: a joint consideration of context and cultural norms

It seems likely that not all behaviours that are intended to help disaster survivors are actually beneficial to these recipients, and it is thus important to understand recipients' perspectives on these support interactions and exchanges, and to describe the requirements or conditions of support which may be required to produce beneficial outcomes. Following this approach, Study 3 explored the perceptions of help recipients regarding social support interactions in postdisaster contexts and identified seven themes which suggested influential features of support interactions. From these seven themes we can infer that the social support interactions that were perceived positively by participants were characterised by the following features. First, the final received support should be "needs matched" in timeliness, quantity and content; and be fair and equal. Second, the providers should help out of sincere intention, and/or have devoted a lot of effort to help. Third, the interaction should be initiated by providers, or initiated by recipients but provided smoothly and easily, the support interaction should be in private, the recipients should be treated with dignity and have opportunity to reciprocate. Lastly, the resources should be managed and used properly to maximise recipients' benefit. These results should be interpreted with a joint consideration of context and cultural norms, as the conditions under which social support interactions are most likely to benefit recipients may vary among different stress contexts and cultural backgrounds.

It has been argued that social support which is beneficial in a particular circumstance may be not suitable in other contexts (Cutrona & Russell, 1990). Relative to other contexts where social support may be mobilised, disaster is a community-level event that bring threat, harm, and loss to large numbers of people simultaneously (Kaniasty & Norris, 2004). Hence, the conditions under which social support interactions can benefit recipients in a postdisaster context may be different relative to other stressful or potentially traumatic contexts. To better interpret the findings of Study 3, we will discuss the kinds of context to which the aforementioned conditions can be generalised.

To begin with, the conditions relevant to 'management and utilisation of resources' and 'equity and fairness' may matter most in contexts where large numbers of people face difficulties simultaneously; for example, in the context of disaster and poverty relief. For these group exposures, it may be difficult or inefficient to distribute social support through one-to-one exchanges, and aid resources may instead be distributed by organisations including government bodies or non-government organisations (NGOs). In these circumstances, many resources will be controlled at the organisational-level, rather than by individual providers, and thus their approach to management of resources can affect recipients. Meanwhile, social comparison seems likely to occur among these survivors, which makes equity and fairness of distribution particularly important.

Another condition that need to be generalized with caution is 'the help interaction should be initiated by providers'. The unsolicited help is often viewed as conveying care and concern by disaster survivors, and the people who offer help are usually highly appreciated by disaster survivors. Thus, it is beneficial for disaster relief worker or volunteers to approach survivors actively, ask for their needs and offer help. However, it may not be wise to encourage people to provide unsolicited help in occupational context. In fact, a study have shown that help provided without request may be less beneficial than help provided in

response to request occupational context(H. W. Lee, Bradburn, Johnson, Lin, & Chang, 2019).

In contrast, other social support conditions may be relevant and important across a variety of contexts where social support is needed. These include needs matching in quantity (Wolff & Agree, 2004), needs matching in content (Rini & Dunkel Schetter, 2010), ease of obtaining support (Rini & Dunkel Schetter, 2010), respectfulness in delivery (Hays, Magee, & Chauncey, 1994; Wolff & Agree, 2004), and the opportunity to reciprocate (Gleason, Iida, Bolger, & Shrout, 2003; Hays et al., 1994; Liang, Krause, & Bennett, 2001; Wolff & Agree, 2004). It is reasonable to believe that the two conditions relating to providers (helping out of sincere intention and devoting substantial effort to help) are also suitable across such contexts context, although there is limited evidence currently to support this premise (Semmer et al., 2008). Similarly, it seems likely that the timeliness of support will be important in most contexts, although this also needs further empirical support.

The salience of conditions under which social support interactions are most likely to benefit recipients may vary across different cultures. For example, it was found that Latinos/as who experienced a natural disaster were reluctant to ask for help due to cultural factors (Rivera, 2012). Similarly, people from Chinese cultural backgrounds may also be reluctant to seek for help, due to the concern for loss of face (Shen, 2011). Thus, spontaneously offering help to survivors from these cultural backgrounds may be particularly important. The concern for face may partly explain why Chinese participants feel uncomfortable receiving help in public, which may not be an equivalent issue in other cultural settings.

6.4 Significance

1. Provide new evidences regarding the complex links with received social support and well-being

The first major contribution of this project was to provide novel data regarding the association between received social support and well-being in postdisaster contexts. The longitudinal mixed-method design suggested that receiving high quality social support can benefit disaster survivors in terms of producing immediate positive feelings, alleviating long-term negative mental health problems and promoting positive psychological changes. This evidence is important given that prior studies of actual received help in postdisaster contexts is limited, and has produced mixed results. Furthermore, the beneficial effects of received social support have been questioned, with some researchers arguing that received support may improve outcomes only if it modifies perceived support, whereby interventions should target perceived rather than received social support (Eagle, Hybels, & Proeschold-Bell, 2019; Haber, Cohen, Lucas, & Baltes, 2007). In contrast, the results of the current project indicated that inconsistencies across prior studies may be due to alternative approaches to operationalising received social support which have obscured the role and effects of the quality of support. By examining the influences of both quantity and quality of received social support on well-being, the current results have provided a potential answer to this controversy, and underscored the importance of jointly considering both support quantity and quality in future research.

2. Provide a new framework for the measurement of received social support in disaster context

Study 3 highlighted that receiving social support in a complex interactive process for help recipients, who were diversely affected by multiple features of these interactions and exchanges. This has shed light on the limitations of most standardised measures of received social support which have been applied in postdisaster contexts. These instruments have

typically measured the frequency of help behaviours, and are thus limited because they overlook many features of social support which can affect recipients (Norris, Murphy, Kaniasty, Perilla, & Ortis, 2001). By way of example, the item 'how often were you given, loaned, or offered money' does not reflect how well recipients were financially supported, given that (a) frequency does not equal the amount received, (b) the level of financial needs are not considered by such items (many disaster survivors may not receive money because they do not need it), and (c) there are other characteristics of the manner in which money is provided that may influence the likely benefits. For example, one survivor may be offered money immediately after a disaster, while another may receive money much later following the event and after being refused many times by different people. The current project suggests that these are key differences that would explain whether or not support interactions are likely to be beneficial.

To improve the validity of measurement of received social support, multiple features of support characteristics should be considered jointly. One approach would be to measure quantity of received social support along with quality via two independent scales. This was the approach adopted in Study 1 and Study 2 of this thesis. The scale of quality of received social support in this thesis can be further modified by adding items to cover the new features identified in Study 3. For example, possible items would be 'how often were you humiliated or criticized while receiving help or social support' (regarding the theme 'the process and manner of obtaining support'), or 'how often do you feel that people helped you out of true concern for your wellbeing' (regarding with the theme 'the genuineness of providers' willingness to help'). An alternative approach to improving measurement would be to develop a new comprehensive scale that would address how well help recipients were supported, and could potentially draw from the dimensions of social support interactions that were identified in Study 3.

3. Provide new perspectives on disaster relief and postdisaster psychological crisis intervention

Strategies for addressing psychological issues in postdisaster contexts have traditionally been considered the domains of mental health specialists. In contrast, this thesis has suggested that many routine disaster relief activities (e.g., distribution of disaster relief supplies) comprise an important source of social support for survivors, and can thus be either protective factors for well-being, or conversely, exacerbate negative psychological outcomes. For example, survivors may benefit psychologically if they receive adequate resources in a timely fashion, but may experience frustration and greater distress if resources are distributed unfairly.

The current evidence that routine disaster relief activities can either enhance or harm survivors' well-being is valuable for policy-makers and practitioners. For example, the guideline that disaster relief workers should not take anything from survivors may initially seems like a reasonable policy, but may inadvertently deny opportunities for survivors to reciprocate and express their gratitude and appreciation. Several participants in Study 3 expressed considerable discomfort about being unable to properly thank the people who had helped them. They also reported feeling uncomfortable and embarrassed when they had to take back food which they had tried to give to disaster relief soldiers. In this context, it may be helpful to provide information about what can be exchanged between survivors and disaster relief workers. For example, it can be made clear that money and food is not allowed, but pennants and letters are acceptable. For the survivors who wish to reciprocate, it may be beneficial to let them contribute in some way; for example, by helping with cooking or goods distribution. Hence, policy-makers and practitioners should consider the potential influences on well-being when formulating postdisaster policy and designing interventions.

6.5 Implications and recommendations

The finding that quality of received social support is an important influence on survivors' well-being has a number of implications for disaster relief policy and practice, and this section thus outlines recommendations for improving the quality of postdisaster social support.

6.5.1 Recommendations for providers of social support in postdisaster contexts

The current thesis indicates that recipients' perceptions of social support were heavily affected by the manner in which support was delivered, and there are a number of relevant recommendations from this thesis for support providers. In particular, in order to improve recipients' subjective experience of postdisaster social support:

- The probably most important strategy is to help sincerely and with no hidden agenda. Disaster survivors are highly sensitive to the motivations of people who help them, and they are particularly grateful to those who help in the absence of personal benefit. In contrast, they often feel disappointed and angry when they perceive that help providers are acting insincerely.
- Be initiative. Reach out to those affected by disaster, express care and concerns, ask for their needs and offer help if needed.
- Survivors should be treated with respect, and without criticism or judgement.
- Where possible, social support exchanges should be conducted in private.
- Where resources are distributed across multiple survivors, all help recipients should be treated equally, while any indications of favouritism should be avoided.
- Where possible, opportunities to reciprocate or express gratitude should be allowed.

6.5.2 Recommendations for recruitment and management of disaster relief personnel

In regard to the recruitment of disaster relief volunteers, there should be some attention to the sincerity of intentions of help. Recruitment interviews should explore motivations for

volunteering, distinguish those who really wish to help from those who come for curiosity or even try to use the disaster for personal gain or profit. Besides, the aforementioned recommendations for providers can be included in the orientation and training of disaster relief personnel. In addition, it is important to strengthen the supervision on disaster relief workers and officials to ensure that they give priority to the needs of the affected people. For example, setting up a hotline for reporting violations.

6.5.3 Recommendations for disaster management agencies

The results of Study 3 indicated that many complaints and sources of dissatisfaction from disaster survivors were with reference to the management of disaster recover initiatives. In particular, participants reported frustration when they felt that resources were limited due to poor management and utilization of disaster aid; for example, when informal donations were rejected by government agencies, and when resources received by the local government were not all delivered to those affected by disaster. This highlights the opportunity to increase wellbeing by improving community engagement and strengthening inter-agency coordination in disaster relief.

The overall response to the Lushan earthquake was characterised by a top-down approach in which disaster managers typically held power and the responsibility to determine responses. This was evident in the distribution of disaster relief supplies and housing reconstruction activities, where survivors had limited involvement in decision-making even when these were directly related to their homes and interests. As a result, some participants received supplies that were poorly matched to their needs, some were dissatisfied with way that houses were reconstructed by government, and others were unhappy because they thought there were better way of using funding. To some extent, these sources of tension may have been reduced by improving community engagement in disaster relief efforts. This has been

suggested previously in the World Disasters Report 2004, which recommends that communities are actively engaged so as to define their needs and to find appropriate solutions (IFRC, 2004). It has been also been suggested previously that disaster risk management processes should shift from top-down to people-centred or 'shared responsibility' approaches in which the power and responsibility for decision-making is shared among a variety of stakeholders, including people in disaster-affected communities (Howard, Agllias, Bevis, & Blakemore, 2017; Scolobig, Prior, Schröter, Jörin, & Patt, 2015). Community involvement and engagement is important for building trust and boosting community ownership for disaster risk reduction activities (Lee, 2016), and can also provide an opportunity to reciprocate social support exchanges.

There are many different ways in which communities can be engaged in disaster recovery efforts, including through invitations to contribute in needs identification. This thesis has highlighted the importance of needs matching in terms of social support, and also suggests that identifying the needs of survivors can be challenging in postdisaster contexts due to the large numbers and diversity of people affected. Study 3 also suggested that survivors may feel embarrassed and uncomfortable when reporting their own needs, and this suggests a role for neighbours and local officials who may be positioned to recognise the priorities of community members who are unwilling to disclose. However, it is also important to encourage survivors to report their own needs and the needs of other people in their social network. The reporting on the needs of others may address or bypass the reluctance of survivors to ask for help themselves. Furthermore, members of disaster-affected communities can also be supported to engage in the supervision of disaster relief activities. As recipients of disaster relief services, these community members may be well placed to identify biases and unfair approaches to aid distribution, and it may be beneficial for both help recipients and

mangers of disaster relief if members of affected communities had mechanisms to report potential issues.

Make social support easy to access. It is important to simplify the processes required in order to make requests for formal aid and support, and make it clear to public if there are specific people or departments that are responsible for these requests. It is also important to reduce the threshold for making use of support for survivors. For example, in some disaster area, survivors can only obtain rebuilding subsidies after they started rebuilding, thus this subsidy became unavailable for those that were unable to start the rebuilding immediately.

Maximum efforts should be made to promote equity and fairness of disaster relief activities. Study 3 contributes to prior research which has shown that unfairness can erode trust in people and agencies that are responsible for disaster relief (Akbar & Aldrich, 2017). In addition to favouritism among disaster relief personnel, there may also be inequality across different segments of the disaster-affected population. For example, people who lived near the epicentre of the quake often received more support due to intense media coverage, while survivors in more readily accessible areas are also more likely to receive support than those living in remote regions. Hence, additional efforts could be devoted to identify and supporting groups who are neglected. It is noteworthy that people may have different understanding on what constitute fairness in disaster relief (Johnston, 2014). It may be beneficial for policy makers to investigate how the affected population interpret fairness.

6.6 Strengths

To the best of our knowledge, this is the first theoretically-based research project that has explicitly assessed quality of received social support in a postdisaster context, and thus provides greater understanding of the effect of received social support on survivors'

psychological outcomes. In addition, Study 3 is the first to explore what matters to recipients in their evaluation of social support experiences in a postdisaster context.

The thesis was based on a longitudinal mixed-method design which provided both breadth and depth of information on the effects of received social support on disaster survivors through convergence and triangulation of findings across three studies. A major advantage of longitudinal design over cross-sectional design is that it allows for inferring causation (VanderWeele, Jackson, & Li, 2016). With two longitudinal quantitative studies (Study 1 and Study 2), the causal inferences regarding the relationship between negative mental health outcomes (posttraumatic stress symptoms and psychological distress), and PTG received social support and were drawn. These two studies demonstrated that received social support had influences on disaster survivors' long-term well-being, both in terms of alleviating negative mental health outcomes and promoting positive psychological changes. The qualitative study contributed rich and in-depth narrative evidence regarding how social support interactions can affect recipients' immediate feelings and perceptions. A particular strength of the mixed-method design was the triangulation of findings from different methods, which provides stronger evidence and support for the broad conclusion that the benefits of received social support are conditional on contextual factors. The two quantitative studies (Study 1 and Study 2) found that the receiving greater amount of social support did not necessarily lead to better long-term well-being, and the effects of received social support was determined, in part, on the quality of support. Similarly, the qualitative study (Study 3) highlighted a range of conditional factors that may determine the experiences of social support interactions for recipients.

6.7 Limitations

Despite the major strengths of this thesis, there were also various limitations that are important to consider when interpreting the results. To begin with, the reference period for

considering social support was different across quantitative and qualitative studies. In the two quantitative studies (Study 1 and 2), survey questions were about social support received in the first 7 months after the earthquake (T1), while the interview questions in Study 3 addressed support experiences from the earthquake until 31 months post-earthquake (T2). In fact, the initial design of Study 3 endeavoured to address the same period of social support as assessed in Study 1 and 2, but during the pilot interview it was apparent participants still shared many experiences beyond of the reference period, and these were rich in information relating to the research question. Thus, the reference period for questions about social support in Study 3 was ultimately from the earthquake until 31 months post-earthquake. Given that both quantitative and qualitative approaches were used in this thesis, the remaining discussion of the methodological limitations will be organized in terms of these two approaches.

6.7.1. Limitations of Study 1 and 2

Study 1 and Study 2 were based on the same prospective quantitative methodology, and thus share the same limitations. First, the external validity of the findings is limited by unique characteristics of the sample which was recruited with convenience sampling methodology. For example, the participants reported low levels of trauma exposure on average, which indicate that they were not severely affected by the disaster, and consequently may experience less mental health problems than those severely exposed to disaster. Thus, the current finding may not be generalized to people severely affected by the disaster. Second, like all longitudinal studies, the current sample was further affected by sample attrition (19% attrition rate). Third, the self-developed measures of quantity and quality of received support, although modelled on empirically established instruments, had not been validated prior to data collection. And only internal consistency reliability of the two self-developed scales were examined, the psychometric properties of the scales need to be

evaluated with further studies. Four, though questions were intended to measure support received in the first seven months after the earthquake, quality of support was measured at 31 months after the disaster, and was thus based on retrospective recall. Though retrospective data often suffer from recall bias, previous studies have suggested that the accuracy of retrospective collection varied with the type of data (Berney & Blane, 1997; Jacobs, 2002), and received support in disaster context can be assessed retrospectively with adequate reliability (Norris & Kaniasty, 1992). The narratives of Study 3 also suggested that participants in the current study remembered clearly about the help they received shortly after the earthquake. Thus, it is unlikely that the data regarding quality of received social support were severely affected by recall error.

Five, the sample size of the current study was not calculated based on prospective power test prior to data collection, the ultimate sample size (n=161) was not large, and there may have been insufficient power to detect interaction effects between quantity and quality of received social support, in particular. Last, although it is common to use frequency as the measurement index for quantity of received social support, it should be noted that frequency does not necessarily correspond with the total amount of support received. It is possible that participants receive a specific help frequently but low in total amount due to the low average amount each time. More importantly, inspired by the findings of study 3, it may be more reasonable to measure the relevant quantity of support received (e.g., the extent of matching with needs) rather than to measure the absolute quantity of received support.

6.7.2. Limitations of Study 3

First, the study was conducted 31 months after the Lushan earthquake, and a large proportion of the social support interactions reported by the participants occurred in the first few months after the earthquake. Therefore, the participants' perceptions of these interactions reported at the time of interviewing may not be the same as when they first received the

support. In other words, the participants' perceptions of their social support interactions may have been affected by the long-term course of disaster recovery. The cross-sectional design of the current study meant that this influence could not be identified. Second, as this study focused on recipients' perceptions of social support interactions, people affected by disaster were mainly treated as help recipients during interviewing. However, it should be noted that the population affected by the Lushan earthquake engaged actively in mutual assistance as well, their social support interactions as providers were not explored in this study. A third limitation is that questions were not asked about social support received from different providers, including government, volunteers and family or friends. Finally, the interviews narratives were in the local dialect, and some information and nuance may be lost when conducting thematic analysis Mandarin, and also when translating the results to English.

6.8 Future directions

The current thesis suggests a number of important directions for future research. For example, in the aftermath of disaster survivors do not wait passively for support and instead they work to help themselves and each other. As such, it is important to know more about survivors' experiences of providing support to disaster relief workers and other survivors. In the context of data collection for Study 3, almost all participants described experience of helping others, even though they were only asked to report their experiences of receiving help. This is in line with a study which reported that 60% of households reporting exchanging mutual support with neighbours and friends after Cyclone Sidr (Islam & Walkerden, 2014). Similar to experiences of receiving help, the experiences of providing support may be both positive and negative. For example, one participant in Study 3 reported that the event which influenced him deeply was an experience of providing help rather than receiving it (he was cheated by the person he helped and lost a significant amount of money). As support providers, survivors may receive positive feedback from recipients, such as

gratitude. They may also be misunderstood, blamed or criticized. Previous studies which have sampled the people who are both helpers and survivors mainly focus on those who provide help as part of their work responsibilities (e.g., health professionals, disaster relief officials) (Hugelius, Adolfsson, Örtenwall, & Gifford, 2017). Accordingly, there has been less attention paid to the large number of survivors who are involved in the provision of informal types of support, and it seems important to know more about the nature and effect of these experiences, and the conditions under which help provision may be beneficial.

Perceived social support, which is the belief that help would be available if needed, is often regarded as a reflection of a person's individual history of receiving effective social support (Lakey, Orehek, Hain, & VanVleet, 2010), and has been found to be consistently linked to good mental health (Brewin, Andrews, & Valentine, 2000; Cherry et al., 2015). However, a range of studies also show that perceived social support is only modestly correlated with received social support (Haber et al., 2007; Lakey et al., 2010). It is noteworthy that only quantity of received social support was measured in these studies. A more thorough examination of the relationship between received and perceived social support can be achieved by a joint consideration of both quantity and quality of the received support.

6.9 Key messages

1. Greater quality of social support received 7 months after disaster predicted lower posttraumatic stress symptoms and psychological distress two years later. In contrast, quantity of received social support was not a significant predictor of these two outcomes. The findings thus indicate that what appears to be critical in the process of supporting disaster survivors is the quality, not necessarily the quantity, of support provided.

2. The association between quantity of received social support and PTG was moderated by the quality of received social support. Specifically, for survivors who received high quality postdisaster social support, greater amounts of support received was related to improved

posttraumatic growth. However, for those survivors who received poor quality of support, greater quantity of support impeded development of psychological benefits associated with disaster exposure. These findings indicate that both quantity and quality of support received in the aftermath of disaster are critical for understanding survivors' posttraumatic growth and psychological recovery.

3. Recipients' perceptions on the social support following disaster varied according to a range of features of support interactions. First, recipients cared about features of the outcomes of social support interactions; that is, whether the support that was received fulfilled their needs, and also whether distribution of support was equal and fair. Second, they cared about whether the interaction goes smoothly and easily; whether the interaction is initiated by providers; whether the interaction is public and therefore witnessed by others; whether they are treated with dignity in the interaction; and whether they have opportunities to reciprocate. Third, they cared about characteristics of help providers, including whether they sincerely wanted to help them, and what they have devoted in order to provide assistance. Last, they cared about features of how resources were managed; specially, the efficacy and appropriateness regarding the management of disaster relief resources.

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APPENDICES

Appendix A. Correlation tables of Study 1

Appendix B. Instruments of quantity and quality of received social support

Appendix C. All the questionnaires used at T2 (Chinese and English Version)

Appendix D. Interview protocol (Chinese and English Version)

Appendix E. Participation information and consent form (Chinese and English Version)

Appendix F. Declaration for thesis with publication and co-authorisation form (Paper 1 and Paper 2)

Appendix G. Ethics approval (Peking Universty and The University of Melbourne)

Appendix H. Published papers

Appendix A. Correlation tables of Study 1

Table 7.1

Intercorrelations among variables in T2 PTSD regression model

	1	2	3	4	5
1. Earthquake trauma	-	-	-	-	-
2. Material losses	.20**	-	-	-	-
3. Quantity of RSS	.08	-.18**	-	-	-
4. Quality of RSS	-.01	-.22**	.38**	-	-
5. T1 PTSD	.24**	.37**	-.18*	-.30**	-
6. T2 PTSD	.32**	.37**	-.11	-.30**	.59**

Note. $N = 161$. * $p \leq .05$, ** $p \leq .01$. PTSD = Posttraumatic stress disorder.

Table 7.2

Intercorrelations among variables in T2 GHQ regression model

	1	2	3	4	5
1. Earthquake trauma	-	-	-	-	-
2. Material losses	.20**	-	-	-	-
3. Quantity of RSS	.08	-.18**	-	-	-
4. Quality of RSS	-.01	-.22**	.38**	-	-
5. T1 GHQ	.19**	.37**	-.24**	-.29**	-
6. T2 GHQ	.15	.23**	-.13	-.37**	.52**

Note. $N = 161$. * $p \leq .05$, ** $p \leq .01$. GHQ = General health questionnaires.

Appendix B. Instruments of quantity and quality of received social support

Quantity of Received Social Support

These questions are about the help you actually received after the earthquake till now (7 months following the earthquake). The help does not have to be connected to the earthquake. We are interested in all your activities, whatever the reason. The best approach is to answer fairly quickly. Don not try to count up the number of times these things happened; rather, indicate a reasonable estimate the frequency of the help.

1 = almost never，2 = rarely, 3 = often, 4 = very often

01	Listened when you want to talk (Emotional)	1	2	3	4
02	Invite you to a party or group events (Social)	1	2	3	4
03	Helped you do something, such as housework, babysitting or keep track of your things (Instrumental)	1	2	3	4
04	Helped you understand a situation or what was going on (Informational)	1	2	3	4
05	Offered or provided place to stay or helped you repair your house (Instrumental)	1	2	3	4
06	Comforted with expression or physical affection (Emotional)	1	2	3	4
07	Invited you to have fun together (Social)	1	2	3	4
08	Gave, loaned, or offered money (Instrumental)	1	2	3	4
09	Gave information on the access to service or materials (Informational)	1	2	3	4
10	Provided service for you such as medicalservice, Psychological consultation, skill training etc.(Instrumental)	1	2	3	4
11	Suggested an action you could take or gave information on how to do something (Informational)	1	2	3	4
12	Said something to make you feel relaxed or comfortable (Emotional)	1	2	3	4
13	Gave, loaned, or offered other thing than money, such as clothes, food and instruments etc.(Instrumental)	1	2	3	4
14	Did something together with you to shift your attention from negative things (Social)	1	2	3	4

Quality of Received Social Support

After the Lushan earthquake, you may sometimes need help or support from the government, your friends and relatives. The following questions ask about your experiences of receiving in the first 7 months following the earthquake.

1=Never, 2=seldom/rarely, 3=sometimes, 4=often, 5=very often

01. How often did you feel that the amount of help you received after the earthquake was not enough for your needs?
02. How often did you feel you were treated unfairly when you received help after the earthquake?
03. How often were you involved in conflicts or disagreements in the process of receiving post-disaster aid?
04. How often did you have to compete with others for help and aid?
05. How often did feel that you were bullied, obstructed or persecuted by others when you received help?
06. How often did you feel that the help you needed arrived too late for it to be useful?
07. How often did you feel that getting the help you needed was just too difficult to accomplish?
08. How often did the help you received match the amount of aid that you needed? That is, the amount of aid was not too little or too much, it was just right?
09. How often the help you received matched (was fitting) in terms of what you need you needed… that is the type of help you received was what you wanted, was what needed?
10. How often did you feel that the people who were trying to help you did not know what to do to help you or did not understand your needs?
11. How often was the help you received from others provided skillfully and sensitively, that is, in such a way that you did not feel uncomfortable in needing it?
12. How often did people help you without you actually asking for help?

Appendix C. All the questionnaires used at T2 (Chinese and English Version)

负责单位：墨尔本大学精神病学系 北京大学精神卫生研究所

芦山地震后灾区居民社会支持与心理健康的随访研究

调查问卷

被试姓名：＿＿＿＿＿＿＿＿＿＿

地区：＿＿＿＿县/区＿＿＿＿镇/乡＿＿＿＿村

调 查 编 号：□□□□

填表人姓名：＿＿＿＿＿＿＿＿＿＿

调 查 日 期：□□□□年□□月□□日

质检员姓名：＿＿＿＿＿＿＿＿＿＿

质 检 日 期：□□□□年□□月□□日

二 〇一五 年 十一 月

芦山地震后灾区居民社会支持与心理健康的随访研究
调查表

A、一般资料

题目	调查内容	
A00	调查编号：□□□□	
A01	您目前职业状态是	1=全职工作（本地，外地） 2=临时工作（本地，外地） 3=离退休 4=务农，无其他收入 5=照顾家庭无收入 6=其他
A02	您的职业状态与地震前比是否有变化	1=无变化 2=变好了（请说明：　　） 3=变差了（请说明：　　）
A03	您目前关系状态	1=已婚或有事实婚姻且在一起居住 2=结婚或有事实婚姻但不在一起居住 3=分居，离婚或丧偶 4=处于恋爱关系但并未同居 5=单身
A04	目前居住状态	1=独自居住 2=与家人一同居住 3=与其他人一同居住（请注明：　　）
A05	考虑到目前的需求和家庭责任，您认为您的家庭经济状况为	1=非常贫穷 2=贫穷 3=勉强维持 4=比较舒适 5=非常舒适

		6=富裕
A06	您的经济状况与地震前比	1=变差了很多 2=变差了一点 3=基本没变化 4=变好了一点 5=变好了很多
A07	您如何评价您总体的健康状况	1=非常差 2=差 3=还行 4=好 5=非常好
A08	您的健康状况与地震前相比有什么变化	1=变差了很多 2=变差了一点 3=基本没变化 4=变好了一点 5=变好了很多
A09	您如何评价您的生活质量	1=非常差 2=差 3=还行 4=好 5=非常好
A10	您的生活质量跟地震前相比有什么变化	1=变差了很多 2=变差了一点 3=基本没变化 4=变好了一点 5=变好了很多
A11	您对您的健康状况满意么	1=非常不满意

		2=不满意 3=还行 4=满意 5=非常满意
A12	您目前住在哪里	1=地震前修建的房子 2=地震后修建的房子 3=其他（请注明：　　）
A13	您现在的邻居是	1=地震前的邻居 2=新的邻居
A14	请选择最近 1 年内发生过的不良事件，如果此事发生在 1 年前但仍对现在有不良影响也要选择（不良影响是指某问题导致情绪或行为的负性改变，如担心，焦虑，睡不好，吃不下饭，脾气变坏等）	1=恋爱或结婚问题 2=与生育有关的问题 3=夫妻间发生矛盾 4=与家庭其他成员发生矛盾 5=与其他人发生矛盾 6=家庭其他成员间发生矛盾 7=患急、重病或外伤 8=经济问题 9=工作或学习问题 10=亲友患重病或去世 11=躯体虐待 12=性虐待 13=其它负性生活事件（如有，请注明：　　）
A15	在两年前我们上次见面（2013 年 11 月）到现在为止，您是否有过可怕的经历	1=经历过灾难（另一场地震，洪水，火灾等） 2=经历过严重的事故（交通事故，工作事故，其他事故） 3=经历过其他觉得特别可怕甚至有生命危险的事情（请说明：　　）

B、接受到的社会支持的质（I）

指导语：地震后您可能有时需要获得从政府，朋友和亲戚那里获得帮助。请回忆**地震发生后到我们上次见面期间（2013 年 11 月，地震后前 7 个月，也就是政府每人每天补助 10 块钱 1 斤米结束前的日子**）您的经历，并判断以下情形在那段时期发生的频率。

1=从来没有， 2=很少， 3=有时 ， 4=经常 ， 5=非常经常

B01 您觉得地震后您接受到的帮助不够满足您的需要	1	2	3	4	5
B02 您觉得您在地震后接受帮助时受到不公正待遇	1	2	3	4	5
B03 您在接受帮助的时候卷入了冲突和争执中	1	2	3	4	5
B04 您不得不与其他人争夺帮助和救援	1	2	3	4	5
B05 您感到在接受帮助时被他人欺负，为难或者伤害	1	2	3	4	5
B06 您觉得您接受到的帮助来的太晚了以致都没那么有用了	1	2	3	4	5
B07 您觉得获得所需要的帮助太难了，简直无法完成	1	2	3	4	5
B08 您觉得您获得的帮助的量刚好符合您的需求，也就是说不多不少刚刚好	1	2	3	4	5
B09 您所获得的帮助符合您的需要，也就是说您获得的帮助的类型刚好是您所需要的	1	2	3	4	5
B10 您觉得那些来帮您的人不知道您的需求或者不知道该做什么来帮助您	1	2	3	4	5
B11 他人给予您的帮助是细心的和有技巧的，也就是不会让您因为需要帮助而觉得不舒服	1	2	3	4	5
B12 您没开口别人就来帮您	1	2	3	4	5
B13 您接受帮助的时候觉得被评论或者被批评	1	2	3	4	5
B14 您接受帮助的时候觉得被轻视或者不被尊重	1	2	3	4	5
B15 您接受帮助时觉得欠人情，亏欠别人	1	2	3	4	5

B16 即使在接受到帮助后您仍感到无助甚至绝望	1	2	3	4	5
B17 您接受帮助时感到难为情或尴尬	1	2	3	4	5
B18 您在接受帮助时感到内疚	1	2	3	4	5
B19 您在接受帮助时感到生气	1	2	3	4	5
B20 您在接受帮助时感到无能或者失败	1	2	3	4	5
B21 您在接受帮助时觉得挫败	1	2	3	4	5
B22 您在接受帮助时觉得自己像个乞丐	1	2	3	4	5

C、接受到社会支持的质（II）

指导语：您在芦山地震后接受帮助的经历可能在某种程度上影响您或者改变您。您在多大程度上认为以下的陈述是符合您的。

1=一点也不符合，2=很小程度符合，3=中等程度符合，4=很大程度符合，5=非常符合

C01 总的来说我接受到的帮助让我有信心能处理遇到的事情	1	2	3	4	5
C02 总的来说我接受到的帮助给了我希望和乐观的感觉	1	2	3	4	5
C03 总的来说我接受到的帮助让我继续前行不放弃	1	2	3	4	5
C04 总的来说我接受到的帮助让我相信我还可以对我的生活有所掌控	1	2	3	4	5
C05 总的来说我接受到的帮助让我感到被他人关心和被爱	1	2	3	4	5
C06 总的来说我接受到的帮助让我相信寻求帮助是正常的，也是有用的	1	2	3	4	5

D、12 项一般健康问卷（GHQ-12）

指导语：您们将了解您最近几周内的身体健康状况。在以下问题中最适当的一栏划上圆圈。

D01 在做什么事情的时候，能集中精神吗	能集中	和平时一样	不能集中	完全不能集中
D02 有由于过分担心而失眠的情况吗	没有过	和平时一样	有过	总这样
D03 觉得自己是有用的人吗	有用	和平时一样	没有用	完全没有用
D04 觉得自己有决断力吗	有	和平时一样	没有	完全没有
D05 总是处于紧张状态吗	不紧张	和平时一样	紧张	非常紧张
D06 觉得自己不能解决问题吗	能	和平时一样	不能	完全不能
D07 能享受日常活动吗	能	和平时一样	不能	完全不能
D08 能够面对您所面临的问题吗	能	和平时一样	不能	完全不能
D09 感到痛苦、忧虑吗	不觉得	和平时一样	觉得	总是觉得
D10 失去自信了吗	没有	和平时一样	失去	完全失去
D11 觉得自己是没有价值的人吗	不觉得	和平时一样	觉得	总是觉得
D12 觉得所有的事情都顺利吗	顺利	和平时一样	不顺利	完全不顺利

E、创伤后障碍筛查量表（PCL-C）

指导语：下面是一些人们在面对应激事件后的出现的问题或反应。请仔细阅读并评价在**过去的一个月中**，您被这些问题或反应困扰的程度。

1=没有发生　2=轻度　3=中度　4=重度　5=极重度

E01	反复出现关于地震的令人不安的回忆、念头或影像	1	2	3	4	5
E02	反复梦到令人不安的关于地震的内容。	1	2	3	4	5
E03	突然出现仿佛地震再次发生的行为或感受（仿佛您再次体验地震）。	1	2	3	4	5
E04	当某些事件使您回忆起地震时，感到心情非常糟糕	1	2	3	4	5
E05	当某些事件使您回忆起地震时，出现身体上的反应（如心跳加快，呼吸困难，出汗）。	1	2	3	4	5
E06	回避想到或谈论地震，或者回避产生与之相关的体验	1	2	3	4	5
E07	回避容易使人联想起地震的活动或情景。	1	2	3	4	5
E08	回忆地震的重要部分时，感到有困难。	1	2	3	4	5
E09	对过去热衷的活动丧失兴趣。	1	2	3	4	5
E10	感到与他人疏远或隔离。	1	2	3	4	5
E11	情感麻木或者没有能力对身边亲近的人产生爱的感觉。	1	2	3	4	5
E12	觉得自己的未来在某种程度上被缩短了。	1	2	3	4	5
E13	难以入睡或不能安眠。	1	2	3	4	5
E14	易被激惹，或者常发怒。	1	2	3	4	5
E15	注意力难以集中。	1	2	3	4	5
E16	过分警觉或小心。	1	2	3	4	5
E17	容易受到惊吓。	1	2	3	4	5

F、创伤后成长调查问卷

下面的陈述是地震发生后可能给您的生活带来的变化，请根据您的实际情况再相应的数字上画圈。

0=没有变化 1=变化很小 2=变化较小 3=变化一般 4=变化较大 5=变化很大

F01	您更懂得生命中哪些事情对您来说更重要。	0	1	2	3	4	5
F02	您更愿意尝试去改变那些需要改变的事情。	0	1	2	3	4	5
F03	欣赏您自己生命的价值。	0	1	2	3	4	5
F04	您发现在生活中遇到问题时，您可以靠自己的力量去解决。	0	1	2	3	4	5
F05	更能够理解某些神秘的事情（如宗教、神灵、命运之神等）。	0	1	2	3	4	5
F06	在遇到麻烦的时候，您可以找别人求助。	0	1	2	3	4	5
F07	感觉和别人更加亲近。	0	1	2	3	4	5
F08	遇到问题的时候，知道自己能够处理，	0	1	2	3	4	5
F09	愿意向他人诉说自己的情绪。	0	1	2	3	4	5
F10	能够接受事情自然发展的方式（顺其自然）。	0	1	2	3	4	5
F11	珍惜每一天。	0	1	2	3	4	5
F12	能够理解别人的痛苦。	0	1	2	3	4	5
F13	在活着的时候，您应该把事情做得更好，不留下遗憾。	0	1	2	3	4	5
F14	您的生活中出现了以前根本不可能出现的机会。	0	1	2	3	4	5
F15	重视自己的人际关系。	0	1	2	3	4	5
F16	更加理解信仰宗教的行为。	0	1	2	3	4	5
F17	您发现您比自己想象的要坚强。	0	1	2	3	4	5

F18	您懂得了人是多么的美好。	0	1	2	3	4	5
F19	您培养了新的兴趣。	0	1	2	3	4	5
F20	知道自己在有些情况下是需要他人的，并且能够接受这一事实。	0	1	2	3	4	5
F21	您为自己的人生寻找到了新的道路。	0	1	2	3	4	5
F22	更加理解冥冥之中有某种不可控的力量存在。	0	1	2	3	4	5

G、感知到的社会支持

指导语：下面描述的情况对您来说可能是准确的（符合您**目前的想法**），也可能一点都不准确（完全不符合您现在的想法）。请逐一评价。

1 =非常不准确;2 = 有一点准确;3 =有些准确;4 =比较准确 5=特别准确

G01	您缺钱但是无法借到	1	2	3	4	5
G02	如果您想跟其他人一起玩，您能找到人	1	2	3	4	5
G03	消息不灵通，对那些有用的消息（如可用的服务和资源）常常知道的比别人晚	1	2	3	4	5
G04	您感到您对某些人来说是很重要的	1	2	3	4	5
G05	您身边的人只是表面上友好，但是他们并不是真的关心您	1	2	3	4	5
G06	假如您需要一些材料或工具，您能借到它们	1	2	3	4	5
G07	通常都没有人邀请您一起做事	1	2	3	4	5
G08	当您拿不定主意的时候，能找到人给您建议	1	2	3	4	5
G09	您心情不好的时候，找不到人来陪您做些事情转移注意力	1	2	3	4	5
G10	当您情绪不好的时候，会有人主动安慰您	1	2	3	4	5
G11	您需要找人帮您干活，但是您几乎找不到人帮您	1	2	3	4	5
G12	若周围有新鲜事发生，会有人主动告诉您	1	2	3	4	5
G13	当您有心事的时候，找不到人诉说	1	2	3	4	5
G14	如果您需要，会有人无偿的给您钱或物	1	2	3	4	5
G15	如果您想知道别人怎么看待您的想法或行为，没有人会告诉您	1	2	3	4	5
G16	您有自己的小圈子或关系网	1	2	3	4	5

H、感知到的社区凝聚力

指导语：下面的这些问题是有关您对周围人的感受和看法的，特别是关于**现在地震2年后**大家都是怎么看待其他人的。请用来评价您们社区的人或您的邻居。

1=非常不同意 2=不同意 3=同意 4=非常同意

H01	现在地震过去2年了，与地震前相比大家对彼此越来越友好，您是否同意这个说法	1	2	3	4
H02	我相信地震2年后人们对彼此更加真挚、坦诚和开放	1	2	3	4
H03	大家比地震前更经常争吵	1	2	3	4
H04	我相信地震的结果是使这里的人们更加和睦和团结	1	2	3	4
H05	好像地震后大家变得更少包容更少原谅	1	2	3	4
H06	地震教会了大家更加尊重他人的感受和观点	1	2	3	4
H07	地震是造成大家不互相信任的原因	1	2	3	4
H08	我认为地震让大家理解了彼此和睦相处友好相待的重要性	1	2	3	4
H09	我相信今天大家更能感受到我们是社区的一部分。换句话说，大家彼此团结的意识更强了。	1	2	3	4
H10	现在，大家比地震前更信任彼此	1	2	3	4

J、生活满意度量表

指导语：请仔细阅读下列5项，并在1-7点量表上评价您对各项的同意程度，请以开明和诚实的态度作答。

1=非常不同意 2=不同意 3=有点不同意 4=中立 5=有点同意 6=同意 7=非常同意

J01	我的生活大致符合我的理想	1	2	3	4	5	6	7
J02	我的生活状况非常圆满	1	2	3	4	5	6	7
J03	我满意自己的生活	1	2	3	4	5	6	7
J04	直至现在为止我都能够得到我在生活上希望拥有的重要东西	1	2	3	4	5	6	7
J05	如果我能重新活过，差不多没有东西我想改变	1	2	3	4	5	6	7

K、 兴盛人生量表

指导语：以下八项表述您可能同意也可能不同意，请用1到7来评价您在多大程度上同意这些表述。

1=非常不同意 2=不同意 3=有点不同意 4=中立 5=有点同意 6=同意 7=非常同意

K01	我的生活有目标和意义	1	2	3	4	5	6	7
K02	我的社交关系能支持我且使我获益	1	2	3	4	5	6	7
K03	我对日常活动又投入又感兴趣	1	2	3	4	5	6	7
K04	我积极为他人的幸福和快乐做贡献	1	2	3	4	5	6	7
K05	我能胜任且做到对我重要的事	1	2	3	4	5	6	7
K06	我是一个好人并且过着好的生活	1	2	3	4	5	6	7
K07	我对我的未来乐观	1	2	3	4	5	6	7
K08	别人尊重我	1	2	3	4	5	6	7

非常感谢您的参加！

Lushan earthquake study T2 Instruments

Thank you for taking part in this study, all these questions will be read to you by interviewers; please don't spend too much time on any one question. Just record your initial response without thinking too much about it.

General Information

(Designed by the researcher)

Survey NO：□□□□	Contact：□□□□□□□□□□□
A01. What is your current occupation	1=Full time work (at hometown, other places) 2=Casual or part-time work (at hometown, other places) 3=Retired 4=Farmers 5=Look after family with no income 6=Other
A02. How did your occupation change after the earthquake	1=Stay the same 2=Get better (please specify) 3=Get worse (please specify)
A03. What is your current relationship status	1=Married or de facto and living together 2=Married or de facto and not living together 3=Separated, divorced or widowed 4=In a relationship and not living together 5=Single
A04. What is your current household	1=Lived alone 2=Lived with families 3=Lived with other people (specify:)
A05. Given your current needs and financial responsibilities, would you say that you and your family are	1=Very poor 2=Poor 3=Just getting along 4=Reasonably comfortable

	5=Very comfortable 6= Prosperous
A06. How did your financial status change after the earthquake	1=Dropped largely 2=Dropped slightly 3=Stay the same 4=Increase slightly 5=Increase largely
A07. In general how would you rate your overall health	1=Very poor 2=Poor 3=Fair 4=Good 5=Very good
A08. How did your health status change after earthquake	1=Became poorer to a large extent 2=Became poorer slightly 3=Stay the same 4=Improve slightly 5=Improve largely
A09. How would you rate your quality of life	1=Very poor 2=Poor 3=Neither poor nor good 4=Good 5=Very good
A10. How did your quality of life change after earthquake	1=Deteriorate largely 2=Deteriorate slightly 3=Stay the same 4=Improve slightly 5=Improve largely
A11. How satisfied are you with your health	1=Very dissatisfied 2=Dissatisfied 3=Neither satisfied nor dissatisfied

	4=Satisfied 5=Very satisfied
A12. Where is your current residence	1=House built before earthquake 2=House built after the earthquake 3=Other (Please specify:)
A13. Did you change neighbors after the earthquake	1=Former neighbors 2=New neighbors
A14. Negative life occurred within recent a year or occurred one year ago but still have influence to current life	1=Love or marriage issue 2= Fertility issue 3=Conflicts between you and your partner 4=Conflicts between you and other family members 5=Conflicts between you and other people except family members 6=Conflicts between family members 7= You were ill or injured seriously 8=Economic issue 9=Work or study issue 10= Family members or close friends seriously ill or died 11=You were physical abused 12=You were sexually abused 13=Other negative life events (specify:)
A15. Please tell us about any horrible experience occurred SINCE our last meeting two years ago, in October/November 2013?	1=You were a victim of a disaster (e.g. another earthquake, flood, fire) 2=You were a victim of a serious accident (e.g. transportation accident, accident at work, accident somewhere else) 3= You were involved in an horrible event even in danger of life, please specify

B. Instrument on Quality of Received Help Post-disaster: Part I

(Designed by the researcher)

After the Lushan earthquake, you may sometimes need help or support from the government, your friends and relatives. The following questions ask about help or support you may want to receive or actually received in the first 7 months and what you thought of it.

1=Never, 2=seldom/rarely , 3=sometimes , 4=often , 5=very often

B01. How often did you feel that the amount of help you received after the earthquake was not enough for your needs?

B02. How often did you feel you were treated unfairly when you received help after the earthquake?

B03. How often were you involved in conflicts or disagreements in the process of receiving post-disaster aid?

B04. How often did you have to compete with others for help and aid?

B05. How often did feel that you were bullied, obstructed or persecuted by others when you received help?

B06.How often did you feel that the help you needed arrived too late for it to be useful?

B07. How often did you feel that getting the help you needed was just too difficult to accomplish?

B08. How often did the help you received match the amount of aid that you needed? That is, the amount of aid was not too little or too much, it was just right?

B09. How often the help you received matched (was fitting) in terms of what you need you needed… that is the type of help you received was what you wanted, was what needed?

B10. How often did you feel that the people who were trying to help you did not know what to do to help you or did not understand your needs?

B11. How often was the help you received from others provided skilfully and sensitively, that is, in such a way that you did not feel uncomfortable in needing it?

B12. How often did people help you without you actually asking for help?

B13. How often did you feel judged or criticized when you received help?

B14. How often did you feel you were looked down on or disrespected when you received help?

B15. How often did you feel indebted, like you owed something to others when you received help?

B16. How often did you helpless or hopeless after you received help?

B17. How often did you feel ashamed or embarrassed when you received help?

B18. How often did you feel guilty when you received help?

B19. How often did you feel angry when you received help?

B20. How often did you feel incompetent or a failure when you received help?

B21. How often did you feel frustrated when you received help?

B22. How often did you feel like a beggar when you received help?

C. Instrument on Quality of Received Help Post-disaster: Part II

(Designed by the researcher)

Your experience of receiving help after Lushan earthquake may have influenced you or changed you in some way, to some extent. To what extent do you believe that each of the following statements is true about you:

1=Not at all, 2=To a Small Extent, 3=To a Moderate Extent, 4=To a Large Extent, 5=To a Very Large Extent

C01. In general the help I received made me feel confident I can cope with this event.

C02. In general the help I received gave me hope and a sense of optimism

C03. In general the help I received kept me going and helped me to not give up

C04. In general the help I received helped me to believe I still have some control over my life

C05. In general the help I received made me feel I am cared for or loved by others

C06. In general the help I received made me believe it is normal and useful to ask for help

D. 12-item General Health Questionnaire (GHQ-12)

(Standard survey instrument)

We want to know how your health has been in general over the last few weeks. Please read the questions below and each of the four possible answers. Circle the response that best applies to you. Thank you for answering all the questions.

Have you recently:

D01. been able to concentrate on what you're doing?

- better than usual
- Same as usual
- Less than usual
- much less than usual

D02. Lost much sleep over worry?

- not at all
- no more than usual
- rather more than usual
- much more than usual

D03. Felt that you are playing a useful part in things?

- more so than usual
- same as usual
- less so than usual
- much less than usual

D04. felt capable of making decisions about things?

- more so than usual
- same as usual
- less so than usual
- much less than usual

D05. Felt constantly under strain?

- not at all
- no more than usual
- rather more than usual
- much more than usual

D06. Felt you couldn't overcome your difficulties?

- not at all
- no more than usual
- rather more than usual
- much more than usual

D07. been able to enjoy your normal day to day activities?

- more so than usual
- same as usual
- less so than usual
- much less than usual

D08. been able to face up to your problems?

- more so than usual

- same as usual
- less so than usual
- much less than usual

D09. Been feeling unhappy or depressed?

- not at all
- no more than usual
- rather more than usual
- much more than usual

D10. Been losing confidence in yourself?

- not at all
- no more than usual
- rather more than usual
- much more than usual

D11. Been thinking of yourself as a worthless person?

- not at all
- no more than usual
- rather more than usual
- much more than usual

D12. Been feeling reasonably happy, all things considered?

- not at all
- no more than usual
- rather more than usual
- much more than usual

E. **PTSD Check-List – Civilian Version (PCL-C)**

(Standard survey instrument)

Below is a list of problems and complaints that veterans sometimes have in response to stressful life experiences. Please read each one carefully, put an "X" in the box to indicate how much you have been bothered by that problem in the last month.

(1) Not at all (2) A little bit (3) Moderately (4) Quite a bit (5) Extremely

E01. Repeated, disturbing memories, thoughts, or images of a stressful experience from the past?

E02. Repeated, disturbing dreams of a stressful experience from the past?

E03. Suddenly acting or feeling as if a stressful experience were happening again (as if you were reliving it)?

E04. Feeling very upset when something reminded you of a stressful experience from the past?

E05. Having physical reactions (e.g., heart pounding, trouble breathing, or sweating) when something reminded you of a stressful experience from the past?

E06. Avoid thinking about or talking about a stressful experience from the past or avoid having feelings related to it?

E07. Avoid activities or situations because they remind you of a stressful experience from the past?

E08. Trouble remembering important parts of a stressful experience from the past?

E09. Loss of interest in things that you used to enjoy?

E10. Feeling distant or cut off from other people?

E11. Feeling emotionally numb or being unable to have loving feelings for those close to you?

E12. Feeling as if your future will somehow be cut short?

E13. Trouble falling or staying asleep?

E14. Feeling irritable or having angry out bursts?

E15. Having difficulty concentrating?

E16. Being "super alert "or watchful on guard?

E17. Feeling jumpy or easily startled?

F. **The Posttraumatic Growth Inventory (PTGI)**

(Standard survey instrument)

Listed below are 21 areas that are sometimes reported to have changed after traumatic events. Please mark the appropriate box beside each description indicating how much you feel you have experienced change in the area described. The 0 to 5 scale is as follows:

0 = I did not experience this change as a result of my crisis
1 = I experienced this change to a very small degree

2 = a small degree

3 = a moderate degree

4 = a great degree

5 = a very great degree as a result of my crisis

	possible areas of growth and change	*0*	*1*	*2*	*3*	*4*	*5*
F01	my priorities about what is important in life						
F02	an appreciation for the value of my own life						
F03	I developed new interests						
F04	a feeling of self-reliance						
F05	a better understanding of spiritual matters						
F06	knowing that I can count on people in times of trouble						
F07	I established a new path for my life						
F08	a sense of closeness with others						
F09	a willingness to express my emotions						
F10	knowing I can handle difficulties						
F11	I'm able to do better things with my life						
F12	being able to accept the way things work out						
F13	appreciating each day						
F14	new opportunities are available which wouldn't have been otherwise						
F15	having compassion for others						
F16	putting effort into my relationships						
F17	I'm more likely to try to change things which need changing						
F18	I have a stronger religious faith						
F19	I discovered that I am stronger than I thought I was						
F20	I learned a great deal about how wonderful people are						
F21	I accept needing others						
F22	I have a better understanding of the existence of uncontrollable power						

G. Perceived Availability of Social Support

(Designed by researcher)

Suppose you need help now, please forecast the likelihood of occurrence of situation described in each item.

1= not true, 2 =slightly true, 3 =somewhat true, 4 =very true, 5 =extremely true

G01	If I need money, I can't borrow it	1	2	3	4	5
G02	If I want to have fun together with others, I can find someone.	1	2	3	4	5
G03	I am ill-informed, often know the useful information (e.g. public service and resource available) later than others	1	2	3	4	5
G04	I can feel that I am important to someone	1	2	3	4	5
G05	Those around me just are superficially friendly; however they are not really care about me	1	2	3	4	5
G06	If I need some material or instruments, I can borrow it	1	2	3	4	5
G07	I don't often get invited to do things with others	1	2	3	4	5
G08	I can't make up my mind what to do , I can find someone to give me suggestions	1	2	3	4	5
G09	When I am in a bad mood, I can't find someone to do something to shift my attention	1	2	3	4	5
G10	When I am in a bad mood, someone will comfort me without asking	1	2	3	4	5
G11	I need someone to help me do something, I can hardly find anyone	1	2	3	4	5
G12	If something new spring up nearby, I will know it soon somehow.	1	2	3	4	5
G13	When something weights in my mind, I can't find listening ears	1	2	3	4	5
G14	If I need, someone will give me money or material and don't expect me to return	1	2	3	4	5
G15	If I want to know others' opinion on my ideas or behavior, nobody will tell me	1	2	3	4	5
G16	I have my own circle or social groupings	1	2	3	4	5

H. Perceived post-disaster community cohesion

(Standard survey instruments)

The next few questions concern your feelings and opinions about other people, especially about how people are now feeling toward each other 6 months after the EARTHQUAKE. Please answer these as they apply to the people that live in your community or in your neighborhood.

1=strongly disagree, 2= disagree, 3= agree 4= strongly agree

Note: These options are opposite of T1 (1=strongly agree, 2=agree, 3=disagree, 4= strongly disagree)

H01	Now, almost 7 months years after the *EARTHQUAKE*, on a day-to-day basis people are nicer toward each other than they were before disaster.	1	2	3	4
H02	I believe that now after 7 months the *EARTHQUAKE*, people are more sincere, honest, and open toward each other.	1	2	3	4
H03	People quarrel more often after the *EARTHQUAKE* than before	1	2	3	4
H04	I believe that in result of the *EARTHQUAKE* people here are more integrated and united.	1	2	3	4
H05	It seems that since the *EARTHQUAKE* people became less tolerant and less forgiving.	1	2	3	4
H06	The *EARTHQUAKE* taught people to have greater respect for the feelings and opinions of other people.	1	2	3	4
H07	The *EARTHQUAKE* is the reason why nobody trusts anybody.	1	2	3	4
H08	I think that because of the *EARTHQUAKE* people understood how important it is to live in peace and with kindness toward each other.	1	2	3	4
H09	I believe that today people have a stronger sense that we are all part of one community. In other words, people now have a greater sense of solidarity with others.	1	2	3	4
H10	Nowadays, people have a stronger sense of trust toward one another than before the *EARTHQUAKE*.	1	2	3	4

J. Satisfaction with life scale

Below are five statements that you may agree or disagree with. Using the 1-7 scale below, indicate your agreement with each item by placing the appropriate number on the line preceding that item. Please be open and honest in your responding.

1= strongly disagree, 2 =Disagree, 3= slightly disagree, 4 =neither agree nor disagree

5= slightly agree, 6= Agree, 7= strongly agree

J01. In most ways my life is close to my ideal.

J02. The conditions of my life are excellent.

J03. I am satisfied with my life.

J04. So far I have gotten the important things I want in life.

J05. If I could live my life over, I would change almost nothing

K. FLOURISHING SCALE

Below are 8 statements with which you may agree or disagree. Using the 1 to 7 scale below, indicate your agreement with each item by indicating that response for each statement.

1= strongly disagree, 2 =Disagree, 3= slightly disagree, 4 =neither agree nor disagree

5= slightly agree, 6= Agree, 7= strongly agree

K01. I lead a purposeful and meaningful life

K02. My social relationships are supportive and rewarding

K03. I am engaged and interested in my daily activities

K04. I actively contribute to the happiness and well- being of others

K05. I am competent and capable in the activities that are important to me

K06. I am a good person and live a good life

K07. I am optimistic about my future

K08. People respect me

Thank you for taking the time to complete this survey.

We appreciate your effort and are grateful for your participation.

Appendix D. Interview protocol (Chinese and English Version)

访谈提纲

1. 地震发生时你在干什么？

2. 你能告诉我一个在地震接受帮助的积极/正面体验么？

   - 请尽可能仔细的描述的描述它（谁，什么时候，为什么，怎么样）
   - 在当时，你对这个帮助的想法和感受是什么
   - 这个帮助是如何影响您的功能的

3. 能告诉我在地震后接受帮助的一次消极/负面体验么
   - 请尽可能仔细的描述的描述它（谁，什么时候，为什么，怎么样）
   - 在当时，你对这个帮助的想法和感受是什么
   - 这个帮助是如何影响您的功能的

4. 对于地震后您接受到的帮助，您有什么不满意的么？或者有哪里是可以被提高的么？

5. 您认为要想为自然灾难的灾民提供高质量的帮助，人们最需要知道或做的事情是什么（考虑下灾难刚发生的时候，考虑下中长期的时候）？

6. 您觉得有什么重要的事情被遗漏了要补充么，您有问题要问我么？

Qualitative Interview

Interview outline

1. Can you tell me what you are doing when the earthquake struck?

2. Could you tell me about a positive experience of receiving help after Lushan earthquake?

- Please describe it in detail (who, when, why, how)
- What were your thoughts and feelings about the help at the time you received it?
- How did this help affect your functioning?

3. Could you tell me about a negative experience of receiving help after the earthquake?

- Please describe it in detail (who, when, why, how)
- What were your thoughts and feelings about the help at the time you received it?
- How did this help affect your functioning?

4. Are there any things you are not satisfied with? Are there any things which can be improved?

5. What do you think is the most important thing for people to know or do to provide high quality help to survivors of a natural disaster? (consider immediately after…. consider in the medium to longer term)

6. Do you want to add anything important that I have missed, or do you have any questions for me?

Appendix E. Participation information and consent form (Chinese and English Version)

知情同意书（1）

芦山地震后灾区居民社会支持与心理健康的随访研究

尊敬的先生/女士：

我们邀请您参加本项研究是因为您在 2013 年 11 月参加了一项名为“雅安地震后社会支持与心理健康的相关研究”。此研究是在那次研究基础上的随访研究，也就是参与之前研究的人将被再次访谈。本研究是由墨尔本大学精神病学系与北京大学精神卫生研究所共同发起的，且由这两家机构共同出资。获取的研究结果将被尚凡红用于获得博士学位。

1. 研究目的

本研究的第一个目的是了解地震后早期获得的社会支持对两年后心理健康的影响。第二个研究目的是探索灾民所认为的高质量的社会支持是怎样的，具有什么样的特征。

2. 如果您同意参加，您要做的是

调查员将会对您进行面对面的访谈，向您阅读一些结构化的问卷并记录您的答案。这些问卷的内容与您 2013 年参加的研究中使用的问卷基本相同，会涉及您目前的关系状态，最近一年发生的负性生活事件，您对地震后接受到的帮助的观点及评价，您的心理状态和社区里人们的相处状态等问题，调查大约持续 40 分钟。

3. 研究费用

本次调查您不需要支付任何费用。

4. 您的信息将会被如何储存和使用

我们将确保您的私人信息保密，您的身份在所有的本研究中的发表物中均不会被公开。该项目获得的您所有身份信息都会被保密。仅在得到您的允许，或者基于法律的要求时才会提供给他人。如果您签署知情同意，我们计划在科研刊物上发表本研究的结果，不过所有的数据都是集体数据，也就是说，您的身份无法被识别。

您的个人数据（纸版）将被保存在北京大学精神卫生研究所上锁的柜子中。仅有本项目的研究员、伦理委员会，上级主管视察/稽查人员才可以接触。电子数据库将不包含您的身份信息，并且会被保存在设置密码的电脑中。按照北京大学精神卫生研究所伦理委员会的规定，您的数据将保存到研究完成后 5 年，5 年后所有纸版数据和原始数据都将被销毁，而不包含身份信息的数据将被继续保存。

5. 您必须参加本研究么

参加本研究是自愿的，如果您不愿意参加就可以不参加。如果您改变主意，也可以在研究过程中随时退出。

6. 可能的获益是

通过参加本研究，您没有直接获益。但是您提供的信息将有助于我们了解灾后社会支持与心理健康的关系，为灾后社会支持的服务模式提供政策建议。您会因此间接获益。

参加本研究一个可能的获益是，您可能通过谈论您过去的地震经历会获得新的视角和理解。您也可能通过回忆和意识到他人帮助你和支持你而获益。本研究的结果还可能通过发现灾后社会支持的好的服务模式来使其他自然灾难的灾民获益。

7. 可能的风险是

尽管本研究的大部分问题是有关社会支持的，但您最近一年内发生的负性生活事件也将被询问。我们仅想知道这些事件是否发生过，并不要求您描述细节。不过您可能仍然觉得这次访

谈勾起了您一些没有机会谈论或已经想了好一阵子的伤心事。在访谈的过程中，如果您觉得累了或者觉得太伤心而不愿意继续，请告诉研究者。他或她将终止访谈并在您休息后且同意继续的情况下继续访谈。如果您因为参加本研究而感到难过，我们将提供给您当地心理服务的联系方式，如您需要我们也将协助转诊。

8. 研究补偿

在调查接受后您将获得 50 元，用于补贴您的交通费用和占用的时间。

9. 本研究获得批准了么

本研究被墨尔本大学人类研究伦理委员会批准，同时也被北京大学精神卫生研究所伦理委员会批准。

10. 对本研究的疑问和投诉

如果您有与本研究相关的任何问题，请联系尚凡红：13260135986，shangf@student.unimelb.edu.au。

如果您有与自身权利/权益相关的任何问题，或者您想反映参与本研究过程中遭遇的困难、不满和忧虑，或者想提供与本研究有关的意见和建议，请联系北京大学第六医院伦理委员会办公室电话：010－82077885，或墨尔本大学人类研究伦理委员会(+61) 03 8344 2073。

知情同意声明

“知情同意书的语言我可以阅读并能够理解，我有足够的时间和机会进行提问，问题的答复我很满意。我也被告知，当我有问题、紧急情况、想反映困难、顾虑、对研究的建议，或想进一步获得信息，或为研究提供帮助时，应当与谁联系。我已经阅读这份知情同意书，并且同意参加本研究。我理解我需要参加面对面的使用结构性问卷的访谈，访谈将持续 40 分钟。我知道我可以在研究期间的任何时候无需任何理由退出本研究。我的身份将不会被公开，研究收集的所有信息也将被保密。我同意在研究中产生的医疗信息和其他个人数据被合法、合理的应用。我将得到这份知情同意书的副本。”

请在适用的条目上打钩。

我同意我提供的数据将被保存和用于

☐ 此项研究

☐ 其他相关研究

此外签署此表我还同意:

☐ 如有其他相关的我可能感兴趣的研究项目时可以联系我

_____

受试者姓名（正楷）

_____ _____

受试者签名　　签字日期　年/　月/　日

知情同意书（2）

芦山地震后灾区居民社会支持与心理健康的随访研究

尊敬的先生/女士：

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1. 研究目的

本研究的第一个目的是了解地震后早期获得的社会支持对两年后心理健康的影响。第二个研究目的是探索灾民所认为的高质量的社会支持是怎样的，具有什么样的特征。

2. 如果您同意参加，您要做的是

您将参加由尚凡红进行的面对面访谈，访谈约持续一个半小时。首先将问您几个有关芦山地震后接受帮助经历的问题，该部分的访谈在您允许的情况下将被录音。接下来尚凡红会向您阅读一些结构化的问卷并记录您的答案。这些问卷的内容与您 2013 年参加的研究中使用的问卷基本相同，会涉及您目前的关系状态，最近一年发生的负性生活事件，您对地震后接受到的帮助的观点及评价，您的心理状态和社区里人们的相处状态等问题。

3. 研究费用

参加本研究您不需要支付任何费用。

4. 您的信息将会被如何储存和使用

我们将确保您的私人信息保密，您的身份在所有的本研究中的发表物中均不会被公开。该项目获得的您所有身份信息都会被保密。仅在得到您的允许，或者基于法律的要求时才会提供给他人。如果您签署知情同意，我们计划在科研刊物上发表本研究的结果，不过所有的数据都是集体数据，也就是说，您的身份无法被识别。

您的个人数据（纸版）将被保存在北京大学精神卫生研究所上锁的柜子中。仅有本项目的研究员、伦理委员会，上级主管视察/稽查人员才可以接触。电子数据库将不包含您的身份信息，并且会被保存在设置密码的电脑中。按照北京大学精神卫生研究所伦理委员会的规定，您的数据将保存到研究完成后 5 年，5 年后所有纸版数据和原始数据都将被销毁，而不包含身份信息的数据将被继续保存。

5. 您必须参加本研究么

参加本研究是自愿的，如果您不愿意参加就可以不参加。如果您改变主意，也可以在研究过程中随时退出。

6. 可能的获益是

通过参加本研究，您没有直接获益。但是您提供的信息将有助于我们了解灾后社会支持与心理健康的关系，为灾后社会支持的服务模式提供政策建议。您会因此间接获益。

参加本研究一个可能的获益是，您可能通过谈论您过去的地震经历会获得新的视角和理解。您也可能通过回忆和意识到他人帮助你和支持你而获益。本研究的结果还可能通过发现灾后社会支持的好的服务模式来使其他自然灾难的灾民获益。

7. 可能的风险是

尽管本研究的大部分问题是有关社会支持的，但您最近一年内发生的负性生活事件也将被询问。我们仅想知道这些事件是否发生过，并不要求您描述细节。不过您可能仍然觉得这次访谈勾起了您一些没有机会谈论或已经想了好一阵子的伤心事。您还可能在谈论芦山地震后不好的受助经历也会感到难过。在访谈的过程中，如果您觉得累了或者觉得太伤心而不愿意继续，请告诉研究者。他或她将终止访谈并在您休息后且同意继续的情况下继续访谈。如果您因为参加本研究而感到难过，我们将提供给您当地心理服务的联系方式，如您需要我们也将协助转诊。

8. 研究补偿

在调查接受后您将获得 100 元，用于补贴您的交通费用和占用的时间。

9. 本研究获得批准了么

本研究被墨尔本大学人类研究伦理委员会批准，同时也被北京大学精神卫生研究所伦理委员会批准。

10. 对本研究的疑问和投诉

如果您有与本研究相关的任何问题，请联系尚凡红：13260135986，shangf@student.unimelb.edu.au。

如果您有与自身权利/权益相关的任何问题，或者您想反映参与本研究过程中遭遇的困难、不满和忧虑，或者想提供与本研究有关的意见和建议，请联系北京大学第六医院伦理委员会办公室电话：010－82077885，或墨尔本大学人类研究伦理委员会(+61) 03 8344 2073。

知情同意声明

“知情同意书的语言我可以阅读并能够理解，我有足够的时间和机会进行提问，问题的答复我很满意。我也被告知，当我有问题、紧急情况、想反映困难、顾虑、对研究的建议，或想进一步获得信息，或为研究提供帮助时，应当与谁联系。我已经阅读这份知情同意书，并且同意参加本研究。我理解我需要参加面对面的使用结构性问卷的访谈，访谈将持续 40 分钟。我知道我可以在研究期间的任何时候无需任何理由退出本研究。我的身份将不会被公开，研究收集的所有信息也将被保密。我同意在研究中产生的医疗信息和其他个人数据被合法、合理的应用。我将得到这份知情同意书的副本。”

请在适用的条目上打钩。

我同意我提供的数据将被保存和用于

- ☐ 此项研究
- ☐ 其他相关研究

此外签署此表我还同意:

- ☐ 同意在定性访谈时被录音
- ☐ 如有其他相关的我可能感兴趣的研究项目时可以联系我

_____

受试者姓名（正楷）

_____ _____

受试者签名　　签字日期　年/　月/　日

Invitation to participate in this research project

Project title: Social support and well-being among survivors in Lushan Earthquake

Name of investigator(s): Fanhong Shang (Ph.D. Candidate), Associate Professor Darryl Wade, Professor Ma Hong & Professor Krys Kaniasty

---

1. Introduction:

You are invited to take part in this study because you participated in a project titled "Social Support and Well-being in the aftermath of disaster" in November, 2013. This study is a follow-up study based on that project, which means the same people will be re-interviewed. This research is being conducted by Phoenix Australia, University of Melbourne, in collaboration with the Peking University Institute of Mental Health. It is financially supported by these two organizations. The results of the research will be used by Ms Fanhong Shang to obtain a PhD.

2. What is the purpose of this research project?

The first purpose of this project is to investigate the relationship between social support received after the Lushan earthquake and well-being more than 2 years later. Secondly, we want to explore whether some kinds of social support received is preferred more than others and why that is the case.

3. What will you do if you agree to participate?

You will be interviewed face to face using structured questionnaires. The questionnaires are almost the same as the ones used in the study you participated in 2013, with topics covered like your relationship status, negative life events occurred in the recent year, your opinion and judgement about the help you received after Lushan earthquake, how easily you believe you can get specific help, how you are feeling and coping, and how people in your community get along with each other. It will takes about 40 minutes. You will be paid 50 CNY as reimbursement for your travel and time.

4. What will happen to your information

We will ensure that access to this information will comply with all privacy legislation and that you will not be identifiable in any publications resulting from this research. Any

information obtained in connection with this project that can identify you will remain confidential. It will only be disclosed with your permission, except as required by law. If you give us your permission by signing the Consent Form, we plan to publish the results from the study in scientific journals; however, all published information will be group data. That is, information will be published in such a way that you cannot be identified.

Your individual data (hard copy) will be stored in a locked cabinet at Peking University Institute of Mental Health. Only researchers involved in the project will have direct access to this data. The database will not contain any personal identifying information, and will be stored in computers secured by password access. Your data will be retained for a period of 7 years. At the end of this period, all paper data will be shredded and all raw data will be destroyed, but de-identified data will be kept.

5. Do I have to take part in this research project?

Participation in any research project is voluntary. If you do not wish to take part, you do not have to. If you decide to take part and later change your mind, you are free to withdraw from the project at any stage.

6. What are the possible benefits?

One possible benefit of participating this study is that you may gain new perspective and understanding of your earthquake experience by having a chance to talk about it. You may also benefit by recalling and realizing how others helped and supported you. Participation in this research may also benefit other survivors of natural disaster in the future by providing evidence on good practice of post-disaster support and relief.

7. What are the possible risks?

Though most of the questions in this study are about social support, your experience of negative life events in recent a year will also be covered. We only want to know whether or not specific negative life events happened, no detail about these events are required. During any assessment, if you feel you are too tired or upset to continue, please let the researcher know. He or she will stop the assessment so that you can have some rest, and they will provide active listening and support if needed. The interview will only continue after you have had a break and agree to carry on with it. If you continue to feel upset as a result of your participation in this study, referrals and information for further support will be provided to you at the interview.

8. Is this research project approved

The ethical aspects of this research project have been approved by the Human Research Ethics Committee of the University of Melbourne. It has also been approved by Peking University Institute of Mental Health Ethic Committee.

Questions and further information about the study

Please contact one of the researchers, Fanhong Shang on +61 426270302 or shangf@student.unimelb.edu.au if you have any questions.

Concerns / complaints regarding the conduct of the study

Should you have any concerns about the integrity or ethical conduct of this study you can contact the Executive Officer, Human Research Ethics, The University of Melbourne, on (+61) 03 8344 2073.

OR

Secretary of Ethic Committee, Peking University Institute of Mental Health, on 010-82077885

Invitation to participate in this research project

Project title: Social support and well-being among survivors in Lushan Earthquake

Name of investigator(s): Fanhong Shang (Ph.D. Candidate), Associate Professor Darryl Wade, Professor Ma Hong & Professor Krys Kaniasty

---

1. Introduction:

You are invited to take part in this study because you participated in a project titled "Social Support and Well-being in the aftermath of disaster" in November, 2013. This study is a follow-up study based on that project, which means the same people will be re-interviewed. This research is being conducted by Phoenix Australia, University of Melbourne, in collaboration with the Peking University Institute of Mental Health. It is financially supported by these two organizations. The results of the research will be used by Ms Fanhong Shang to obtain a PhD.

2. What is the purpose of this research project?

The first purpose of this project is to investigate the relationship between social support received after the Lushan earthquake and well-being more than 2 years later. Secondly, we want to explore whether some kinds of social support received is preferred more than others and why that is the case.

3. What will you do if you agree to participate?

You will be involved in a face to face interview conducted by Fanhong Shang, which will take approximately one and a half hours. To start with, you will be asked several questions on your experience of receiving help after the Lushan earthquake, this part will be audio recorded if you agree. Then you will be interviewed using structured questionnaires which are almost the same as the ones used in the study you participated in 2013, with topics covered like your relationship status, negative life events occurred in the recent year, your opinion and judgement about the help you received after Lushan earthquake, how easily you believe you can get specific help, how you are feeling and coping, and how people in your community get along with each other. You will be paid 100 CNY as reimbursement for your travel and time.

4. What will happen to your information

We will ensure that access to this information will comply with all privacy legislation and that you will not be identifiable in any publications resulting from this research. Any information obtained in connection with this project that can identify you will remain confidential. It will only be disclosed with your permission, except as required by law. If you give us your permission by signing the Consent Form, we plan to publish the results from the study in scientific journals; however, all published information will be group data. That is, information will be published in such a way that you cannot be identified.

Your individual data (hard copy) will be stored in a locked cabinet at Peking University Institute of Mental Health. Only researchers involved in the project will have direct access to this data. The database will not contain any personal identifying information, and will be stored in computers secured by password access. Your data will be retained for a period of 7 years. At the end of this period, all paper data will be shredded and all raw data will be destroyed, but de-identified data will be kept.

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7. What are the possible risks?

Though most of the questions in this study are about social support, your experience of negative life events in recent a year will also be covered. We only want to know whether or not specific negative life events happened, no detail about these events are required. You may also feel distressed when talking about negative experience of receiving help after Lushan earthquake. During any assessment, if you feel you are too tired or upset to continue, please let the researcher know. He or she will stop the assessment so that you can have some rest,

and they will provide active listening and support if needed. The interview will only continue after you have had a break and agree to carry on with it. If you continue to feel upset as a result of your participation in this study, referrals and information for further support will be provided to you at the interview.

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Appendix F. Declaration for thesis with publication and co-authorisation form

Declaration for a thesis with publication

THE UNIVERSITY OF MELBOURNE

PhD and MPhil students may include a primary research publication in their thesis in lieu of a chapter if:

- The student contributed greater than 50% of the content in the publication and is the "primary author", ie. the student was responsible primarily for the planning, execution and preparation of the work for publication
- The student has approval to include the publication in their thesis from their Advisory Committee
- It is a primary publication that reports on original research conducted by the student during their enrolment
- The initial draft of the work was written by the student and any subsequent editing in response to co-authors and editors reviews was performed by the student
- The publication is not subject to any obligations or contractual agreements with a third party that would constrain its inclusion in the thesis

Students must submit this form, along with *Co-author authorisation forms* completed by each co-author, when the thesis is submitted to the Thesis Examination System: *https://tes.app.unimelb.edu.au/*. If you are including multiple publications in your thesis you will need to complete a separate form for each publication. Further information on this policy is available at: *gradresearch.unimelb.edu.au/preparing-my-thesis/thesis-with-publication*

A. PUBLICATION DETAILS *(to be completed by the student)*

Full title	Social support following a natural disaster: A longitudinal study of survivors of the 2013 Lushan earthquake in China	
Authors	Fanhong Shang, Krzysztof Kaniasty, Sean Cowlishaw, Darryl Wade, Hong Ma, David Forbes	
Student's contribution (%)	70%	
Journal or book name	Psychiatry Research	
Volume/page numbers	273 (2019) 641–646	
Status	☐ Accepted and In press ☒ Published ☐ In progress	Date accepted/ published: 26/1/2019

B. STUDENT'S DECLARATION

I declare that the publication above meets the requirements to be included in the thesis

Student's name	Student's signature	Date *(dd/mm/yy)*
Fanhong Shang	Fanhong Shang	12/6/2019

C. PRINCIPAL SUPERVISOR'S DECLARATION

I declare that:

- the information above is accurate
- The advisory committee has met and agreed to the inclusion of this publication in the student's thesis
- All of the co-authors of the publication have reviewed the above information and have agreed to its veracity
- 'Co-Author Authorisation' forms for each co-author are attached.

Supervisor's name	Supervisor's signature	Date *(dd/mm/yy)*
DAVID FORBES		11/6/19

Co-author authorisation form

All co-authors must complete this form. By signing below co-authors agree to the listed publication being included in the student's thesis and that the student contributed greater than 50% of the content of the publication and is the "primary author" ie. the student was responsible primarily for the planning, execution and preparation of the work for publication.

In cases where all members of a large consortium are listed as authors of a publication, only those that actively collaborated with the student on material contained within the thesis should complete this form. This form is to be used in conjunction with the *Declaration for a thesis with publication form*.

Students must submit this form, along with the *Declaration for thesis with publication form*, when the thesis is submitted to the Thesis Examination System: *https://tes.app.unimelb.edu.au/*

Further information on this policy and the requirements is available at:
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Journal or book name	Psychiatry Research	
Volume/page numbers	273 (2019) 641–646	
Status	☐ Accepted and In-press ■ Published ☐ In progress	Date accepted/published 26 January 2019

B. CO-AUTHOR'S DECLARATION *(to be completed by the collaborator)*

I authorise the inclusion of this publication in the student's thesis and certify that:

- the declaration made by the student on the *Declaration for a thesis with publication form* correctly reflects the extent of the student's contribution to this work;
- the student contributed greater than 50% of the content of the publication and is the "primary author" ie. the student was responsible primarily for the planning, execution and preparation of the work for publication.

Co-author's name	Co-author's signature	Date *(dd/mm/yy)*
Krzysztof Kaniasty		10/06/19

Co-author authorisation form

THE UNIVERSITY OF MELBOURNE

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Co-author's name	Co-author's signature	Date *(dd/mm/yy)*
Sean Cowlishaw		11/06/19

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Co-author's name	Co-author's signature	Date *(dd/mm/yy)*
David Forbes		11/06/19

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Co-author's name	Co-author's signature	Date *(dd/mm/yy)*
DARRYL WADE		12/6/19.

Co-author authorisation form

THE UNIVERSITY OF MELBOURNE

All co-authors must complete this form. By signing below co-authors agree to the listed publication being included in the student's thesis and that the student contributed greater than 50% of the content of the publication and is the "primary author" ie. the student was responsible primarily for the planning, execution and preparation of the work for publication.

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Co-author's name	Co-author's signature	Date *(dd/mm/yy)*
Ma Hong		10/06/2019

Declaration for a thesis with publication

THE UNIVERSITY OF MELBOURNE

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- The student contributed greater than 50% of the content in the publication and is the "primary author", ie. the student was responsible primarily for the planning, execution and preparation of the work for publication
- The student has approval to include the publication in their thesis from their Advisory Committee
- It is a primary publication that reports on original research conducted by the student during their enrolment
- The initial draft of the work was written by the student and any subsequent editing in response to co-authors and editors reviews was performed by the student
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A. PUBLICATION DETAILS *(to be completed by the student)*

Full title	The impact of received social support on posttraumatic growth after disaster: addressing both support quantity and quality
Authors	Fanhong Shang, Krzysztof Kaniasty, Sean Cowlishaw, Darryl Wade, Hong Ma, David Forbes.
Student's contribution (%)	70%
Journal or book name	Psychiatry Research
Volume/page numbers	
Status	☐ Accepted and In press ☐ Published ☒ In progress — Date accepted/ published

B. STUDENT'S DECLARATION

I declare that the publication above meets the requirements to be included in the thesis

Student's name	Student's signature	Date *(dd/mm/yy)*
Fanhong Shang	Fanhong Shang	12/6/19

C. PRINCIPAL SUPERVISOR'S DECLARATION

I declare that:

- the information above is accurate
- The advisory committee has met and agreed to the inclusion of this publication in the student's thesis
- All of the co-authors of the publication have reviewed the above information and have agreed to its veracity
- 'Co-Author Authorisation' forms for each co-author are attached.

Supervisor's name	Supervisor's signature	Date *(dd/mm/yy)*
David Forbes		11/6/19

Co-author authorisation form

THE UNIVERSITY OF MELBOURNE

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A. PUBLICATION DETAILS *(to be completed by the student)*

Full title	The impact of received social support on posttraumatic growth after disaster: addressing both support quantity and quality
Authors	Fanhong Shang, Krzysztof Kaniasty, Sean Cowlishaw, Darryl Wade, Hong Ma, David Forbes
Student's contribution (%)	70%
Journal or book name	Psychiatry Research
Volume/page numbers	
Status	☐ Accepted and In-press ☐ Published ☐ In progress
Date accepted/published	

B. CO-AUTHOR'S DECLARATION *(to be completed by the collaborator)*

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- the student contributed greater than 50% of the content of the publication and is the "primary author" ie. the student was responsible primarily for the planning, execution and preparation of the work for publication.

Co-author's name	Co-author's signature	Date *(dd/mm/yy)*
DARRYL WADE		12/6/19.

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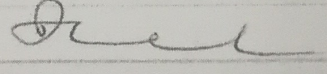
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Co-author's name	Co-author's signature	Date *(dd/mm/yy)*
DAVID FORBES		11/6/19

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Krzysztof Kaniasty		10/06/19

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Co-author's name	Co-author's signature	Date *(dd/mm/yy)*
Ma Hong		10/06/2019

Appendix G. Ethics approval (Peking Universty and The University of Melbourne)

北京大学第六医院（精神卫生研究所）医学伦理委员会

医学研究评审批件

（2013） 伦审第（31）号

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2013 年 8 月 7 日</td></tr>
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伦理委员会名称及地址：北京大学第六医院（精神卫生研究所）医学伦理委员会

北京市海淀区花园北路 51 号 电话 010-82077885 秘书：王雪芹

THE UNIVERSITY OF MELBOURNE

29 October 2015

A/Prof Darryl Wade
Psychiatry
The University of Melbourne

Dear A/Prof Wade

I am pleased to advise that the Health Sciences Human Ethics Sub-Committee approved the following Project:

Project title: **Social support and well-being among survivors of a natural disaster**
Researchers: **A/Prof D J Wade, F Shang, Professor H Ma, Professor K Kaniasty**
Ethics ID: **1544838**

The Project has been approved for the period: **29-Oct-2015 to 31-Dec-2015**

It is your responsibility to ensure that all people associated with the Project are made aware of what has actually been approved.

Research projects are normally approved to 31 December of the year of approval. Projects may be renewed yearly for up to a total of five years upon receipt of a satisfactory annual report. If a project is to continue beyond five years a new application will normally need to be submitted.

Please note that the following conditions apply to your approval. Failure to abide by these conditions may result in suspension or discontinuation of approval and/or disciplinary action.

(a) **Limit of Approval:** Approval is limited strictly to the research as submitted in your Project application.

(b) **Variation to Project:** Any subsequent variations or modifications you might wish to make to the Project must be notified formally to the Human Ethics Sub-Committee for further consideration and approval. If the Sub-Committee considers that the proposed changes are significant, you may be required to submit a new application for approval of the revised Project.

(c) **Incidents or adverse effects:** Researchers must report immediately to the Sub-Committee anything which might affect the ethical acceptance of the protocol including adverse effects on participants or unforeseen events that might affect continued ethical acceptability of the Project. Failure to do so may result in suspension or cancellation of approval.

(d) **Monitoring:** All projects are subject to monitoring at any time by the Human Research Ethics Committee.

(e) **Annual Report:** Please be aware that the Human Research Ethics Committee requires that researchers submit an annual report on each of their projects at the end of the year, or at the conclusion of a project if it continues for less than this time. Failure to submit an annual report will mean that ethics approval will lapse.

(f) **Auditing:** All projects may be subject to audit by members of the Sub-Committee.

If you have any queries on these matters, or require additional information, please contact me using the details below.

Please quote the ethics registration number and the title of the Project in any future correspondence.

On behalf of the Sub-Committee I wish you well in your research.

Yours sincerely

Ms Hilary Young - Secretary
Health Sciences HESC
Phone: 03 8344 8595, Email: hilary.young@unimelb.edu.au

Appendix H. Published papers

Psychiatry Research 273 (2019) 641–646

Contents lists available at ScienceDirect

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journal homepage: www.elsevier.com/locate/psychres

Social support following a natural disaster: A longitudinal study of survivors of the 2013 Lushan earthquake in China

Fanhong Shang[a], Krzysztof Kaniasty[b,c], Sean Cowlishaw[a], Darryl Wade[a], Hong Ma[d,*], David Forbes[a]

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ARTICLE INFO

Keywords:
Trauma
Earthquake
Posttraumatic stress
Psychological distress

ABSTRACT

The idea that social support post-disaster is beneficial to survivors' mental health is widely accepted by both researchers and practitioners. However previous social support studies are mainly focused on perceived social support, and the limited received social support studies have produced mixed results. In this study we modelled the influence of both quantity and quality of received social support on long-term mental health outcomes in a longitudinal study of 2013 Lushan earthquake survivors in China. Survivors were invited to complete a questionnaire interview 7 months after the earthquake and were followed up 31 months later (n = 161). Hierarchical regression analyses that controlled for disaster exposure variables showed that greater quality of social support received 7 months after disaster predicted lower levels of posttraumatic stress symptoms and psychological distress two years later, however quantity of received social support was not significant in predicting these two outcomes. These results remained robust when controlled for gender, negative life events and family financial status. The findings of this study suggest that what appears to be critical in the process of supporting disaster survivors is the quality, not necessarily the quantity, of support provided.

1. Introduction

Each year millions of people are affected by disasters resulting from both natural hazards and human activities. There is substantial evidence that disasters can lead to a range of mental health problems, such as posttraumatic stress disorder (PTSD), depression and anxiety (Bonanno et al., 2010; Cofini et al., 2015; Gigantesco et al., 2013; Kokai et al., 2004; Liang et al., 2019; Minardi et al., 2016; Norris et al., 2002; Xu et al., 2018). It has been generally assumed that post-disaster social support may buffer these negative consequences, however studies investigating the association between social support and mental health in the aftermath of disaster have produced inconsistent results. This inconsistency is partly due to the complex construct of social support (Kaniasty and Norris, 2004) with studies focusing on social support measuring received support (actual receipt of help; e.g., Cerda et al., 2013), social embeddedness (quality and type of relationships with others; Wyndol and Duane, 1985), perceived support (the belief that help would be available if needed; e.g., Chan et al., 2015; Chang et al., 2014; Cherry et al., 2015; Feder et al., 2013; Ward et al., 2018), or a mixture of the above (Ren et al., 2015; Zhang et al., 2017).

Compared with other facets of social support, received social support is less frequently addressed in disaster studies and the pattern of the findings observed when relevant measures are included have been mixed. For example, a small number of relevant studies have suggested a beneficial role of actual support received on psychological well-being in disaster context (e.g., Cerda et al., 2013; Deković et al., 2008; Hussain et al., al.,2013; Norris and Kaniasty, 1996), while other studies have revealed no effects, or worse, documented positive associations between received support and increased mental health problems (e.g., Lowe et al., 2015; Morgan et al., 1995; Shiotani, 2014).

One key limitation of these prior disaster studies is that the social support instruments typically used assessed only the quantity (or frequency) of social support received. It may be that other features of received social support also matter, such as what type of support is provided and when and how it is delivered, as well as other dimensions related to the broader concept of quality of received support. For

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example, one qualitative study found that except for insufficiency of aid, survivors also complained about support that was distributed unfairly, or in a delayed or conditional manner (Ibañez et al., 2003).

The concept of quality of received social support is the foundation of the social support effectiveness model (SSE, Rini and Dunkel Schetter, 2010; Rini et al., 2006), which was initially developed to improve understanding of the effectiveness of support received by pregnant women from their partners. The SSE model encompassed dimensions of both quantity and quality, and identified five features which underlie the effectiveness of received social support: needs matching in quantity, needs matching in type, the skilfulness /sensitivity of support delivering, the ease of obtaining support, and the extent to which received help might negatively influence recipients' self-concept. The SSE model provides a solid theoretical framework for assessing the effectiveness of social support but does not address all features important for support received in disaster context where substantial social support is provided by government or other organizations through intensive disaster aid distribution. In this context, research also suggests that dissatisfaction with aid distribution (such as unfairness or lack of transparency) predicts lower levels of subsequent social psychological well-being (Kaniasty, 2012). Thus, characteristics of the disaster aid distribution such as justice and fairness should also be considered in evaluating quality of received social support in disaster context.

The aim of this study was to examine the influences of both quantity and quality of received social support on mental health outcomes in a longitudinal study of earthquake survivors in China. It was conducted in the aftermath of a 7.0 magnitude earthquake that severely devastated Lushan County, Sichuan Province, China. The Lushan earthquake, which struck on April 20, 2013, affected close to 2 million people and resulted in 196 deaths, 21 missing individuals, and more than 13,000 injured survivors.

2. Methods

2.1. Participants and procedure

The first survey (T1) was conducted 7 months after the disaster. Participants were recruited from four towns, two from the worst-hit disaster areas and two from less severely affected areas. Convenience sampling was used in each town and participants were recruited during a free influenza vaccination program for the entire geographical area that was affected by the earthquake. Individuals 18 years of age and older and who were at the disaster area when the earthquake occurred were invited to participate. A total of $n = 199$ survivors were recruited at the first survey. The respondents were interviewed face to face at meeting rooms of the hospitals where free influenza vaccination program was conducted.

The follow-up survey was conducted two years later, 31 months following the earthquake (T2). All the respondents participating at the first survey were invited via telephone before the study's entrance into the field. Those respondents who changed their phone numbers were contacted with help of local residents. Thirty-eight people were lost at the follow-up (i.e., 19% attrition rate), amounting to 161 completed interviews. The participants were interviewed face-to-face in their homes or at appropriate locales near their residences. Seven respondents (4%) could not be met in person and were interviewed via a telephone.

The research and ethics committees of Peking University Institute of Mental Health (reference number: 201,531) and The University of Melbourne (reference number: 1,544,838) approved the study and all participants interviewed face-to-face were provided written informed consent to participate in the study, for those interviewed by phone oral informed consent was used instead.

2.2. Measures

2.2.1. Mental health

Post-traumatic stress symptoms were assessed at both times of data collection (T1 - 7 months and T2 - 31 months after the earthquake) using the PTSD Checklist-Civilian Version (PCL-C; Weathers et al., 1991). The PCL-C consists of 17 items that correspond to symptoms of PTSD as described in DSM-IV. Participants reported how much they have been bothered by each symptom in the last month, with responses ranging from *not at all* (1) to *extremely* (5). A severity score can be calculated as the sum of raw scores, with values ranging from 17 to 85. The internal reliability coefficients of the PCL-C scores in this study were excellent (T1 $\alpha = 0.93$; T2 $\alpha = 0.92$).

Psychological distress was measured using the 12-item General Health Questionnaire (GHQ-12; Cheng et al., 1990) at 7 months and 31 months after the earthquake (T1 & T2). The GHQ-12 is a widely used instrument assessing common mental health problems of depression, anxiety, somatic symptoms and social withdrawal. The present study used the original scoring method (Goldberg and Williams, 1988), with possible scores ranging from 0 to 12, where higher values indicate relatively severe psychological distress. The GHQ-12 scores evidenced good Cronbach's internal reliability coefficients at both times in this study (T1 $\alpha = 0.84$; T2 $\alpha = 0.83$).

2.2.2. Quantity of received social support

Quantity of received social support was assessed using an instrument modelled on the Inventory of Post-Disaster Social Support (IPSS, Kaniasty and Norris, 2000; Norris et al., 2001). The scale included 14 items that asked how often different types of support were received since the earthquake (until the day of interviews), and were scored on a 4-point scale (1 = *almost never*, 2 = *rarely*, 3 = *often*, 4 = *very often*), with values ranging from 14 to 56. This scale was administered at the first survey, and assessed social support received in the 7-month period since the earthquake. Instructions explained that helping acts referenced in the measure could have been provided by anyone in their social network (i.e., the source of support was not specified), and did not have to be related directly to the disaster. Items addressed four types of support received: tangible support (5 items, e.g., "offered or provided place to stay or helped you repair your house"); emotional support (3 items, e.g., "was comforted with physical affection"); informational support (3 items, e.g., "was helped with understanding a situation"); and companionship support (3 items, e.g., "was invited to have fun together"). The internal consistency reliability of this scale was 0.87, with higher scores indicating greater amounts of received social support (*Mean* = 30.04; *SD* = 7.85).

2.2.3. Quality of received social support

The quality of received social support was measured using a scale that was developed for this study and covered multiple features of the content and distribution of social support. These included facets which were drawn from Rini and Dunkel Schetter's SSE model (Rini and Dunkel Schetter, 2010; Rini et al., 2006), and addressed the quantity, easiness, needs matching and skilfulness of received support. Additional facets addressed the fairness, timeliness and conflicts encountered while receiving aid, and were based on studies of receiving social support in the context of disaster aid distribution (e.g., Kaniasty, 2012).

The scale comprised of 12 items which were scored on a 5-point response scale (1 = *never*, 2 = *seldom/rarely*, 3 = *sometimes*, 4 = *often*, 5 = *very often*), with a range of total (sum) values between 12 and 60. The questions referred to the adequacy of the amount of support received (2-items, e.g., "…the amount of help you received after the earthquake was not enough for your needs), ease of obtaining this support (3-items, e.g., "…getting the help you needed was just too difficult to accomplish"), the extent to which aid matched their needs (2-items, e.g., "…the help you received matched in terms of what you needed, that is, the type of help you received was what you wanted, it

was what you needed"), skilfulness with which it was provided (one item, "…the help you received from others was provided skilfully and sensitively, that is, in such a way that you did not feel uncomfortable for needing it"), perceived fairness (one item, "…you were treated unfairly"), timeliness of provision (one item, "…the help you needed arrived too late for it to be useful"), and presence of conflicts while receiving support (2-items, e.g., "…involved in conflicts or disagreements in the process of receiving post-disaster aid"). This scale was administered at the follow-up survey, but the participants were asked to retrospectively appraise the quality of support received in the first 7 months after the earthquake. Hence, the measurements of both the quality and the quantity of received social support referenced the same timeframe of disaster aftermath. The internal reliability of this scale was 0.75, with higher scores indicating greater quality of received social support (*Mean* = 44.55; *SD* = 7.23).

2.2.4. Disaster exposure

The experience of disaster was assessed with two indices administered at the first survey time point (7 months after the earthquake). The index of earthquake trauma exposure, scored from 0 to 5, was based on answers to five questions: (1) being injured, (2) being trapped in the rubble, (3) death of a family member/other close person, (4) injury to a family member/other close person, and (5) whether there were things that made you feel guilt or regret. Answers were recoded as "0" (No) and "1" (Yes) (*Mean* = 0.56; *SD* = 0.52).

The second index of disaster exposure, a measure of material losses, was comprised of five items that asked respondents to appraise their earthquake losses in terms of: (1) damage to their apartment/home; (2) income/financial losses; (3) employment-related stoppages/job loss; (4) getting into financial debt due to reconstruction needs; and (5) the extent to which material losses were more (or less) severe as compared to other survivors. Responses to these items ranged from 0 to 2, and were aggregated into a sum score representing an assessment of material losses (*Mean* = 5.76; *SD* = 2.61).

2.2.5. Covariates

Two covariates of mental health and social support used in additional analyses were collected at the follow-up survey (31 months after the earthquake). Family financial status was assessed using a single-item 6-point scale, asking participants to rate their financial situation considering the context of their current needs and financial responsibilities (1 = very poor, 6 = prosperous; *Mean* = 2.80; *SD* = 0.87). Negative life events were assessed using a 13-item checklist (Li et al., 2008), referencing events that occurred within the past year of the follow-up survey, or earlier if they still had an impact on the participants' lives. The checklist covered: (1) Love or marriage issues; (2) Fertility issues; (3) Conflicts with a partner; (4) Conflicts with other family members; (5) Conflicts with people outside of family; (6) Conflicts among family members but not involving the respondent; (7) Illness or serious injury to self; (8) Economic issues; (9) Work or study issues; (10) Serious illness or death of family members or close friends; (11) Being physically abused; (12) Being sexually abused; and (13) Other negative life events. The items were combined into an index of total number of negative life events (range 0–13; *Mean* = 1.40; *SD* = 1.47).

2.3. Data analysis

The unique influences of quantity and quality of received social support on posttraumatic stress symptoms and psychological distress, respectively, were examined using hierarchical multiple regression analyses in SPSS version 25. Posttraumatic stress and psychological distress symptoms, measured at 31 months after the earthquake, were the outcome variables in two separate models which utilized the same sets of predictors. Predictor variables were entered in a series of stages. The mental health scores, posttraumatic stress or psychological distress symptoms, collected at 7 months after the earthquake (T1) were specified in the initial stage to estimate stability effects. Second, measures of disaster exposure were subsequently entered to account for their share of the variance in the outcome variables. Measures of quantity of received social support and quality of received social support were then specified in the third and fourth stages, respectively, in order to examine the unique influences of these variables. Finally, the interaction between quantity and quality of received social support were entered in a fifth stage to estimate potential moderation effects (i.e., to examine whether the influence of quantity of received social support on post-disaster mental health varied by the quality of received social support). The constituent variables for interactions were centred before the interaction terms were computed as their cross-products (Aiken et al., 1991). Subsequent analyses also examined whether results from the aforementioned models differed when the equations included gender, negative life events and family financial situation as control variables.

3. Results

3.1. Sample

The follow-up sample ($n = 161$) was predominantly female ($n = 108$, 67%), aged between 20 and 76 years old (*Mean* = 41.61, *SD* = 12), and the participants completed 8.8 years of education on average (*SD* = 3.95; range: 0–18 years).

The non-responders of the follow-up survey were not significantly different from the remaining participants in terms of age ($t_{197} = 1.31$, $p = .19$), years of education ($t_{197} = -0.91$, $p = .36$), and gender ($x^2_{199} = 0.59$, $p = .44$), baseline PTSD ($t_{197} = 0.46$, $p = .31$), and baseline GHQ ($t_{197} = -0.22$, $p = .42$). However, the participants who did not complete the follow-up survey suffered lower material losses than the completers ($t_{197} = -2.67$, $p = .058$), experienced less earthquake trauma ($t_{197} = -2.27$, $p < .001$), and received less social support ($t_{197} = -1.58$, $p = .04$).

3.2. Mental health change

Paired *t*-tests indicated that PCL-C scores declined significantly from 7 months after the earthquake ($M = 34.25$, $SD = 12.29$) to 31 months after the earthquake ($M = 29.98$, $SD = 11.64$), t (160) = 5.01, $p < .001$), for the sample as a whole. Likewise, GHQ scores declined significantly between 7 months ($M = 4.10$, $SD = 3.07$) and 31 months following the earthquake ($M = 2.57$, $SD = 2.77$), t (160) = 6.73, $p < .001$.These findings indicate improvements in survivors' mental health over time.

3.3. Regression analyses

Results from the regression models of both posttraumatic stress symptoms and psychological distress are shown in Table 1. Tests to examine if the data met the assumption of collinearity indicated that multicollinearity was not a concern (T1 PCL-C, VIF = 1.31; Earthquake trauma, VIF = 1.11; Material losses, VIF = 1.22; Support quantity, VIF = 1.22; Support quality, VIF = 1.30; Interaction, VIF = 1.06). The final model of posttraumatic stress scores as the outcome variable with five predictor variables and an interaction explained 42.2% of the variance in symptoms assessed 31 months after Lushan Earthquake, *adjusted* $R^2 = 0.400$, $F(6, 153) = 18.65$, $p < .001$. Posttraumatic stress symptoms 7 months after the earthquake (Step 1) accounted for 35.3% of the variance in PCL-C scores, $F(1, 158) = 86.07$, $p < .001$, indicating rank-order stability in posttraumatic stress symptoms over time. Earthquake trauma and material losses entered at Step 2 explained an additional 5.2% of the variance in PCL-C scores, above the stability effect, $F(2, 156) = 6.76$, $p = .002$, and suggested that survivors who experienced greater disaster exposure reported more symptoms of posttraumatic stress.

Table 1
Predicting posttraumatic stress symptoms and psychological distress 31 *months after 2013 Lushan earthquake: summary of multiple hierarchical regression analysis.*

Predictors	T2 PTSD				T2 GHQ			
	Hierarchical model[a]			Final model[b]	Hierarchical model[a]			Final model[b]
	β	*t*	ΔR^2	*β*	*β*	*t*	ΔR^2	*β*
Step 1 – T1 PTSD/GHQ	0.59	9.28***	353***	0.46***	0.52	7.67***	.271***	0.45***
Step 2			0.052**				0.008	
Earthquake trauma	0.17	2.71**		0.18**	0.07	0.94		0.08
Material losses	0.15	2.14*		0.13+	0.05	0.74		0.02
Step 3 – quantity of received social support	−0.01	−0.17	0.000	0.04	0.004	0.05	0.000	0.08
Step 4 – quality of received social support	−0.15	−2.19*	0.018*	−0.15*	−0.27	−3.75***	0.060***	−0.26***
Step 5 – quantity × quality	−0.008	−0.12	0.000	−0.008	0.06	0.88	0.003	0.06

Note. $N = 161$.
+ $p \leq .06$.
* $p \leq .05$.
** $p \leq .01$.
*** $p \leq .001$.
[a] The entries are standardized (β) regression coefficients and corresponding *t*-values obtained when the variables was first entered, and R^2 changes for each block of the multiple hierarchical regressions equation.
[b] The entries are standardized (β) regression coefficients obtained in the final block of the multiple regression equation when all predictor variables were entered.

Later stages of the hierarchical regression revealed that quantity of received social support (Step 3) did not uniquely predict posttraumatic stress symptoms 31 months after the earthquake, when controlling for stability effects and disaster exposure. In contrast, quality of received social support (Step 4) was significantly associated with change in posttraumatic stress and accounted for an additional 1.8% of the variance (above and beyond other predictors including the quantity of received social support), $F(1, 154) = 4.78$, $p = .03$. This suggests that survivors reporting greater quality of support received after the disaster exhibited greater reductions in posttraumatic stress symptoms over time. The interaction between quantity of received social support and quality of received social support did not account significantly for PCL-C scores assessed at 31 months after the earthquake. Follow-up regression analyses that included additional control variables (gender, negative life events and family financial status) showed that the effect of quality of received social support on posttraumatic stress symptoms was slightly reduced, yet it was still marginally significant ($\beta = -0.141$, $p = .058$), and the nature of the association was substantively unchanged.

In terms of the psychological distress symptoms prediction model, tests for multicollinearity indicated that a very low level of multicollinearity was present (T1 GHQ, VIF = 1.24; Earthquake trauma, VIF = 1.08; Material losses, VIF = 1.19; Support quantity, VIF = 1.24; Support quality, VIF = 1.29; Interaction, VIF = 1.05), and the assumption of multicollinearity was deemed to have been met. The final model of psychological distress symptoms with five predictors and an interaction explained a total of 34.3% of the variance in GHQ-12 scores assessed at 31 months after the earthquake, adjusted $R^2 = 0.317$, $F(6, 153) = 13.30$, $p < .001$. GHQ-12 scores assessed at 7 months after the earthquake were significantly related to GHQ-12 scores assessed at 31 months after the earthquake, $\Delta R^2 = 0.271$, $F(1, 158) = 58.82$, $p < .001$. Earthquake trauma and material losses did not significantly explain the variance in the outcome variable, $\Delta R^2 = 0.008$, $F(2, 156) = 0.85$, $p = .43$.

Quantity of received social support (Step 3) was not found to significantly predict psychological distress 31 months after the earthquake, $\Delta R^2 = 0.000$, $F(1, 155) = 0.003$, $p = .96$. In contrast, quality of received social support (Step 4) was a significant predictor and accounted for an additional 6.0% of the variance in GHQ-12 scores assessed at 31 months after the earthquake, $F(1, 154) = 6.34$, $p < .001$. Survivors receiving social support of higher quality reported reduced levels of psychological distress over time. The interaction of quantity of received social support and quality of received social support (Step 5) was not statistically significant. Follow-up regression analyses that included additional control variables indicated that the effect of quality of received social support on psychological distress was slightly reduced but remained statistically significant ($\beta = -0.182$, $p = .018$).

4. Discussion

This study examined the prospective relationships involving two most important dimensions of received social support and mental health in the aftermath of a major earthquake in China. The results indicated that higher levels of quality, but not quantity, of social support received by earthquake victims within the first 7 months following the disaster predicted lower levels of posttraumatic stress symptoms and psychological distress assessed 31 months after the earthquake. These effects of quality of received social support were observed when accounting for mental health 7 months following the disaster (and thus stability effects), disaster exposure, and the quantity of received social support. Substantively the same findings were observed when control variables - gender, negative life events, and family financial status – were included in the equations.

To the best of our knowledge, this is the first theoretically based study that has explicitly assessed quality of received social support in a disaster context, by measuring both quantity and quality of received social support. This study can therefore provide a greater understanding of the impact of received social support on post-disaster mental health. That is, rather than “how much” of support is received, the key ingredients of the beneficial function of support receipt on psychological health are the ease of access to it, its adequately meeting the needs of the recipients, skilfulness and sensitivity of its delivery, and fairness and timeliness of received provisions. Several of these key dimensions have been noted in previous disaster research (Kaniasty and Norris, 2009; Kaniasty, 2012).

Our findings are partly congruent with results reported by Rini et al. (2011), who found that hematopoietic stem cell transplant survivors reported less mental health problems when they received more effective partner support (i.e., main effect of support quality). On the other hand, however, the potential moderating function of quality of social support in the link between support quantity and mental health, stipulated by the Social Support Effectiveness model (SSE, Rini and Dunkel Schetter, 2010), was not supported by the current findings. Rini et al. (2011) found that when received support was appraised as effective, the quantity of support received by trauma survivors was not associated with distress. Interestingly in their study, when partner support was ineffective, receiving greater quantities of support predicted elevated distress (i.e., support quantity by quality interaction). It has to be recognized that the two studies examined different stressors (community disaster versus personal illness), assessed

different sources of support (help from all sources versus help from a partner), as well as were conducted in different cultural contexts (China versus USA). More studies are needed to explore the potentially complex associations involving quantity and quality of received social support and diverse indicators of mental health over time for survivors of different types of stressful and traumatic events.

The quality of social support received in the first 7 months after an earthquake served a unique protective function for survivors' mental health 31 months after the event. This finding offers clear implications for researchers, practitioners, disaster relief agencies and governmental institutions. What appears to be critical in the process of supporting disaster survivors is the quality, not just the quantity, of support provided. Typically, the first responders and disaster relief agencies attempt to distribute support quickly and fairly, but things may not occur as intended due to bureaucratic processes and pace and formality of the relief system. Disappointments, frustrations, and even conflicts are common in the aftermath of disasters, partly due to the fact that even generous aid may be distributed in ways that undermine its effectiveness (Kaniasty, 2012; Kaniasty and Norris, 2009). This observation applies also to informal support networks such as relatives, friends, and personal acquaintances. Much can be done to improve the manner of support delivery to survivors. Distributing adequate amount of aid in a timely, sensitive, nonthreatening and respectful way is critical for survivors' subsequent psychological and social well-being. Disaster aid distribution strategies should be carefully designed to be fair, transparent, and readily accessible to all affected. It is also important for practitioners to monitor disagreements and conflicts that may surface during the aid distribution processes, and to deal with them timely and confidently. More studies are needed to further examine which facets of the effectiveness of received social support are most beneficial in protecting survivors' mental health.

Major methodological limitations of the study should also be noted. The external validity of the findings are limited by unique characteristics of the sample; for example, it is a convenience sample, respondents were predominately women who were recruited from community clinics offering influenza vaccinations. It is unlikely that this sample was representative of all survivors of the Lushan earthquake, or victims of other disasters in China. Like all longitudinal studies, the current sample was further affected by sample attrition; the drop-out participants reported lower material losses than completers, experienced less earthquake trauma, and received less social support. A few participants had to be interviewed by telephone. Our measures of quantity and quality of received support effectiveness, although modelled on empirically established instruments, had not been validated prior to data collections. Although not unusual for social support appraisals, both the quantity and the quality of received support were assessed without referencing the source of provisions (e.g., family, friends, and people outside respondents' immediate support circle). The source distinctions are important for social support theory and interventions. Most importantly, however, the two dimensions of received social support were assessed at different times of data collection, whereby the quantity of received support was measured at 7 months after the earthquake, while the quality of support was measured at 31 months after the earthquake (2 years later). Nevertheless, the participants in both cases were asked to reflect retrospectively on help they received in the first 7 months after the earthquake.

In conclusion, this study demonstrated the protective function of quality of social support received in the first 7 months after an earthquake for survivors' posttraumatic stress symptoms and psychological distress assessed 31 months after the event. Quantity of received social support, on the other hand, was not found to be a significant predictor for posttraumatic stress symptoms and psychological distress. These findings indicate that what appears to be critical in the process of supporting disaster survivors is the quality, not necessarily the quantity, of support provided.

Conflicts of interest

None declared.

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Supplementary materials

Supplementary material associated with this article can be found, in the online version, at doi:10.1016/j.psychres.2019.01.085.

Appendix

Instrument on quality of received social support post-disaster

After the Lushan earthquake, you may sometimes need help or support *from the government, your friends and relatives. The following questions ask about help or support you may want to receive or actually received in the first 7 months and what you thought of it.*

1 = Never, 2 = seldom/rarely, 3 = sometimes, 4 = often, 5 = very often

01. How often did you feel that the amount of help you received after the earthquake was not enough for your needs?
02. How often did you feel you were treated unfairly when you received help after the earthquake?
03. How often were you involved in conflicts or disagreements in the process of receiving post-disaster aid?
04. How often did you have to compete with others for help and aid?
05. How often did feel that you were bullied, obstructed or persecuted by others when you received help?
06. How often did you feel that the help you needed arrived too late for it to be useful?
07. How often did you feel that getting the help you needed was just too difficult to accomplish?
08. How often did the help you received match the amount of aid that you needed? That is, the amount of aid was not too little or too much, it was just right?
09. How often the help you received matched (was fitting) in terms of what you need you needed… that is the type of help you received was what you wanted, was what needed?
10. How often did you feel that the people who were trying to help you did not know what to do to help you or did not understand your needs?
11. How often was the help you received from others provided skilfully and sensitively, that is, in such a way that you did not feel uncomfortable in needing it?
12. How often did people help you without you actually asking for help?

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The Impact of Received Social Support on Posttraumatic Growth After Disaster: The Importance of Both Support Quantity and Quality

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Objective: Few studies have investigated the relationship between received social support (actual help received) and posttraumatic growth (PTG), and these studies focused only on the quantity of support received. This study examined the joint implications of both the quantity and quality of postdisaster received social support for PTG. ***Method:*** Data were collected from Lushan earthquake (China, in 2013) survivors at 7 (n = 199) and 31 (n = 161) months after the earthquake. The main effects of quantity and quality of received support, and the interaction between support quantity and support quality, were examined using hierarchical multiple regression analyses controlling for the extent of disaster exposure, postdisaster negative life events, and sociodemographic factors. ***Results:*** Neither quantity nor quality of received social support exerted significant main effects on PTG. However, the influence of the amount of received social support on PTG was moderated by the quality of received social support. Among survivors who appraised the postdisaster social support they received as higher in quality, greater amounts of received support were associated with more subsequent PTG. Among those survivors who appraised the postdisaster social support they received as lower in quality, greater quantity of received support was associated with lower levels of reported PTG. ***Conclusion:*** This study calls attention to the importance of enhancing the quality of help provided to disaster survivors because simply "more" support is not necessarily better.

Clinical Impact Statement
This study shows that receiving efficacious social support following potentially traumatic events may promote emergence of psychological benefits and advantageous transformations. Receiving help from others may facilitate posttraumatic growth, but it is its quality that matters the most. Received social support that does not adequately meet survivors' specific needs, that is not delivered skillfully, and/or is not delivered in a timely fashion, could be potentially disadvantageous for the experience of posttraumatic growth. Thus, both informal and formal postdisaster relief efforts and interventions should aim to enhance the quality of social support delivered along with attention to the adequacy of the amount of help offered.

Keywords: disaster, posttraumatic growth, received social support, quality of help

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The potential adverse mental health consequences of exposure to traumatic events are well documented, with the most common conditions reported being posttraumatic stress disorder, depression, and broader anxiety disorders and substance use disorders (e.g., Bonanno, Brewin, Kaniasty, & La Greca, 2010; Bryant et al., 2014). However, it is increasingly recognized that those exposed can also experience positive changes that go beyond pretrauma status in some areas, which can include greater appreciation of life, spiritual changes, increased personal strength, identifying new possibilities, and improved interpersonal relations (Tedeschi & Calhoun, 2004). Such changes can be conceptualized in terms of posttraumatic growth (PTG; Tedeschi & Calhoun, 2004), which has been documented in the context of various traumatic circumstances, including life-threatening physical illnesses (e.g., Rzeszutek & Gruszczyńska, 2018), sexual violence (e.g., Ulloa, Guzman, Salazar, & Cala, 2016), and disasters (e.g., Bernstein & Pfefferbaum, 2018).

According to Tedeschi and Calhoun (2004), social support plays an important role in facilitating PTG by providing a way to craft narratives "through the provision of new schemas related to growth, and the empathetic acceptance of disclosures about the traumatic event and about the growth-related themes" (p. 12). Although there are large numbers of PTG studies examining the global construct of social support, generalizations based on these results should be made with caution because different facets of social support are typically assessed. Kaniasty and Norris (2009) identified three different facets of support: social embeddedness (frequency and types of relationships with others), received support (actual help received), and perceived support (the belief that help would be available if needed). Distinctions between the different facets of support have been identified by empirical studies, with each facet found to contribute uniquely to psychological outcomes (e.g., Guilaran, De Terte, Kaniasty, & Stephens, 2018; Kaniasty & Norris, 2009). As almost customary in the stress and coping research area, perceived social support has been the main social support facet investigated in PTG studies (e.g., Du et al., 2018; Dursun, Steger, Bentele, & Schulenberg, 2016; Leppma et al., 2018; Sattler, Assanangkornchai, Moller, Kesavatana-Dohrs, & Graham, 2014). However, this primary focus on perceived social support runs contrary to the interest in social support as a malleable resource for psychosocial intervention programs. Researchers have thus called for an increased emphasis on received social support to better inform the development of support-based interventions (Dunkel-Schetter & Bennett, 1990; Kaniasty & Norris, 2009).

The limited number of studies that have investigated the relationship between received social support (actual help received) and PTG have produced mixed results. Two studies reported that received social support was a significant predictor of positive psychological changes among people living with HIV (Rzeszutek, Oniszczenko, & Firląg-Burkacka, 2017) and cancer patients (Schulz & Mohamed, 2004). However, two studies of Hurricane Katrina survivors living with HIV and ovarian cancer patients found that received support did not predict overall PTG, and it was only positively correlated with one PTG dimension ("relating to others"; Cieslak et al., 2009; Hill & Watkins, 2017). Investigations examining specific functional subtypes of received social support (e.g., informational support, emotional support, instrumental support) have also produced inconsistent results. For example, received emotional support was found to be a significant predictor of PTG in one cross-sectional study (Kamen et al., 2016) and in one longitudinal investigation (Schroevers, Helgeson, Sanderman, & Ranchor, 2010). In contrast, another cross-sectional study of stem cell transplant patients found that emotional support received from partners did not predict PTG, whereas received instrumental support was related to PTG (Nenova, DuHamel, Zemon, Rini, & Redd, 2013). It is worth noting that only one of the aforementioned studies was conducted in the disaster context (Cieslak et al., 2009).

Importantly, these studies have all focused on the quantity or amount of support received and have not considered other features of support attempts, such as what type of support is provided or when and how it is delivered. Social support with different features may vary largely in its effects. In fact, social support investigations have reported, on occasion, that received social support may also lead to negative unintended outcomes for recipients, such as a sense of embarrassment, resentment, concerns about reciprocity, low self-esteem, feelings of dependency, or incompetence (e.g., Dunkel-Schetter & Bennett, 1990; Newsom, 1999; Ullman & Filipas, 2001). Thus, at times, receiving support could appear to be a "mixed blessing" (Gleason, Iida, Shrout, & Bolger, 2008; Mcclure et al., 2014). The recognition of potential liabilities of actual exchanges of social support has led to a pressing need for more complex considerations of both its quantity and quality. Rini and Dunkel Schetter (2010) proposed a social support effectiveness model, which delineated five characteristics of effective received social support that can inform the conceptualization and measurement of support quality. These features include (a) the extent to which received help matches needs in quantity, (b) the extent to which received help matches needs in type, (c) the skillfulness/sensitivity of support delivery, (d) the easiness of obtaining support, and (e) the extent to which received help is free of negative emotional liabilities for the recipients.

Our research has previously demonstrated the importance of quality of postdisaster received social support among earthquake survivors, in which greater quality of social support received predicted lower levels of posttraumatic stress symptoms and psychological distress (Shang et al., 2019). As a next step, the current analyses of these longitudinal data considered the joint implications of both the quantity and quality of postdisaster received social support for PTG. Specifically, this investigation sought to (a) examine whether the quantity of social support received in the aftermath of disaster would predict change in PTG over time, (b) evaluate whether the quality of social support received in the aftermath of disaster would predict PTG, and (c) assess a joint effect of both characteristics of postdisaster help receipt, whereby the influence of quantity of support received on PTG would be conditional on the quality of social support received.

These objectives were addressed in a longitudinal model that examined change in PTG over time, controlling for key covariates reflecting sociodemographic factors (gender, education), the extent of disaster exposure (experience of trauma, material losses), and survivors' postdisaster life context (financial status, negative life events).

Method

Participants and Procedure

This longitudinal study was conducted in the aftermath of a 7.0 magnitude earthquake that severely devastated Lushan County,

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Sichuan Province, China. The Lushan earthquake, which struck on April 20, 2013, affected close to 2 million people and resulted in 196 deaths, 21 missing individuals, and more than 13,000 injured survivors.

The first assessment (Time 1 [T1]) for this study was conducted 7 months after the disaster. Participants were recruited from four towns: two from the worst-hit disaster areas and two from less severely affected settings. Convenience samples of people aged 18 years or older were recruited at each site during a free influenza vaccination program that was offered to the entire geographical area affected by the earthquake. In total, 211 people were approached to take part in the study; two people declined because of lack of time, one person did not finish the whole survey because of a sudden emergency, and another 10 people were excluded because they were not in the disaster area during the earthquake. All 199 participants who completed the first wave of the data collection (T1) were interviewed face-to-face with a questionnaire administered by trained interviewers. The participants received minor monetary compensation as a token of appreciation for their time. Research procedures were reviewed and approved by ethics committees (Peking University, China; University of Melbourne, Australia), and the study was conducted in accordance with the ethical criteria for social research.

The sample was followed up with 2 years later, which was 31 months after the earthquake, and 161 people (80.9% response rate) completed this second assessment, which mainly involved face-to-face interviews (seven participants were interviewed via telephone). The Time 2 [T2] responders were predominantly female (n = 108; 67%), aged from 20 to 76 years (M = 41.61, SD = 12), and had an average of 8.8 years of completed education (SD = 3.95; range = 0–18 years).

Measures

Posttraumatic growth. PTG was assessed with the Chinese version of the Posttraumatic Growth Inventory (Tedeschi & Calhoun, 1996), which was adapted for Chinese language and culture by Chen, Zhang, and Cheng (2018). The original 21-item scale includes five factors: New Possibilities, Relating to Others, Personal Strength, Spiritual Change, and Appreciation of Life (Tedeschi & Calhoun, 1996). Considering cultural differences and the psychological status of disaster survivors, Chen and colleagues added an additional item ("I have a better understanding of the existence of uncontrollable power") following their interviews with survivors of the 2008 Wenchuan earthquake. Responses were scored on a 6-point scale ranging from *no change* (0) to *a great change* (5), with total scores ranging from 0 to 110. This 22-item Chinese version demonstrated robust psychometric properties in both reliability and validity (Chen et al., 2018). The internal reliability coefficients of the scores of this scale in the present study were also high (T1, α = .91; T2, α = .92).

Quantity of received social support. Amount of received social support was measured at T1 using an instrument modeled on the Inventory of Post-Disaster Social Support (Norris, Murphy, Kaniasty, Perilla, & Ortis, 2001; Shang et al., 2019). The assessment involved 14 items measuring the frequency of specific social support acts received in the 7-month period since the earthquake. The social support acts referenced by the scale could have been provided by anyone (i.e., the source of support was not specified) and did not have to be related directly to the disaster experience (e.g., "How often you were provided with place to stay or be helped with housing repairs"). Respondents were asked to offer their answers on a 4-point Likert-type scale (1 = *almost never*, 2 = *rarely*, 3 = *often*, 4 = *very often*). Four types of support received were assessed: tangible support (five items), emotional support (three items), informational support (three items), and companionship support (three items). A higher score of this scale indicated greater quantities of received social support, and its internal consistency reliability coefficient was 0.87.

Quality of received social support. The quality of received social support was measured at T2 with a 12-item scale developed by the authors that covered multiple features of the content and distribution of social support (Shang et al., 2019). The scale was administered at T2, but the participants were asked to retrospectively report on social support received in the first 7 months following the earthquake. That way, the assessment time frames for the reports of the quantity and quality of received social support were consistent.

The scale addressed seven dimensions of support delivery: adequacy, easiness, needs matching. and skillfulness of received support (based on the social support effectiveness [SSE] model; Rini & Dunkel Schetter, 2010), as well as fairness, timeliness, and conflicts encountered while receiving aid. These additional dimensions were developed by the authors based on previous postdisaster social support studies (e.g., Kaniasty, 2012). Items were scored on a 5-point response scale (1 = *never*, 2 = *seldom/rarely*, 3 = *sometimes*, 4 = *often*, 5 = *very often*), with total (summed) scores ranging from 12 to 60. By way of illustration, questions referenced the adequacy of the amount of support received (two items; e.g., ". . . the help you received match the amount of aid that you needed? That is, the amount of aid was not too little or too much, it was just right"), ease of obtaining support (three items; e.g., ". . . getting the help you needed was just too difficult to accomplish"), the extent to which aid matched their needs (two items; e.g., ". . . the help you received matched in terms of what you needed, that is, the type of help you received was what you wanted/needed"), skillfulness with which it was provided (one item; ". . . the help you received from others was provided skillfully and sensitively, that is, in such a way that you did not feel uncomfortable for needing it"), perceived fairness (one item; ". . . you were treated unfairly"), timeliness of provision (one item; ". . . the help you needed arrived too late for it to be useful"), and presence of conflicts while receiving support (two items; e.g., ". . . involved in conflicts or disagreements in the process of receiving post-disaster aid"). The internal reliability of the score on this scale was 0.75, with higher scores indicating greater quality of received social support.

Disaster exposure. Disaster experience was assessed with two indices measured at T1. The first was an index of earthquake trauma exposure scored from 0 to 5, based on answers to five questions about experiences during and after the earthquake: (a) being injured, (b) being trapped in the rubble, (c) death of a family member/other close person, (d) injury to a family member/other close person, and (e) whether there were things that made you feel guilt or regret. Answers were recoded as 0 ("no") or 1 ("yes"). Sixty-one percent of respondents (n = 121) did not report any trauma, 27% (n = 53) experienced moderate trauma (scored 1),

and 18% ($n = 25$) reported the experience of high trauma (scored 2 or above).

The second disaster exposure indicator appraised the level of material losses, which were assessed with five Likert-scale items that asked about (a) damage to the apartment/home, (b) income/financial losses, (c) employment-related stoppages/job loss, (d) getting into financial debt due to reconstruction needs, and (e) the extent to which material losses were more (or less) severe compared with those experienced by other survivors. Responses to these items ranged from 0 to 2 (0 = low, 1 = moderate, 2 = high) and were combined to form a total score ranging from 0 to 10, with higher scores indicating greater material losses. Twenty-seven percent of respondents ($n = 54$) scored less than or equal to 4, 31% ($n = 61$) scored 5 or 6, 27% ($n = 54$) scored 7 or 8, and 15% of them ($n = 20$) scored 9 or 10.

Covariates. Sociodemographic characteristics included gender, education in years of schooling, and current economic status. Family economic status was measured at T2 using a single item asking participants to appraise their family's economic standing in relation to their current needs and financial responsibilities (1 = *very poor* to 6 = *prosperous*).

Negative life events were assessed at T2 using a 13-item checklist (Li, Michael, & Zhang, 2008) referencing events that might have happened within the past year, or earlier if the respondents believed that a particular event still had an impact on their lives. These included (a) love or marriage issues, (b) fertility issues, (c) conflicts with a partner, (d) conflicts with other family members, (e) conflicts with people outside of family, (f) conflicts among family members but not involving the respondent, (g) illness/serious injury to self, (h) economic issues, (i) work or study issues, (j) serious illness or death of family members or close friends, (k) physical abuse, (l) sexual abuse, and (m) other negative life events. The items were combined into an index of total number of negative life events (range = 0–13).

Data Analysis

The influences of the quantity and quality of received support on PTG were examined using hierarchical multiple regression analyses in SPSS Version 25. The outcome variable was the PTGI total score assessed 31 months after the earthquake (T2). In the first step of the regression model, the T1 PTGI score was entered in order to estimate stability effects for PTG. The second step included gender and education. Next, both disaster exposure measures, earthquake trauma and material losses, were entered together to account for the impact of disaster experience on PTG. Step 4 included T2 negative life events and T2 family financial situation. Measures of quantity of received social support and quality of received social support were then entered in the fifth and sixth steps, respectively. Finally, the interaction term (Step 7) examined whether the influence of quantity of received social support varied by the quality of received social support. The constituent variables were centered before the interaction term was computed as their cross-product (Aiken & West, 1991). The nature of the interaction effect was examined using PROCESS, a computational tool for path-analysis-based moderation analysis through bootstrapping (Hayes, 2013).

Results

Preliminary Analyses

Missing data analyses showed that noncompleters ($n = 38$) were not significantly different from the completers with respect to age, $t(197) = 1.31$, $p = .19$, years of education, $t(197) = -0.91$, $p = .36$, and gender, $\chi^2(1, N = 199) = 0.59$, $p = .44$. However, compared with the completers, the participants lost to follow-up at T2 experienced less material earthquake losses, $t(197) = -2.67$, $p = .058$, experienced less earthquake trauma, $t(197) = -2.27$, $p < .001$, and received less social support, $t(197) = -1.58$, $p = .04$.

Gender comparisons were conducted on scores of T1 PTG, T2 PTG, quantity of received social support, and quality of received social support. The difference between women ($M = 52.51$, $SD = 20.18$) and men ($M = 47.06$, $SD = 20.00$) in T1 PTG total scores were marginally significant, $t(197) = 1.81$, $p = .07$. There were no mean differences by gender on the scores of T2 PTG, quantity of received social support, and quality of received social support. Correlations among all variables and their descriptive statistics are presented in Table 1. This shows that the independent variables were not highly inter-correlated, while Variance Inflation Factor (VIF) values (not shown) also indicated that the data did not present with multicollinearity issues. Other assumptions of hierarchical regression analysis were also tested and no violations were found.

Table 1
Intercorrelations Among Variables in PTG Regression Model

Variable	1	2	3	4	5	6	7	8	9	*M*	*SD*
1. Gender[a]	—	—	—	—	—	—	—	—	—	—	—
2. Education	.07	—	—	—	—	—	—	—	—	8.80	4.07
3. T2 Family financial status	.09	.48**	—	—	—	—	—	—	—	2.80	.87
4. T2 Negative life events	.01	−.22**	−.38**	—	—	—	—	—	—	1.40	1.47
5. Earthquake trauma	.00	−.07	−.01	−.01	—	—	—	—	—	.56	.52
6. Material losses	−.04	−.33**	−.34**	.17*	.20**	—	—	—	—	5.76	2.61
7. Quantity of RSS	−.07	.15*	.22**	−.21**	.08	−.18*	—	—	—	30.04	7.85
8. Quality of RSS	.00	.38**	.41**	−.34**	−.01	−.22**	.38**	—	—	44.55	7.23
9. T1 PTG	−.13	−.06	−.01	.11	−.01	.12	−.01	−.10	—	50.65	20.23
10. T2 PTG	.00	.26**	.32**	−.21**	.22**	−.05	.13	.21**	.20*	53.96	21.87

Note. $N = 161$. T2 = time 2; T1 = time 1; RSS = received social support; PTG = posttraumatic growth.
[a] 0 = female, 1 = male.
* $p \leq .05$. ** $p \leq .01$.

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Regression Analyses

The results of the hierarchical regression analysis are summarized in Table 2. All nine predictor variables and one interaction explained a total of 26.2% of the variance in PTG assessed 31 months after the Lushan earthquake, adjusted $R^2 = .212$, $F(10, 149) = 5.29$, $p < .001$. T1 PTG accounted for 3.8% of the variance in T2 PTG scores, $F(1, 158) = 6.25$, $p = .013$, indicating rank-order stability over time. Gender and education (Step 2) together explained 7.9% of the variance in PTGI scores, $F(2, 156) = 6.98$, $p = .001$, with greater years of education being significantly associated with increased PTG. Disaster exposure indices entered in Step 3 accounted for an additional 6.2% of the variance, $F(2, 154) = 5.85$, $p = .004$, with greater earthquake trauma significantly predicting greater levels of PTG. At Step 4, T2 family financial status and negative life events made additional contributions, $\Delta R^2 = .052$, $F(2, 152) = 5.16$, $p = .007$, with better financial status being associated with higher PTG sores. Quantity of received social support was not significantly related to T2 PTG (Step 5), $\Delta R^2 = .001$, $F(1, 151) = 0.28$, $p = .60$. Likewise, the quality of received social support (Step 6) did not make an significant contribution to explaining the variance in T2 PTG scores, $\Delta R^2 = .002$, $F(1, 150) = 0.43$, $p = .513$. However, the interaction between the quantity and quality of post-disaster-received support reliably explained 2.7% of the variance in the outcome, $F(1, 149) = 5.38$, $p = .022$.

The nature of the interaction effect was examined using the PROCESS procedure for SPSS (Release 2.11; Hayes, 2013), which also revealed this effect to be significant, $F(1, 149) = 4.66$, $p = .032$. PROCESS was also used to calculate simple slopes and to plot the interaction, which is displayed in Figure 1. Among survivors who received high-quality support (one standard deviation above the mean), there was evidence that support quantity was positively associated with more PTG ($\beta = .47$), whereas among survivors reporting receiving low-quality support (one standard deviation below the mean), there was evidence that support quantity was negatively associated with PTG ($\beta = -.48$).

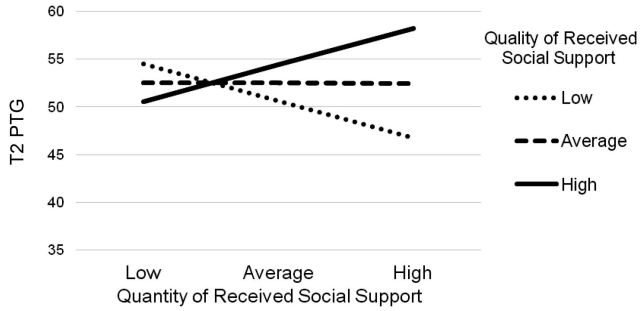


Figure 1. Interaction between the quantity of received social support and quality of received social support predicting survivors' posttraumatic growth. T2 = time 2; PTG = posttraumatic growth.

Discussion

This longitudinal study investigated the influence of received social support on PTG in the aftermath of a devastating natural disaster in China. Specifically, we examined whether both quantity and quality of social support received in the first 7 months after the 2013 Lushan earthquake would predict survivors' PTG at 31 months (T2) after the disaster, controlling for survivors' PTG at 7 months (T1), disaster exposure, family financial status, negative life events, gender, and education. Neither the quantity nor quality of received social support exerted significant main effects on PTG. However, the joint effect of these two variables explained a significant portion of variance in changes in PTG scores. The association between the quantity of received social support and PTG

Table 2
Predicting Posttraumatic Growth 31 Months After 2013 Lushan Earthquake

	T2 PTG			
	Hierarchical model[a]			
Predictors	β	*t*	ΔR^2	Full model[b] β
Step 1: T1 PTG	.20	2.50*	.038*	.21**
Step 2			.079***	
Gender	.02	.25		.002
Education	.28	3.71***		.20*
Step 3			.062**	
Earthquake trauma	.26	3.42***		.25***
Material losses	−.04	−.53		.02
Step 4			.052**	
T2 Family financial status	.21	2.35*		.20*
T2 Negative life events	−.10	−1.33		−.09
Step 5: Quantity of received social support	.04	.53	.001	−.002
Step 6: Quality of received social support	.06	.66	.002	.08
Step 7: Quantity × Quality	.17	2.32*	.027*	.17*

Note. $N = 161$. T1 = time 1; T2 = time 2; PTG = posttraumatic growth.
[a] The entries are standardized (β) regression coefficients and corresponding *t* values obtained when the variable was first entered, and R^2 changes for each block of the multiple hierarchical regressions equation. [b] The entries are standardized (β) regression coefficients obtained in the final block of the multiple regression equation when all predictor variables were entered.
* $p \leq .05$. ** $p \leq .01$. *** $p \leq .001$.

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was moderated by the quality of received social support. Simply put, among survivors who received high quality social support, greater amounts of support received appeared to facilitate their PTG, whereas among survivors who reported receiving poorer quality social support, greater amounts of postdisaster support were associated with lower PTG scores.

The pattern of the quantity by quality of received support interaction is consistent with the postulates of the SSE model (Rini & Dunkel Schetter, 2010). In their investigation of psychological distress among hematopoietic stem cell transplant survivors, Rini et al. (2011) found no discernible effect of received support amount on distress for survivors who were recipients of effective (i.e., high quality) partner support, as they exhibited better psychological health regardless of the quantity of support received. However, when partner support was evaluated as ineffective (i.e., low quality), receiving a greater amount of support was associated with elevated psychological distress. Notwithstanding different contexts and outcome measures, the converging results of Rini and colleagues' research and our own investigation underscore the importance of recognizing that the effect of quantity of received social support may be conditional on the quality of received social support. Prior studies investigating the influence of received social support on PTG present mixed findings (Cieslak et al., 2009; Kamen et al., 2016; Nenova et al., 2013; Rzeszutek et al., 2017; Schroevers et al., 2010; Schulz & Mohamed, 2004). The current results suggest that such inconsistencies may be accounted for, in part, by variability in quality of received social support. That is, the expected association between greater amounts of received support and higher levels of PTG may be more likely to be observed in contexts in which levels of quality of received social support are also high.

The present findings are also congruent with investigations reporting that receiving social support may be a "mixed blessing" (e.g., Burke & Goren, 2014; Gleason et al., 2008; Mcclure et al., 2014). Indeed, the pattern of the observed interaction between the quantity and quality of received support indicated that low-quality support had an adverse effect on PTG. This may be explained by the threat to self-esteem model (Fisher, Nadler, & Whitcher-Alagna, 1982), which stipulates that receiving aid (i.e., social support) contains a mixture of positive and negative self-relevant messages. On the one hand, support may be threatening, in that it implies an inferiority–superiority relationship between recipient and providers and clashes with values of self-reliance and independence. On the other hand, support may be supportive, in that it may communicate caring and concern and provides instrumental benefits (e.g., tangible resources, information, new perspectives). Thus, whether a particular instance of support receipt is predominantly threatening or supportive may be determined by characteristics of the transaction, such as the way in which support is provided, the type of support given, and the attributes of support providers. Accordingly, low-quality support (e.g., which is difficult to obtain or provided insensitively) may amplify self-threating elements that are inherent in receiving support, and consequently inhibit emergence of positive outcomes. It seems imperative that both quantity and quality of social support received should be considered in future investigations examining the effectiveness of enacted social support (Rini & Dunkel Schetter, 2010).

The current findings offer some practical implications for the development of postdisaster intervention efforts. Evidence suggests that disasters and other potentially traumatic events, along with obvious adverse mental health consequences, may bring about opportunities for positive life changes. Providing efficacious social support to survivors may not only counteract negative psychological burdens of disaster exposure but also promote emergence of advantageous psychological adaptations and transformations. In the context of providing assistance and support to trauma survivors, it seems that "more" is not necessarily better. Most importantly, help that does not adequately meet specific needs, or is not delivered skillfully or in a timely fashion, could inadvertently be inefficient, if not simply disadvantageous for PTG. Given that disaster relief is a long and complex process, pernicious blends of disappointments, frustrations, and even conflicts are likely to be common. Thus, existing aid distribution programs and interventions should aim to enhance the quality of support they deliver, along with attention to the adequacy of the amount of help offered.

Strengths and Limitations

This study has two notable methodological strengths. First, to the best of our knowledge, this is the first study examining postdisaster social support and PTG that has considered both the quantity and quality of received support. That is, rather than only assessing "how much" support was received, our measurement instruments also asked about effectiveness-related features of support receipt, such as ease of access, adequacy in meeting needs, skillfulness and sensitivity of delivery, and fairness and timeliness of received provisions. Second, the longitudinal design of this research enabled analyses to control for earlier levels of PTG, and thus offered a more complex analytical framework than those presented by cross-sectional studies.

However, methodological limitations of the study should be noted. First, the external validity of the findings is limited by the unique characteristics of the sample—the respondents were predominately women who were recruited from community clinics offering influenza vaccinations. It is unlikely that this sample was representative of all survivors of the Lushan earthquake or survivors of other disasters in China. Second, the two broad dimensions of received social support were assessed at different time points, whereby the quantity of received support was measured at T1, whereas the quality of support was measured at T2 (2 years later), and the participants were asked to recall and appraise help they received in the first 7 months after the event. Finally, the study's measures of quantity and quality of received support effectiveness, although modeled on empirically established instruments, had not been validated in postdisaster contexts.

Conclusions

The present study demonstrated the moderating role of the quality of received social support in the relationship between the quantity of received social support and PTG among Lushan earthquake survivors. Specifically, among survivors who appraised the postdisaster social support they received as higher in quality, greater amounts of received support were associated with more subsequent PTG. However, among survivors who appraised the postdisaster support they received as lower in quality, greater quantity of received support was associated with lower levels of reported PTG. These findings indicate that both quantity and

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quality of support received in the aftermath of disaster are critical for understanding survivors' PTG and psychological recovery.

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