Identifying and understanding family resilience to disaster in China

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CONTENTS

SUMMARY

Disasters occur worldwide resulting in substantial human, social, economic and environmental losses. Building the resilience of nations and communities to disasters is regarded as a critical international strategy for disaster risk reduction. China is a large country spanning varied geographic-regions with a large population experiencing disasters annually. The Chinese Government National Comprehensive Disaster Prevention and Mitigation Twelfth Five-Year Plan (2011-2015) placed strong emphasis on building the capabilities of the community in disaster reduction, as well as improving public literacy on disaster prevention and mitigation.

The family provides an important connection between community and individuals. Therefore, improving family disaster resilience will positively influence the entire community's disaster resilience. However, there is a dearth of knowledge regarding the nature and development of family disaster resilience, with most literature focusing on the community and individuals.

The aim of this project is to identify and understand significant factors of family disaster resilience and develop a family disaster resilience model to explain how these factors interact with each other and help families deal with disaster in the Chinese socio-cultural context. This research project is guided by grounded theory methodology. Data was collected via in-depth interviews with families that had experienced flooding in a district in Chongqing city, south-west China during 2013 in China. Initial coding, focused coding and theoretical coding and simultaneous memo writing were employed to analyse interview data. Five family disaster resilience factors were identified including "Having social resources and connections", "Having family inner resources", "Communicating", "Solving problems" and "Easing minds", and a model entitled "Acting and easing: the process of family disaster resilience" has been developed.

This model provides deeper insights into family resilience in the disaster situation and Chinese socio-cultural context. It contributes to the evolution of the family resilience concept, informs the direction of future research regarding family resilience in the disaster context, and provides evidence for disaster management policy makers and health professionals to develop intervention strategies for building family disaster resilience, and strengthening community disaster resilience within China and globally.

DECLARATION

I certify that this thesis does not incorporate without acknowledgment any material previously submitted for a degree or diploma in any university; and that to the best of my knowledge and belief it does not contain any material previously published or written by another person except where due reference is made in the text.

Signed.....

Date.....

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CHAPTER 1 INTRODUCTION & BACKGROUND

1. Introduction

This chapter presents an overall outline of the study. Firstly, the global situation of disasters is introduced with an emphasis on the tremendous damage they cause. The significance of disaster risk reduction and the strategic plans and milestones of disaster risk reduction are also illustrated. The importance of building a greater understanding of disaster resilience and the critical roles that the community plays in disaster risk reduction are addressed, followed by a presentation of disaster and disaster risk reduction strategies in the Chinese context. The concept of disaster resilience is introduced, research pertaining to disaster resilience in the community context is reviewed, and then the research problem is identified accordingly. Subsequently, the research question is presented, the objectives and significance of the study revealed, and the assumptions made in the research are highlighted. The chapter concludes with a brief summary of how the thesis is organised.

1.1 Background to the study

1.1.1 Impacts of disaster

Disaster caused by natural events occurs worldwide resulting in tremendous human, social, economic, and environmental damage (Keim 2008; Williams, Nocera & Casteel 2008). Recently, there has been an increased occurrence of devastating disasters across the globe, taking numerous lives and causing unprecedented economic losses. Recent examples include: 2005 Hurricane Katrina in the United States; 2008 Wenchuan earthquake in China; 2010 massive floods in Australia; 2011 earthquake/tsunami in Japan; 2013 typhoon Phailin in India (Huber 2013); 2014 typhoons Haiyan and Hagupit in the Philippines; and the 2014 floods in the Solomon Islands (Huber 2014). Based on information from the EM-DAT, a worldwide database on disasters maintained by the Centre for Research on the Epidemiology of Disaster (CRED), the annual average from 2004 to 2013, 384 natural disasters occurred, 99,820 people were killed, 199.2 million people suffered, and the economic damage reached USD$162.5 billion (Guha-Sapir, Hoyois & Below 2015). Current trends indicate that both the frequency and the impact of disasters is increasing (Lee et al. 2014), and the global economy and population are continually threatened by disaster. International disaster management initiatives and strategies have been formulated and promulgated with the aim of reducing the impact of disasters. Disaster risk reduction activities have been highlighted as effective strategies in disaster management.

1.1.2 Strategies for disaster risk reduction

Disaster risk reduction (DRR) is *"the concept and practice of reducing disaster risks through systematic efforts to analyse and manage the causal factors of disasters"* (UNISDR 2007).

Disaster risk reduction covers a spectrum of activities from lessening human and property vulnerability, reducing exposure to hazards, improving land and environment management, to promoting preparedness and early warning systems for disruptive hazards (UNISDR 2007). Disaster risk reduction is considered to be '*everyone's business*' (PreventionWeb 2008). Apart from governments, related organizations, individuals, and communities are also responsible for reducing disaster risk, and community members should be active participants in engaging with disaster preparedness activities (Levac, Toal-Sullivan & O'Sullivan 2012). It should be noted that many disasters cannot be avoided, however, the impact of disasters can be mitigated and minimised through disaster risk reduction strategies such as heightening preparedness and lessening the vulnerability of people (Lee et al. 2014). Briceno (2004, p. 3) advocated that:

> *Together we must look to shift our emphasis from disaster response and relief to disaster reduction, incorporating preparedness, mitigation and prevention within the context of sustainable development towards reducing our collective risk and vulnerability to natural hazards.*

Indeed, the cost of disaster preparedness is far less than the cost of disaster response (Lee et al. 2014, p. e78). As a result, the emphasis of international strategies in response to disaster has shifted from disaster response to disaster risk reduction. A number of important multidimensional frameworks and declarations have been developed globally to guide disaster risk practices over the past few years, with the landmark frameworks being: (1) The *Yokohama Strategy and Plan of Action for a Safer World: guidelines for natural disaster prevention, preparedness and mitigation*, which was developed and endorsed at the World Conference on Natural Disaster Reduction in 1994. This strategy has been regarded as providing landmark guidelines for disaster risk and impact reduction (The United Nations Office for Disaster Risk Reduction 1994); (2) The *International Strategy for Disaster Reduction (ISDR)*, which was released by the United Nations General Assembly in 1999. This strategy aims to decrease human, social, economic, and environmental losses (Wahlstrom 2013). Four fundamental objectives are proposed in this global framework which aims to build *"disaster resilient communities by promoting increased awareness of the importance of disaster reduction"* (Briceno 2004, p. 3); (3) The *Hyogo Framework for Action (HFA) 2005-2015: Building the Resilience of Nations and Communities to Disasters* which was endorsed by the UN General Assembly at the 2005 World Disaster Reduction Conference. This framework was established by reviewing the progress made in implementing the Yokohama Strategy and identifying the existing gaps in practice, and which further supported the critical role of building disaster-resilient communities. Lessening disaster losses dramatically by building the resilience of nations and communities to disasters was the major objective of the HFA (The United Nations Office for Disaster Risk Reduction 2005). Five priorities for action, guidelines, and practical approaches were proposed in this framework in order to achieve disaster resilience, including: making disaster risk reduction a priority; identifying, assessing, and monitoring disaster risks and enhancing early warning systems; increasing awareness, education, and training; and

reducing the underlying risk factors in key sectors and strengthening disaster preparedness (Enarson 2012); and (4) The *Sendai Framework for Disaster Risk Reduction 2015-2030: Making the Difference for Poverty, Health and Resilience* (the Sendai Framework), which was adopted by UN member states at the Third UN World Conference on Disaster Risk Reduction in 2015. The Sendai Framework was established subsequently on the basis of the HFA, and possesses seven global targets and four priorities for action (UNISDR 2015). In terms of the proposed priorities, *"Investing in disaster risk reduction for resilience"* is highlighted, stressing the importance of enhancing the economic, social, health, and cultural resilience of persons, communities, and countries (UNISDR 2015).

Overall, these landmark frameworks have the common aims of building and enhancing resilience which have been emphasized and integrated into global disaster risk reduction strategies. China was chosen as the research setting for this study, thus it is essential to gain an insight into disaster and disaster risk reduction strategies in the Chinese context.

1.1.3 Disaster and disaster risk reduction in the context of China

Due to having a very large landmass, and complicated weather and geographical conditions, a variety of disasters strike China annually, resulting in enormous economic loss and serious casualties (Chen et al. 2008). For instance, the 2008 Wenchuan earthquake killed up to 87,150 people (including missing people) and caused more than RMB 854 billion (around USD$122 billion) in direct economic losses (Liu, Yang & Li 2012). Over the last decade, China has been one of the top five countries most frequently struck by natural disasters (Guha-Sapir, Hoyois & Below 2015). From 2005 to 2014, an average of 29 disaster events occurred per year in China, with an average of 10,469 people killed each year, while economic damage reached almost USD$27 billion annually (PreventionWeb 2014). An annual report from EM-DAT showed that in 2014 alone, 40 natural disasters were reported to have occurred in China, including 15 floods and landslides, 15 storms, 8 earthquakes, and 2 droughts (Guha-Sapir, Hoyois & Below 2015).

The Chinese government has paid great attention to disaster risk reduction and has established a relevant commission to guide the practice of disaster risk reduction. In April 1989, the International Decade for Natural Disaster Reduction Committee (another translation is Commission) of China (IDNDRCC) was established. It was predominantly administered by the State Council and encompassed 28 relevant departments (PreventionWeb 1999). The IDNDRCC was renamed as the China Commission for International Disaster Reduction in October 2000, which again changed to the China National Commission for Disaster Reduction (CNCDR) in December 2004 (China National Commission for Disaster Reduction n.d.). The CNCDR is the comprehensive coordinating organization at the central government level, which consists of 34 member organizations, including related government agencies, research institutions, and non-government organizations (Jiang 2013).

> *CNCDR is commissioned to research and formulate national disaster reduction guiding principles, policies and plans; coordinate major national disaster reduction activities; guide localities in their disaster reduction efforts; promote disaster reduction international exchange and cooperation; and to organize and coordinate disaster response and relief work nationwide (Jiang 2013, p. 101).*

The principle of 'comprehensive disaster reduction' is followed by the Chinese government (Jiang 2013), and the milestones within the Chinese disaster reduction strategies include: (1) *The national natural disaster reduction plan of the People's Republic of China (1998-2010)* which was developed by the China National Committee for IDNDR in 1998. This document described the disaster risks in China, and summarized the disaster reduction achievements in the construction and engineering field. It also proposed objectives, tasks, and approaches towards disaster reduction in China. Agriculture, industry, cities, society, and international cooperation were priority areas for action based on this plan (PreventionWeb 1998); (2) *The disaster reduction action plan of the People's Republic of China (2006-2015)* was issued by the China National Committee for International Disaster Reduction (CNCIDR) in 2006. The conduct of disaster reduction at the national and local levels, evaluation and monitoring of disaster risks, the promotion of early warning systems, and enhancing knowledge dissemination and disaster reduction awareness and preparedness, were the priorities for action in this plan. Furthermore, the implementation of the Hyogo Framework for Action 2005-2015 was stressed in this plan (PreventionWeb 2006), presenting a measure of consistency between the Chinese strategic plan and the international strategic plan for disaster risk reduction; (3) *The National Comprehensive Disaster Reduction Eleventh Five-Year Plan (2006-2010)* which was released on the basis of the National Economic and Social Development Eleventh Five-Year Plan in China in 2007. Eight critical tasks and eight key projects were initiated under this plan. Community disaster reduction modelling and education on disaster reduction were highlighted as two key projects of the plan (Yi et al. 2012); and (4) *The National Comprehensive Disaster Prevention and Mitigation Twelfth Five-Year Plan (2011-2015)* which was issued by the Ministry of Civil Affairs in 2011. This plan proposed ten main tasks and seven key projects, and placed strong emphasis on building the capabilities of the community in disaster reduction, as well as improving public literacy on disaster prevention and mitigation (Yi et al. 2012).

In line with international disaster risk reduction strategies, the Chinese government values the critical role of communities in national disaster risk reduction and demands the immediate promotion of community capacities for disaster reduction. Consequently, the *"Disaster Mitigation Model Communities Standard"* and the *"National Integrated Disaster Mitigation Model Communities Standards" (modified)* were promulgated by the Ministry of Civil Affairs in 2007 and 2010 respectively (Yi et al. 2012, p. 300). The disaster reduction measures and activities of the Chinese community achieved remarkable outcomes between 2006 and 2010 (Yi et al. 2012). Up to 2013, there has been 4,116 comprehensive disaster reduction demonstration communities

established in China (Jiang 2013). Moreover, China established a community-based disaster management system (Zhang, Yi & Zhao 2013).

In conclusion, building disaster resilience and promoting community engagement are essential components in disaster risk reduction strategies (Levac, Toal-Sullivan & O'Sullivan 2012). In order to provide solid evidence to inform best practice, it is critical to gain an in-depth insight into disaster resilience and to conduct relevant research pertaining to disaster resilience and the community.

1.1.4 Disaster resilience

The term 'resilience' originated from the Latin word 'resilier' (to leap back) (Windle 2011). Resilience is defined as *"the quality of being able to return quickly to a previous good condition after problems"* in the Cambridge dictionary (Cambridge Dictionaries Online 2015). Initially, the term 'resilience' was used mostly in engineering; however, over recent decades, there has been a burgeoning trend for resilience to be referred to by policy-makers, practitioners, and academics in different disciplines (McAslan 2010). Recently, resilience has drawn the attention of scholars in the disaster research and management discipline (Bosher & Dainty 2011). *"Resilience has been recognized as a viable and holistic concept in disaster risk reduction"* (Junghardt 2014, p. 349). Adopting a resilience approach shifts the focus from external emergency planning and recovery procedures, to understanding and developing the competence of individuals and communities which helps them to cope with, and recover from, adversity. Furthermore, resilience has gradually been integrated into emergency preparedness, and is now a major aspect of disaster preparedness (Bosher & Dainty 2011; Levac, Toal-Sullivan & O'Sullivan 2012; Matthew Castleden et al. 2011). Building and enhancing resilience has been emphasized and integrated into global disaster risk reduction strategies. Zhai, Li and Chen (2015) introduced relevant Chinese practices for reducing urban disaster risk by improving resilience, further supporting the significant roles of resilience in disaster risk reduction in China.

The UNISDR (2007) defines disaster resilience as:

> *The ability of a system, community or society exposed to hazards to resist, absorb, accommodate to and recover from the effects of a hazard in a timely and efficient manner, including through the preservation and restoration of its essential basic structures and functions.*

Disaster resilience ranges from the resilient personality or organization to resilient infrastructure systems or communities and has been studied from a variety of perspectives including psychology, sociology, policy implementation, decision-making, engineering, geography, and urban planning (Bonanno et al. 2007; Jordan & Javernick-Will 2012). Community disaster resilience (CDR) is one of the most important elements in disaster resilience and has become the cornerstone of disaster risk reduction internationally and in China. There are various definitions regarding community disaster resilience, however, no standard definition of the term has been found (Arbon 2014).

Based on a systematic review, Ostadtaghizadeh et al. (2015) proposed that community disaster resilience is composed of the following five domains: social, economic, institutional, physical, and natural.

The greater part of disaster resilience research has focused on the community level. Current community disaster resilience studies mainly focus on four aspects: (1) Conceptualising and theorizing community disaster resilience, with the research focusing on the analysis of the concept, dimensions and framework of community disaster resilience (Jordan & Javernick-Will 2012; Norris et al. 2008; Price-Robertson & Knight 2012; Uscher-Pines, Chandra & Acosta 2013); (2) The measurement or assessment of community disaster resilience, with the research exploring the development of theory-based or empirical research-based measurements, and the application of the developed measurements or tools to assess community disaster resilience. Relevant studies in this area have been conducted in different settings, such as the USA (Bergstrand et al. 2015; Burton 2015; Pfefferbaum et al. 2015; Sherrieb et al. 2012), Korea (Yoon, Kang & Brody 2016; Yu et al. 2015) , Canada (Cox & Hamlen 2015), India (DasGupta & Shaw 2015; Joerin et al. 2012), Saudi Arabia (Alshehri, Rezgui & Li 2015), the Philippines (Razafindrabe et al. 2015), Australia (Boon 2014a; Singh-Peterson et al. 2014), Taiwan (Wang, Chen & Chen 2013), Israel (Leykin et al. 2013), and Pakistan (Ainuddin & Routray 2012a); (3) Interventions to enhance community disaster resilience, with studies mainly involving the development, application, and/or evaluation of community resilience-based approaches, initiatives, or strategies (Eisenman et al. 2014; Murphy et al. 2014; O'Sullivan et al. 2014; Pfefferbaum, van Horn & Pfefferbaum 2015). The research in this area has also focused on interventions to improve community resilience through enhancing infrastructure serviceability and engineering structures (Deshmukh & Hastak 2014; Reinhorn & Cimellaro 2014) ; and (4) Identification and understanding of the factors that influence community resilience (Boon 2014b; Singh-Peterson et al. 2015a; Thornley et al. 2015).

Indeed, a resilient community, to some degree, depends on a large number of resilient individuals and families within the particular community (Boon 2014a). Community resilience is connected to individual resilience at the population level. Current individual disaster resilience studies focus on the following aspects: (1) Exploring and identifying individuals' resilience factors to disaster (Hegney et al. 2007; Liu & Mishna 2014); (2) The measurement of individual resilience to disaster (Lee, Shen & Tran 2009; Rodriguez-Llanes, Vos & Guha-Sapir 2013b). Note that most of the instruments measuring individual-level resilience have been developed from the psychological perspective, and the assessment of individual disaster resilience has been applied as predictors for the mental health of individuals (Ni et al. 2015); and (3) The development of approaches to enhance the resilience of individuals towards disasters, such as children (Grotberg 2001), and health workers (Maunder et al. 2008).

Overall, community and individual resilience to disaster have been highlighted in recent years and

a number of sound outcomes have been achieved through these approaches. It has been found that the family provides an important connection between the community and individuals. Families are integral units of communities and play vital roles in community recovery in the wake of disasters (Botey & Kulig 2014; Landau, Mittal & Wieling 2008). How families withstand and recover from adverse situations, protect themselves from hardship, re-establish their functioning capabilities and move on, will influence the short-term adjustment and the long-term adaptation of each family member, as well as the recovery of the entire family unit (Walsh 1998). Therefore, improving family resilience towards disaster will have a positive influence on the disaster resilience of the entire community (Price-Robertson & Knight 2012). However, there is a dearth of literature regarding family resilience to disaster. The following section briefly reviews the current research on family disaster resilience, identifies the research problem and gap existing in the extant research, and in turn illustrates the rationale for the present research.

1.2 Research problem

In this study, disaster is considered as being:

> *a serious disruption of the functioning of a community or a society causing widespread human, material, economic or environmental losses which exceed the ability of the affected community or society to cope using its own resources (WHO 2015),*

and

> *natural events, social disruptions, and political phenomena that affect individuals, families, and communities physically, psychologically, and spiritually (Huang, Wong & Tan 2014, p. 344).*

As indicated in the background section, China has been experienced various natural disaster annually, therefore this study is focused on one particular type of natural disaster that is, flooding.

In addition, in the context of this study, a family is defined as

> *a group of two people or more (one of whom is the householder) related by birth, marriage, or adoption and residing together (U.S. Census Bureau 2014).*

A growing research-base has illustrated that exposure to disasters negatively affects family well-being and functioning (Lowe, Rhodes & Scoglio 2012; McDermott & Cobham 2012). There are three main aspects to the severe damage caused to families by disaster: first, disasters place a wide range of stressors on families, such as the *"threat of death or injury, the loss of loved ones, limited access to basic needs, and financial strain"* (Ruggiero et al. 2015, p. 139). Families exposed to disasters can develop short- or long-term mental health and physical health problems (Akhter et al. 2015; Freedy & Simpson 2007; Lai et al. 2014; Lowe et al. 2015). Family members also experience psychological disorders, such as post-traumatic stress disorder (PTSD) (Jaycox

et al. 2010; Kessler et al. 2008; Kristensen et al. 2015; Wickrama & Kaspar 2007), depression (Cao et al. 2013), anxiety, sleep disturbances (Brown et al. 2011); and negative physical health outcomes in the aftermath of disaster (Felix et al. 2016; Rath et al. 2007; Sastry & Gregory 2013). Second, disasters result in long-term impacts on families, such as changes to normal routines, financial loss, job loss, and relocation to new places (Peek, Morrissey & Marlatt 2011). Third, disaster can impair communication within a family, destabilize family relationships, and influence familial instability such as in marital relationships (Xu & Feng 2016), and also increases the possibility of family violence (Sriskandarajah, Neuner & Catani 2015).

The family is the basic unit of society and plays an important role in the community and wider society in the preparedness and response to, and recovery phase from, disaster (Botey & Kulig 2014). Maintaining family functioning and family members' physical, mental, and social well-being promotes the capability of the entire community to deal with disaster. Family resilience can positively improve family well-being under austere circumstances, such as following a disaster. While considerable emphasis has been placed on building upon the concept of community disaster resilience, most of the existing literature has focused on resilience factors at the community and individual levels to disaster, with only a limited amount of literature focusing on family resilience factors in the face of disaster (Caldwell & Boyd 2009; Greeff & Lawrence 2012; Hackbarth et al. 2012; Islam & Walkerden 2014). There is a lack of research highlighting the family as a unit when undergoing a disaster, their experiences, and their strengths when they have to cope with a disaster and adapt to the aftermath (Pujadas Botey & Kulig 2014). Natural disasters are unavoidable, hence the variables which may promote family coping and recovery strategies to disaster need to be explored (Hackbarth et al. 2012). Furthermore, the literature on preparedness for natural disaster from a family strength or resilience perspective is very limited (West, Usher & Foster 2011b). Consequently, further investigation is needed in order to gain a deeper insight into family resilience in the face of disaster, and to develop relevant approaches to promote family strengths (Coleman & Ganong 2002).

Indeed, in the Chinese context, disaster resilience itself is a relatively new research area. Literature from five English language databases (Detailed information is presented in Chapter 2) only revealed a small number of research studies related to disaster resilience in China, and the relevant studies commenced mainly after the occurrence of the devastating 2008 Wenchuan earthquake in China. The main aspects of disaster resilience research in Chinese settings include: (1) Building disaster resilience: urban disaster resilience (Guo 2012; Smith 2014; Zhai, Li & Chen 2015); and economic resilience (Xie et al. 2014); (2) The development of disaster resilience models and measures: drought resilience (Chen et al. 2009; Gao et al. 2008); and hospital disaster resilience (Zhong et al. 2014a; Zhong et al. 2015); (3) The measurement of disaster resilience: hospital disaster resilience (Zhong et al. 2014c); individual resilience to disaster: earthquake survivors' resilience, such as adults, children, and adolescents (Chen, Yang & Wang

2008; Ni et al. 2015; Ye et al. 2014; Yu et al. 2011b; Zeng & Silverstein 2011), and farmers' resilience to drought (Sun et al. 2012); and (4) Interventions for the improvement of children's or adolescents' resilience after an earthquake (Chen et al. 2014; Zeng & Silverstein 2011). The literature from three major Chinese computer-based databases (Wanfang, CNKI, and Weipu) revealed that there were two focuses of disaster resilience-related articles published in Chinese journals. The first was a theoretical or conceptual introduction to disaster resilience, such as reviews of the literature on the concept of disaster resilience and the progress of international disaster resilience research (Fei et al. 2014; Liu et al. 2006; Wan et al. 2010; Zhu 2013). Another focus was the assessment of disaster resilience in areas that are prone to geological hazards or which had experienced disasters, especially agricultural droughts (Gu, Liu & Liu 2014; Yang & Li 2015; Zhou et al. 2009), agricultural floods (Gu, Li & Tang 2013; Li & Gu 2012), earthquakes (You et al. 2013) and other geological hazards (Gong et al. 2013). In addition to the gap in disaster resilience research in the Chinese context, there is also a gap in family disaster resilience research in the Chinese context, with only one article published in an English journal (Sun et al. 2012) and two articles published in Chinese journals exploring farmer households' drought resilience (Wan et al. 2008a; Wan et al. 2008b). On a regular basis, China is catastrophically impacted upon by disasters, and families experience severe negative consequences; therefore, identifying and understanding family resilience to disaster is an initial step in developing strategies to enhance the strengths of the family, and thus, to help families to better prepare for, cope with, rapidly recover from, and thrive in the face of future disasters in China.

Family resilience models are expected to provide a theoretical framework for informing family resilience-related research, hence existing family resilience models have been critically reviewed to determine if they would be suitable for guiding this study (Detailed information is presented in Chapter 2). The results of the review have shown that although current family resilience models reveal the core characteristics of a resilient family, these components are derived from general adversity when families undergo a disruptive event, such as families with a member with a chronic disease. In these cases, only a single family is influenced rather than in a disaster situation which results in collective impacts on the entire family unit as well as every family in a disaster zone (Botey & Kulig 2014). These models have been mainly applied to the clinical situation or to routine family difficulties, which may not make them suitable to apply to the disaster context. More importantly, the majority of family resilience models have been developed through synthesizing the theoretical analysis and empirical studies from a western perspective in western settings, with only one family resilience model proposed in the Korean context. This model was developed through theoretical analysis and field work with families with a member with a chronic disease. However, it appears that this model has not been applied and validated in other research studies. In summary, current family resilience models may not be suitable for the disaster context. In addition, these existing models may not fit the Chinese context, especially Chinese family

structures and norms, and the Chinese socio-cultural environment. To fill this gap, the current study, working through a qualitative paradigm, employs a grounded theory approach to identify and understand the resilience factors of Chinese families with disaster experiences in the process of preparing, coping, and recovering in the course of a disaster. This then leads to the development of a family disaster resilience model in the Chinese context, thereby providing evidence for resilience building-oriented disaster risk reduction in China.

1.3 The research question and objectives

The research gap discussed and identified above leads to the following research question: What is family resilience to disaster in China? This question can then be broken down into the following sub-questions: What factors help the family prepare for, cope with, recover from, and become stronger in the face of disaster? and How do these factors interact with each other?

The specific objectives of the study are to: (1) Identify and understand significant factors of family disaster resilience in China; (2) Develop a family disaster resilience model for the Chinese context.

1.4 Significance of the research

Undertaking this research contributes to filling the current gap in disaster resilience research globally. Identifying and understanding family resilience to disaster is the initial step in defining the factors which could help families to prepare for, respond to, recover from, and thrive in the face of disaster. The development of a family disaster resilience model is expected to gain a deeper insight into family resilience to disaster in the Chinese context, and to provide evidence for developing resilience-oriented initiatives for building family disaster resilience, thereby strengthening community disaster resilience within China. More importantly, the present research contributes new knowledge about, and understandings of, family resilience in the context of disaster and non-Western settings.

1.5 Assumptions within the research

Before the commencement of this study, the following assumptions were made by the researcher:

(1) Each family possesses potential resilience factors (Simon, Murphy & Smith 2005) and the family unit itself is resilient (Isserman et al. 2014, p. 256).
(2) In making the decision to interview family members living in a flood zone and with flooding experiences, there was an expectation that they could draw on their life experiences to describe the factors that helped their families to be resilient in the face of disaster (Mullina & Arcea 2008).
(3) The proposed model aims to interpret family resilience in a specific social, geographical, and cultural context and is not meant to serve as a universal model for all families in other

settings (Peek, Morrissey & Marlatt 2011).

(4) A family should be considered as a unit when understanding and identifying the resilience factors of families.

1.6 Organisation of the thesis

This thesis is organised into the following chapters.

1.6.1 Chapter One: Introduction and Background

The opening chapter presents the background to the study, identifies the research gap, and proposes the research question. Then, the objectives and the significance of the present research study are described, followed by four basic assumptions made by the researcher in conducting this study.

1.6.2 Chapter Two: Review of disaster resilience and family resilience

This chapter commences with an introduction to the literature search strategies, and then divides into three sections. The first section aims to provide an extensive overview of the literature on disaster resilience, especially at the community and individual levels. The second section aims to provide a similar overview of family resilience across disciplines, with an emphasis on family resilience in the context of disaster. Then the research gap is addressed and the justification of the study is presented in the third section.

1.6.3 Chapter Three: Methodology and Method

Chapter Three describes the research methodology which informs this study and the detailed approaches to conducting the present research. First, the rationale for choosing a grounded theory methodology is addressed. Second, an overview of grounded theory methodology is provided, and the reason of choosing constructivist grounded theory is clarified. Third, the underpinning philosophy of grounded theory methodology is illustrated. Fourth, the methods of data collection and analysis are provided in detail. Finally, the reflection on the evaluation of grounded theory research is demonstrated.

1.6.4 Chapter Four: Findings

The findings from the data are presented in Chapter Four. Based on the analysis of the study data, five emergent categories and a core category are identified and defined. Quotes from the transcripts are used to provide evidence for the proposed categories and the core category.

1.6.5 Chapter Five: Discussion

This chapter draws on the data and the relevant literature to discuss each category and the corresponding family disaster resilience model situated in the context of China. First, the Chinese

socio-cultural context of this study is introduced in order to better understand the interpretation of the proposed model. Second, every major category is discussed as a family disaster resilience factor, and the relevant literature and theories are utilised to explain and clarify these categories. This is followed by a presentation of the 'Acting and Easing: the process of family disaster resilience' model. The chapter concludes with a comparison of the similarities with, and differences from, current family resilience models and research.

1.6.6 Chapter Six: Conclusion and Implications

This chapter describes the achievement of the study's objectives before drawing conclusions based on the research findings. The limitations of the present research are acknowledged. The implications of this research-based family disaster resilience model for the evolution of the concept of family resilience, the direction of future family disaster resilience research, and the development of practical strategies and initiatives in disaster management and health professional practice, are then presented. Finally a brief summary of the study concludes this chapter and the thesis.

1.7 Summary

This chapter presents an outline of the present study. The rationale for conducting the study is based on current international and Chinese disaster risk reduction strategies, and the gap in the global and Chinese disaster resilience research. Then the research question and specific objectives, and the significance of the study are introduced respectively, followed by the assumptions in the research. Finally, the major contents of each chapter are described.

CHAPTER 2 REVIEW OF DISASTER RESILIENCE AND FAMILY RESILIENCE

2.1 Introduction

The aim of this chapter is to provide an overview of the literature in relation to disaster resilience and family resilience and to provide the background to the gap in the research and the research question for this study. The chapter is presented in the following three sections: Section One: disaster resilience; Section Two: family resilience; Section Three: conclusion. The first section presents an outline of disaster resilience and disaster resilience research at the community and individual levels. The second section focuses on the concept of family resilience, family resilience models, family resilience research in the context of adverse situations, and family resilience research in the context of disaster situations. Finally, Section Three provides a conclusion which outlines the current gaps in the research and addresses the rationale for conducting the present study.

2.2 Literature search strategies

The first section provides an overview of disaster resilience; therefore, 'disaster*' and 'resilien*' were used as the subjects, topics, or keywords to retrieve the relevant literature. Five major computerized English databases, including the Cumulative Index to Nursing & Allied Health (CINAHL), Web of Science, Medline in-Process, Scopus, and Science Direct, and three major computerized Chinese databases, Wanfang, CNKI, and Weipu, were used for the literature search. In order to retrieve the information and to achieve a comprehensive understanding of disaster resilience, no exclusion criteria for the year of publishing were applied to the search.

In total, 7,786 sources from five English language databases were retrieved and imported into Endnote, and 5,454 remained after the duplicated literature was identified and deleted. After this, the titles and abstracts of the remaining articles were screened, and the following inclusion criteria were applied: (1) included concepts or theories of disaster resilience; (2) disaster resilience-related research; (3) community disaster resilience; (4) family disaster resilience; and (5) individual disaster resilience. The exclusion criteria were: (1) not relevant to disaster resilience; and (2) not in the English language. Overall, 621 literature sources were related to the concept of disaster resilience and relevant disaster resilience research, 414 were related to disaster resilience at the community level, 71 at the family or household level, and 476 at the individual level.

Chinese keywords included 'disaster*' (zaihai or zainan) and 'resilience' (kangnili, huifuli). A total of 314 sources were retrieved from the Chinese databases, and 276 remained after the duplicated literature was identified and deleted. After this, the titles and abstracts of the remaining articles

were screened, with 55 being relevant to disaster resilience, and 2 being related to household resilience to disaster. The inclusion and exclusion criteria of the Chinese literature search were identical to the English literature search, except that they were not in the English language.

The second section mainly focuses on an overview of family resilience. Five major computerised English databases, including the Cumulative Index to Nursing & Allied Health (CINAHL), Web of Science, Medline in-Process, Scopus, and Science Direct were used. Initially, 'family' and 'resilience' were used respectively as the subjects, topics, or keywords to search the literature; however, studies focusing on individual resilience within the family were mainly retrieved. In order to retrieve literature highlighting 'family resilience', 'family resilient factors', and 'family resiliency', rather than resilience at the individual level, 'family resilien*' was employed as the subject, topic, or keyword to search for the most relevant literature related to family level resilience. In total, 1,091 literature sources from five English databases were retrieved and imported into Endnote, after which the duplicated literature was identified and removed accordingly, leaving 801 sources retained. The inclusion criterion was family level resilience, while the exclusion criteria were: (1) individual resilience within a family; (2) individual resilience; (3) not relevant to family resilience; (4) not in the English language. The titles and abstracts were subsequently screened and, based on the selection criteria, 471 sources were retained.

The main focus of this project is to identify resilience factors which help families in the face of disaster; therefore, research pertaining to the family or household level (most of the research has failed to clearly distinguish between family and household) disaster resilience factors are fully reviewed and analysed in the last part of the second section of this chapter. This full-text review is expected to provide a justification of this study based on the current gap in the research and will also help to conceptualize the family disaster resilience model developed in this study. In total, 71 English literature sources and 2 Chinese literature sources pertaining to family or household resilience in the disaster context were retrieved from the first round literature search by using the search terms 'disaster*' and 'resilien*'. A total of 18 literature sources relating to family resilience in the disaster context were retrieved from the second round literature search by using the search term 'family resilien*'. Duplicated articles were deleted, and book chapters and conference papers were excluded. 32 full-text literature sources of studies on family or household resilience factors to disaster were fully reviewed and the reference lists of these articles were carefully checked to retrieve further relevant sources (Laditka, Murray & Laditka 2010). Overall, 22 articles were eventually retained and integrated into the review in order to gain a deep understanding of the existing research on family resilience factors in the context of disaster.

2.3 Section 1: Disaster resilience

This section provides an overall understanding of disaster resilience and the background

knowledge for the present project. This section starts with a definition of resilience and then looks at the concept of disaster resilience, followed by a brief summary of the current disaster resilience-related research. After this, disaster resilience research at the community and individual levels is briefly introduced. As well, the research pertaining to family resilience to disaster is introduced in detail in Section 2 because it is critically connected to the present research and provides a justification for conducting this PhD project.

2.3.1 Overview of disaster resilience

2.3.1.1 Resilience

The term 'resilience' originates from the Latin 'resilio', 'reseller', or 'resilire', referring to 'bounce back' or 'bounce forward' (Manyena 2014, p. 2; Zhong et al. 2014b, p. 69). The term was introduced into the English language in the early 17th Century (McAslan 2010; Zhong et al. 2014b), and was initially used in the field of engineering (McAslan 2010).It was subsequently introduced into ecology as *"a measure of the persistence of systems and of their ability to absorb change and disturbance and still maintain the same relationships between populations or state variables"* by Holling (1973, p. 14). Since the late 1990s, the concept of resilience has been applied to social and socio-ecological systems (Doorn 2015), and has been explored in a number of disciplines, including materials science, psychology, economics, environmental studies (Zhong et al. 2014b), ecology, sustainability science, sociology, anthropology, history, polymer science, urology, and urban studies (Thoren 2014, p. 305).

However, there is still no single universally accepted definition for the concept of resilience (Sharifi & Yamagata 2014) because it is a highly context-dependent term (MacAskill & Guthrie 2014). For example, in engineering, resilience is considered to be a property of materials and infrastructure (Doorn 2015) and means that a system returns to its pre-designed state after disturbance (Ainuddin, Routray & Ainuddin 2015, p. 70); in ecology (Doorn 2015), resilience refers to *"an entity or system's ability to return to normal functioning quickly following a disturbance"* (Prior & Hagmann 2014, p. 282); and in psychology, resilience means *"the capacity of an agent to choose a vital and authentic life, the process of overcoming the negative effects of exposure (bouncing back), and the ability to cope successfully with traumatic experiences and avoid the negative trajectories associated with risks"* (Matyas & Pelling 2015, p. 3). Norris et al. (2008) outlined the representative definitions of resilience at the physical, ecological, social, city, community, and individual levels. Based on Edwards (2015), the interpretation of concepts of resilience ranges from narrow 'engineering resilience' focusing on recovery and constancy, to 'ecological/ecosystem and social resilience' focusing on persistence and robustness, and a broader 'socio-ecological resilience' which integrates adaptation, learning, and self-organization, rather than simply the general ability to recover from a disturbance. A recent definition of resilience from the International Panel on Climate Change - IPCC (2014) report referred to *"the ability of a*

social, ecological, or socio-ecological system and its components to anticipate, reduce, accommodate, or recover from the effects of a hazardous event or trend in a timely and efficient manner" (Denton & Wilbanks 2014, p. 1108). This definition shifts the focus of resilience from *"a social or ecological system to a social, ecological, or socio-ecological system"*, and expands the meaning of resilience from *"absorption, self-organization, and adaptation, to anticipation, reduction, accommodation, and recovery"* (Doorn 2015, p. 3).

In summary, the term resilience is inclined to be considered as *"an ability or process rather than as an outcome"*. Again, it is not uncommon for resilience to be conceptualized as 'adaptability' rather than as 'stability' (Doorn 2015, p. 4), and as a boundary object, as well as a metaphor (Thoren 2014).

2.3.1.2 Disaster resilience

The term 'resilience' has been increasingly used in the discipline of disaster management over the last two decades (Doorn 2015). Based on Burton (2015, p. 68), Peter Timmerman was probably the first person to use the term 'resilience' within natural hazards and disaster research in 1981. Resilience is regarded as an essential element in disaster risk reduction and disaster management, especially after the adoption of the Hyogo Framework for Action in 2005 which emphasized the enhancement of resilience to disaster (Manyena 2014).

Similar to the term resilience, and despite the multiple definitions and conceptual frameworks that have been developed, there is still no consensus on a single definition of disaster resilience. However, Yoon, Kang and Brody (2016, p. 437) point out that there are two common elements in defining the concept of disaster resilience: *"adaptive capacity and vulnerability".* The definitions of disaster resilience proposed by a range of researchers present various relationships between resilience and adaptive capacity, resilience and vulnerability, or resilience, adaptive capacity, and vulnerability. For example, while some researchers have defined resilience as *"an integral part of adaptive capacity"*, others have embedded *"adaptive capacity within resilience"*; some researchers have defined resilience as *"a concept nested within a vulnerability structure"*, while others have considered resilience as *"separated from, but conceptually linked to, vulnerability"* (Yoon, Kang & Brody 2016, pp. 437-8). More importantly, resilience is a unique concept and is not simply considered as the opposite of vulnerability in the disaster context. Resilience is not simply "bouncing back"; it is both a process and an outcome (Matyas & Pelling 2015). In hazard and disaster research, disaster resilience has been described as *"a set of adaptive capacities"* and *"an adaptive process"* (Yoon, Kang & Brody 2016, p. 439).

The most relevant and unifying definition of resilience in the field of disaster risk reduction has been proposed by the UNISDR (2007), which defines disaster resilience as:

> *The ability of a system, community or society exposed to hazards to resist, absorb, accommodate to and recover from the effects of a hazard in a timely and efficient manner, including through the preservation and restoration of its essential basic structures and functions.*

This definition highlights that there is more to resilience in relation to disaster risk reduction than simply the study of systems. As well, the roles played by institutions and governance also require consideration when adding to the body of knowledge (MacAskill & Guthrie 2014). Disaster resilience includes resilience to disaster at a range of different levels, including the global, regional, national, local, community, family or household, and individual levels (Walklate, McGarry & Mythen 2014, p. 412).

Meanwhile, resilience has drawn the attention of disaster researchers and become a popular topic in the disaster research area. Current disaster resilience-related research mainly covers the following aspects: (1) Infrastructure resilience to disaster (Hémond & Robert 2014; Hosseini & Barker 2016; Labaka, Hernantes & Sarriegi 2015), such as supply chain resilience (Abe & Ye 2013; Scholten, Scott & Fynes 2014; Yang & Xu 2015), transport resilience (Freckleton et al. 2012; Huang et al. 2010; Trucco, Minato & Careri 2014), electric power resilience or electricity resilience (Esteban & Portugal-Pereira 2014; Ouyang & Duenas-Osorio 2014), telecommunication networks resilience (Pandit 2007), internet infrastructure systems resilience (Omer, Nilchiani & Mostashari 2009), road network resilience (Arcidiacono et al. 2012), wireless network resilience (Kumagai et al. 2014), mobile network resilience (Gomez et al. 2014), airport and sea port resilience (Smith & Babun Jr 2014), and disaster resilience housing (Tuan Anh 2015); (2) Organizational or institutional resilience (Aguirre et al. 2005; Andrew et al. 2016; Mendonca & Wallace 2015), such as hospital resilience (Achour et al. 2014; Rockenschaub & Harbou 2013), school resilience (Shaw & Matsuura ; Shiwaku et al. 2016; ThiMyThi & Shaw 2012), university resilience (Kapucu & Khosa 2013), and local council resilience (Sciulli, D'Onza & Greco 2015); (3) Economic or socio-economic resilience to disaster (Akter & Mallick 2013; Rose 2004, 2007; Xu & Liu 2013); (4) Societal, socio-ecological, and socio-physical resilience to disasters (Adger et al. 2005; Estoque & Murayama 2014; Gaillard 2007; Tang et al. 2015); (5) Natural hazards-focused disaster resilience, such as flood resilience (Kotzee & Reyers 2016), drought resilience (Chen et al. 2009; Gao et al. 2008; Shang, Shang & Zhou 2008), and earthquake resilience (Krawinkler & Deierlein 2014); (6) Industry resilience (Todo, Nakajima & Matous 2015), such as tourism resilience (Biggs, Hall & Stoeckl 2012); and (7) Disaster resilience at different levels, such as regional resilience (Cimellaro, Solari & Bruneau 2014; Seda-Sanabria, Matheu & Stephan 2013), coastal disaster resilience (Kim, Woosnam & Aleshinloye 2014), urban resilience (Guo 2012), and city resilience (Akyol & Eşbah Tunçay 2013; Li & Gu 2014).

The present research focuses on family-level disaster resilience; however, individuals and communities connect closely to family. In order to gain a comprehensive insight into family

resilience in the disaster context, the following section summarizes the extant disaster resilience research at the community and individual levels.

2.3.2 Community resilience to disaster

"A "community" is a social construct, variously defined as constituting block groups, urban districts, counties and other units" (Singer, Hai & Ochiai 2015, p. 211). The terms 'community disaster resilience' (CDR), 'community resilience' (CR), and 'disaster resilience' overlap and are thus interchangeable in some of the literature (White et al. 2015). For example, Ainuddin, Routray and Ainuddin (2015, p. 70) defined disaster resilience as *"the ability of the community to bounce back, self-organize, recover from and absorb the impacts and learn to cope with disasters".* Community resilience is believed to be one of the *"four most critical components of public health and medical preparedness"* alongside bio-surveillance, countermeasure distribution, and mass casualty care (Schoch-Spana 2008) in disaster situations. Several studies pertaining to disaster resilience at the community level have been conducted in the last two decades, with more than 90% of the literature related to community-level disaster resilience being published since 2005, based on the present literature search. Community disaster resilience studies focus on the following aspects:

2.3.2.1 Conceptualising and theorizing community disaster resilience

The concept of community disaster resilience has been gradually advanced by relevant studies and theoretical explorations and analysis of the extant literature. Norris et al. (2008, pp. 135-6) proposed a community resilience framework on the basis of a review of the literature, concluding that community resilience was *"a set of networked adaptive capacities"* (Norris et al. 2008, p. 136). Four fundamental dimensions were identified as networked resources in their framework, including *"Economic Development, Social Capital, Information and Communication, and Community Competence"* (Norris et al. 2008, p. 127). Jordan and Javernick-Will (2012) conducted an in-depth content analysis on articles from 2000 to 2010, and identified four main indicators of community resilience, including infrastructure, and the social, economic, and institutional environments. Ainuddin and Routray (2012a) analysed and reviewed the theoretical and applied community resilience frameworks, and then proposed and applied a new community resilience framework in the context of hazards and natural disasters. Their framework was composed of three elements: individual/community vulnerability (social, economic, physical, and institutional), risk perception/awareness coping, and resilience (social, economic, physical, and institutional). Arbon (2014) identified a number of recurring themes and concepts regarding community resilience based on a review of the literature, and developed a community disaster resilience model, which presented the *"overlapping relationships of community connectedness, risk/vulnerability, planning/procedures, and available resources as comprising a community's disaster resilience"* (Arbon 2014, p. 14). In a recent review, Ainuddin, Routray and Ainuddin (2015)

analyzed the existing sets of resilience indicators that had been theoretically proposed and applied in extant studies based again on an intensive literature review, and proposed social, economic, and physical aspects as the resilience indicators of communities that are prone to natural hazards and disasters. Alshehri, Rezgui and Li (2015) proposed a 'community resilience to disaster' framework in Saudi Arabia through the consensus-based Delphi technique. Six dimensions were included in this framework with the percentages of the total weight, including *"health and well-being (24.5% of the total weight), governance (18%), physical and environmental (17.4%), economic (15.9%), information and communication (14.3%) and social (9.9%)"* (Alshehri, Rezgui & Li 2015, p. 395). In a more recent empirical study, Eshel and Kimhi (2016) proposed a new concept of community resilience (CR) emphasizing that the concept should be concurrently defined by *"community strength as well as vulnerability"* (Eshel & Kimhi 2016, p. 110). The level of community resilience was likely to *"change over time due to contextual and temporal effects on community strength and vulnerability"* (Eshel & Kimhi 2016, p. 110). Therefore, they indicated that community resilience should be assessed through a 'community strength to vulnerability' ratio (COM–SVR) (Eshel & Kimhi 2016).

2.3.2.2 Measurement or assessment of community disaster resilience

The concept of resilience and its assessment is still new in the extant literature on disaster (Ainuddin, Routray & Ainuddin 2015), while community resilience is difficult to measure (Uscher-Pines, Chandra & Acosta 2013). Therefore, there is still no common framework or model that has been developed to measure and monitor community disaster resilience (Ainuddin & Routray 2012a). A number of theory- or research-based measurements have been developed to assess disaster resilience at the community level in a range of different settings, including the USA, Australia, Korea, India, Canada, the Philippines, Israel, and Eygpt. Based on a recent review of the existing literature pertaining to the measurement of disaster resilience in the USA, Cutter (2016) pointed out that disaster resilience assessment approaches include three main categories: indices, scorecards, and tools. However, there is no universal assessment of community disaster resilience, as choosing variables for measurement and the rationale for doing so remain somewhat ambiguous. In addition, Cutter (2016) indicated that the most common elements in all the assessment approaches include attributes and assets (economic, social, institutional, information/communication, environmental, infrastructure) and capacities (social capital, community assets and functions, information/communication, connectivity, and emergency management). Slightly different from this and based on a systematic review of 17 studies presenting 10 models, tools, or indices for CDR assessment, Ostadtaghizadeh et al. (2015) pointed out that extant indicators of community disaster resilience included five domains: social, economic, institutional, physical, and natural. Similarly, Ainuddin, Routray and Ainuddin (2015) proposed operational indicators for resilience assessment at the community level in a review of vulnerability and resilience indicators, which included three categories: economic, social, and

physical.

Indeed, community disaster resilience may also be context-based, as Cox and Hamlen (2015) suggested that specific contextual and cultural factors should be considered when measuring community disaster resilience. Therefore, measurements for assessing community disaster resilience have been developed and applied in different socio-cultural contexts. For example, Yoon, Kang and Brody (2016) developed the Community Disaster Resilience Index (CDRI) including *"human, social, economic, environmental, and institutional factors"* (Yoon, Kang & Brody 2016, p. 436), and used it to measure the community natural disaster resilience of 229 local municipalities in Korea. Lam et al. (2016, p. 1) applied a resilience inference measurement (RIM) model to measure resilience to climate related hazards for 52 U.S. counties along the northern Gulf of Mexico. Pfefferbaum et al. (2015, p. 181) applied a Communities Advancing Resilience Toolkit Assessment Survey by using a sample of affiliated volunteer responders in the USA, and confirmed the five-factor model which demonstrated sound reliability. In addition, Burton (2015) identified a set of metrics of community resilience covering *"social, economic, institutional, infrastructural, community-based, and environmental dimensions"* (Burton 2015, p. 67). These metrics were validated using a case study of the recovery response in the Mississippi Gulf Coast following Hurricane Katrina (Burton 2015), while, Kamh, Khalifa and El-Bahrawy (2016) developed a Flood Disaster Resilience Index (FDRI) to measure the level of community resilience in the mega-coastal cities in Egypt, and Hung et al. (2016) created a resilience metric entitled the Climatic Hazard Resilience Indicators to measure village disaster resilience in Taiwan.

Other measurements for assessing community disaster resilience have been developed by a number of other researchers, including DasGupta and Shaw (2015) who developed a community resilience assessment framework comprised of five dimensions, along with a composite resilience index against climate-related disasters and applied them to measure the community resilience of 19 coastal administrative blocks of the Indian Sundarbans. Cox and Hamlen (2015) developed a user-friendly, process-based, qualitative community resilience assessment tool known as the Rural Resilience Index (RRI) and conducted a pilot test in two Canadian communities. Razafindrabe et al. (2015) proposed a measurement and evaluation approach for community resilience to flood disasters using a set of biophysical and socio-economic indices in the Lagunal Lake region in the Philippines. In the Australian context, Arbon et al. (2015) developed a Community Disaster Resilience Scorecard to measure community disaster resilience, applying it in three Australian communities. Singh-Peterson et al. (2015b) applied a Community Disaster Resilience Scorecard to five communities on the Sunshine Coast in Australia, while in 2014, Singh-Peterson et al. (2014) applied the Baseline Resilience Indicators for Communities (BRIC) to a case study and evaluated the appropriateness of the assessment tool in Australia. Goroshit and Eshel (2013) used the Community Resilience Scale which was developed as part of the

Conjoint Community Resilience Assessment Measure (explained below), including *"leadership, social relations in the community, and an evaluation of community functioning in case of emergency"* (Goroshit & Eshel 2013, p. 636), to measure community resilience in Israel (Goroshit & Eshel 2013). Leykin et al. (2013) developed the Conjoint Community Resiliency Assessment Measure (CCRAM) by using an inductive, exploratory, and sequential mixed-methods approach. In total, 1,052 communities in Israel were assessed using this tool. Finally, Ainuddin and Routray (2012b) developed the Community Resilience Index comprising social, economic, institutional, and physical sub-components, and measured the community resilience of an earthquake-prone area in Baluchistan, Pakistan.

2.3.2.3 Interventions to enhance community disaster resilience

Research pertaining to interventions to enhance community disaster resilience includes both theoretical analyses and empirical studies. Theoretical frameworks for the development of community disaster resilience have been explored and proposed through analysing the extant literature. For instance, in a recent systematic literature review, Pfefferbaum, Pfefferbaum and Van Horn (2015, p. 238) identified the underlying principles that inform the development and implementation of community resilience interventions, including to: *"(a) use a multihazard approach relevant to the local context, (b) utilize community assessment, (c) focus on community engagement, (d) adhere to bioethical principles, (e) emphasize both assets and needs, (f) encourage skill development."* They summarized six action-oriented community resilience interventions in terms of the parameters that address their foundation, methodology, and implementation, including: (1) the ARC-Community Resilience Strategy (CR Strategy); (2) the Bay Localize-Community Resilience Toolkit (CR Toolkit); (3) the CCCR-Community Resilience Manual (CR Manual); (4) the CARRI-Community Resilience System (CR System); (5) the TDC-Communities Advancing Resilience Toolkit (CART); (6) and the UNISDR - How to make cities more resilient: A handbook for local government leaders (Handbook) (Pfefferbaum, Pfefferbaum & Van Horn 2015). In addition, Pfefferbaum, van Horn and Pfefferbaum (2015) proposed a conceptual framework for enhancing community resilience through social capital based on a theoretical analysis of the literature.

Again, in recent years, empirical research has been conducted pertaining to the development and evaluation of tools, models, and interventions to enhance community disaster resilience in different settings. For example, White et al. (2015) developed Community Resilience System Tools (CRS) based on three community case studies in the south-eastern United States. The CRS framework was presented as a process: firstly, engaging community leadership at large; secondly, performing resilience assessment; thirdly, developing a shared community vision, action planning, establishing a mechanism to implement a plan and to sustain the program; and finally, evaluating and revising the community's resilience program. The CRS was applied and

tested in eight communities. Observations and experiences from the case studies indicated that a collaborative, engaging process combined with simple tools provided an effective way to help communities to achieve resilience. Oktari et al. (2015) proposed a School-Community Collaborative Networks (SCCN) model for enhancing coastal community resilience through focus group discussions and a questionnaire survey in 19 schools in Banda Aceh in Indonesia with a total of 634 respondents. O'Sullivan et al. (2014) employed the structured interview matrix (SIM) facilitation technique to develop a community resilience intervention, and conducted nine SIM sessions with professionals and volunteers from emergency management agencies, health and social services, community organisations, and citizens in five geographic communities in Canada. The findings showed that SIM was an effective way to enhance connectedness, find common ground, and develop collaborative action and awareness of existing services and support in each community. Murphy et al. (2014) evaluated a guide book and a suite of resilience planning tools based on the Rural Disaster Resilience Project (RDRP) in three communities from different locations in Canada. The results suggested that communities could mobilize their internal strengths and resources to promote their disaster resilience through resilience thinking and proactive planning.

2.3.2.4 Factors influencing community disaster resilience

Apart from the theoretical analysis of the concept and models of community disaster resilience, several studies have explored and identified a number of factors that influence community disaster resilience. These relevant factors include population characteristics, and social, community, cultural, financial, and other factors, which are summarized in Table 2-1.

Table 2-1 Community disaster resilience factors

Community disaster resilience factors		Literature sources
Social factors	Social capital/resources	(Madsen & O'Mullan 2016; Singer, Hai & Ochiai 2015; Singh-Peterson et al. 2015a; Thornley et al. 2015; Wang, Chen & Chen 2013)
	Social connectedness /Community connectedness	(Boon 2014b; Madsen & O'Mullan 2016; Thornley et al. 2015; Wang, Chen & Chen 2013)
	Social cohesion /Social solidarity	(Doğulu, Karanci & Ikizer 2016; Townshend et al. 2015)
	Sense of place (attachment, identity, and social interaction)	(Boon 2014b; Winstanley, Hepi & Wood 2015)
	Social support	(Doğulu, Karanci & Ikizer 2016)
Community factors	Community participation and engagement	(Thornley et al. 2015)
	Autonomy	(Wang, Chen & Chen 2013)
Population characteristics /Human capital (Singer, Hai & Ochiai 2015)	Individual well-being	(Thornley et al. 2015)
	Individual survival skills	(Thornley et al. 2015)
	Values such as a strong sense of mutual help	(Wang, Chen & Chen 2013)
	Good physical health	(Wang, Chen & Chen 2013)
	Faith following earthquakes	(Doğulu, Karanci & Ikizer 2016)
	Older people in good health	(Cohen et al. 2016)
Cultural factors	Cultural landscape	(Parsizadeh et al. 2015)
	Cultural beliefs	(Parsizadeh et al. 2015)
	Cultural capital	(Singer, Hai & Ochiai 2015)
Financial factors	Financial capital	(Singer, Hai & Ochiai 2015)
	Financial resources	(Doğulu, Karanci & Ikizer 2016)
Preparedness		(Doğulu, Karanci & Ikizer 2016; Orhan 2016)
Physical capital (Singer, Hai & Ochiai 2015)	Community infrastructure	(Thornley et al. 2015)
Attitudes	Optimistic acceptance	(Madsen & O'Mullan 2016)
	Positive attitudes	(Wang, Chen & Chen 2013)
Learning	Learning tolerance and patience	(Madsen & O'Mullan 2016)
	Learning from the past for the future	(Madsen & O'Mullan 2016)
Natural capital		(Singer, Hai & Ochiai 2015)

2.3.3 Individual resilience to disaster

Exposure to disasters can result in adverse impacts on individuals, including mental health problems, decrease of role functioning, and physical health problems (Lowe et al. 2015). Based on the results of the literature search, the first individual disaster resilience research was reported at around the late 19th century. Similar to the community disaster resilience studies, more than 90% of the literature related to individual-level disaster resilience has been published after 2005. The key areas of current individual disaster resilience research include the following aspects:

2.3.3.1 Exploration and identification of individuals' resilience factors to disaster

On one hand, individuals' disaster resilience factors have been explored and identified theoretically. Theoretical level understandings of individual resilience factors to disaster are mainly based on an analysis of the literature. For instance, Rodriguez-Llanes, Vos and Guha-Sapir (2013a) conducted a systematic review and proposed that social support, being female, exposure levels, previous traumatic experiences, resource loss, human loss, and physical and mental health were psychological resilience indicators to disaster. Strong social support was associated with increased psychological resilience, while being of the female gender was related to a decline in resilience levels.

On the other hand, several studies have been conducted in order to understand, identify, or examine resilience factors at the individual level in the disaster context. A range of individuals have been the focus of resilience research, such as first responders, including police officers (Marmar et al. 2006; McCanlies et al. 2014), healthcare workers and other first responders (Freedman 2004), earthquake survivors (Blanc et al. 2016; Ikizer, Karanci & Doğulu 2016; Ni et al. 2015), fire incident survivors (Oteng-Ababio, Sarfo & Owusu-Sekyere 2015), university student earthquake survivors (Burnett Jr & Helm Jr 2013), vulnerable people (children) (Terranova et al. 2015), adolescents (Braun-Lewensohn 2014b; Schulenberg et al. 2015), women (Hamilton-Mason et al. 2012; Kusumasari 2015; Liu & Mishna 2014), mothers (Lai et al. 2015), the aged (Chaitin et al. 2013; Miller & Brockie 2015), homeless people (Donaldson et al. 2009), the poor (Hooli 2016)), residents (Hegney et al. 2007), farmers (Sun et al. 2012), merchants (Matejowsky 2015), war-zone citizens (Mark, Al-Ani & Semaan 2009)), and other population groups, including medical students (Carter et al. 2014), military service members (Chang & Taormina 2011; Simmons & Yoder 2013), refugees (Xin et al. 2013), indigenous people (Hilhorst et al. 2015), and rescue workers handling dead bodies (Tucker et al. 2002)). Relevant individual disaster resilience factors are listed in Table 2-2.

Table 2-2 Individual disaster resilience factors

Individual disaster resilience factors	Literature sources
Belief and religion	(Blanc et al. 2016; Donaldson et al. 2009; Hamilton-Mason et al. 2012; Park 2016; Rajkumar, Premkumar & Tharyan 2008; Sipon et al. 2015; Taylor & Peace 2015)
A sense of belonging	(Chaitin et al. 2013)
Sense of coherence	(Braun-Lewensohn 2014b)
Perceived meaning in life	(Schulenberg et al. 2015)
Social resources, social support, and social capital	(Donaldson et al. 2009; Hackbarth et al. 2012; Hamilton-Mason et al. 2012; Ikizer, Karanci & Doğulu 2016; Kusumasari 2015; Miller & Brockie 2015; Ni et al. 2015; Tucker et al. 2002)
Social cohesion	(Greene, Paranjothy & Palmer 2015)
Economic factors	
• Household income	(Ni et al. 2015)
• Livelihood dimensions	(Matin & Taylor 2015)
• Medical care and employment	(Chang & Taormina 2011)
Demographic characteristics	
• Gender	(Matin & Taylor 2015; Ni et al. 2015)
• Education level	(Ikizer, Karanci & Doğulu 2016; Matin & Taylor 2015)
Physical health	
• Chronic disease	(Ni et al. 2015)
• Physical wellness	(Chang & Taormina 2011)
Personality	
• Culture-based competence	(Kusumasari 2015)
• Extrovert personality	(Ikizer, Karanci & Doğulu 2016)
• Personality traits	(Hegney et al. 2007; Xin et al. 2013)
• Personal control and hardiness	(Hackbarth et al. 2012)
Coping	
• Adaptive coping	(Simmons & Yoder 2013)
• Problem-solving coping style	(Ikizer, Karanci & Doğulu 2016; Xin et al. 2013)
Technology (especially in the war zone)	(Mark, Al-Ani & Semaan 2009)
Experience with disasters	(Terranova et al. 2015; Xin et al. 2013)
Indigenous knowledge	(Hooli 2016)
Cultural factors	
• Cultural norms	(Liu & Mishna 2014; Taylor & Peace 2015)
• Cultural practice	(Taylor & Peace 2015)
Rituals	(Tucker et al. 2002)
Distraction (just tried to forget)	(Tucker et al. 2002)
Reframing (tried to see the good side of things, spent time with others, watched TV, or played games)	(Tucker et al. 2002)
Emotional regulation	(Terranova et al. 2015)
Personal relationships and community relationships	(Chang & Taormina 2011)

2.3.3.3 Measurement of individual resilience to disaster

Relevant studies have involved the development or validation of measures for evaluating and testing individual resilience to disaster; the measurement of individuals' disaster resilience; and the assessment of individual disaster resilience as predictors for the mental health of individuals, especially PTSD (Marmar et al. 2006; McCanlies et al. 2014).

Most of the instruments testing individual-level resilience have been developed from a psychological perspective. Windle, Bennett and Noyes (2011) systematically reviewed the psychometric rigour of resilience measurement scales. Nineteen resilience measures were reviewed including the Resilience Scale for Adults (RSA-37items); the Connor-Davidson Resilience Scale (CD-RISC-25 items); the Brief Resilience Scale; the Resilience Scale for Adults (RSA-33items); Psychological Resilience; the Resilience Scale (RS); the ER 89; the Connor-Davidson Resilience Scale (CD-RISC-10 items); the Dispositional Resilience Scale (3); Resilience Scale for Adolescents (READ); the Resiliency Attitudes and Skills Profile; Adolescent Resilience Scale; Ego Resiliency; the Dispositional Resilience Scale; Youth Resiliency: Assessing Developmental Strengths; the Dispositional Resilience Scale (2); the Child and Youth Resilience Measure (CYRM); California Healthy Kids Survey–the Resilience Scale of the Student Survey; and Ego Resilience (Bromley). The quality of the resilience measures was assessed with the results showing that all the measures were lacking a number of psychometric properties. Overall, the authors suggested that the Connor-Davidson Resilience Scale, the Resilience Scale for Adults, and the Brief Resilience Scale achieved the best psychometric ratings (Windle, Bennett & Noyes 2011).

In disaster research, the most commonly-used individual resilience measures or inventories are: (1) the Connor-Davidson Resilience Scale (CD-RISC) (Connor & Davidson 2003) which has been used in a number of studies measuring individual resilience to disaster (Blanc et al. 2016; Carter et al. 2014; Kukihara et al. 2014; McCanlies et al. 2014; Tosone, McTighe & Bauwens 2015; Turner 2015) and has been applied in other languages, such as the Chinese version (Ni et al. 2015); (2) The Resilience Scale (RS) (Burnett Jr & Helm Jr 2013), and the Brief Resilience Scale (Harville et al. 2011; Schulenberg et al. 2015). In addition, a number of scales have been employed to measure individual resilience indirectly, such as the Edinburgh Postnatal Depression Scale (Harville et al. 2010) and the Sense of Coherence (SOC) scale (Matin & Taylor 2015).

Research has been conducted to evaluate the credibility and validity of scales measuring individual resilience in the non-English language setting. For instance, Lei et al. (2012) examined the psychometric properties of the Chinese version of the Resilience Scale (RS) using a sample of college students who experienced the Wenchuan earthquake. The results demonstrated that the Chinese version of the RS was a reliable and valid measurement for assessing resilience for Wenchuan earthquake survivors. Yu et al. (2011a) examined the psychometric properties of the

Chinese version of the Connor-Davidson Resilience Scale (CD-ISC) among adolescents and found that this scale was a reliable and valid measurement in assessing resilience for Chinese adolescents.

The measurement of individual resilience has been used to explore the relationship between individual resilience and the health of individuals in the aftermath of disaster. Most of the studies have focused on the association of resilience and PTSD in the wake of disasters. For example, Stratta et al. (2015) explored the effects of resilience on the relationship between coping and trauma spectrum symptoms. A cross-sectional survey was conducted with 371 students through a number of measures, including the Resilience Scale for Adolescents and the Brief Cope and Trauma and Loss Spectrum scale. The results showed that resilience influenced PTSD symptoms directly, partially mediating the impact of a person's coping styles. Kukihara et al. (2014) investigated whether resilience was a predictor for mental and physical health. A total of 241 evacuees from Hirono, Fukushima participated in the study. The prevalence of symptoms of PTSD, depression, and general health among the survivors was tested, with the results showing that resilience was a significant protective factor in dealing with natural disasters. Few studies have explored the relationship between resilience and physical health. Kitamura et al. (2013) investigated whether resilience and personality were linked with fatigue of local government employees in the Great East Japan Earthquake disaster areas. In total, 72 municipal employees who responded to the disasters after an earthquake and floods participated in the survey study. The questionnaire covered degrees of workload, fatigue, psychological distress, resilience, and personality traits. The results showed that two-thirds of the employees experienced fatigue and psychological distress, which were negatively associated with emotional stability personality traits and psychological resilience.

2.3.3.4 Development of approaches to enhance individual resilience

A number of studies in this area have involved the development and evaluation of relevant interventions which have aimed to promote a range of individuals' resilience towards disaster, such as youth (Powell & Tuyen 2016), children (Cornelli Sanderson et al. 2016; Grotberg 2001), health workers (Maunder et al. 2008), and adults. For instance, Powell and Tuyen (2016) examined the impact of a school-based psychosocial curriculum, entitled Journey of Hope (JoH), on early adolescents who experienced a tornado in Oklahoma, the United States, through a mixed-methods study. This eight-session intervention aimed to reduce the effects of the disaster through promoting protective factors such as social support, coping, and psycho-education. The results indicated that JoH significantly improved positive coping skills, such as communication, tension management, and prosocial behaviours. Van Kessel, Gibbs and Macdougall (2015) explored people's perspectives on public health interventions that promoted adults' resilience in the wake of natural disasters. In total, 19 people who experienced the 2010/11 Victorian floods

participated in semi-structured interviews six months after the flooding. Witness statements from 20 community members who presented to the 2009 Victorian Bushfires Royal Commission were also used as data. The participants suggested that information, face-to-face communication strategies, and the rebuilding of community capacity could potentially facilitate the resilience of individuals. Salcioglu and Basoglu (2010) developed a control-focused behavioural treatment (CFBT) to help earthquake survivors to develop a sense of control and, in turn, to enhance their resilience against traumatic stressors. As part of the CFBT, survivors were either exposed to an unconditioned stimuli, such as earthquake tremors in a safe and controlled environment, or a conditioned stimuli such as earthquake reminders, until they could tolerate and control their related distress. Meta-analytic comparisons of studies of CFBT have shown that CFBT reduces fear, PTSD, and depression.

In summary, in the context of disaster, resilience is primarily studied at the individual and community levels (Doorn 2015), and the literature search results from this review further confirmed this tendency. However, it should be noted that individual and community resilience are inseparable from family resilience, these aspects are undoubtedly linked (Terte, Becker & Stephens 2009). In the following section, the concept of family resilience, family resilience models, and family resilience research in adverse situations and in the disaster context will be presented.

2.4 Section 2: Family resilience

2.4.1 Concept of family resilience

As a basic social unit, the family is composed of two or more individuals; however, family resilience is far more than the sum of the resilience of the individual family members (Card & Barnett 2015, p. 130), because the family is not only a group of people, but is also the relationships that are embedded within the individuals. All families possess potential resilience factors (Simon, Murphy & Smith 2005); however, family resilience varies in different contexts. Family type, social class, and ethnicity contribute to the different strengths that families have (McCubbin & McCubbin 1988). The concept of family resilience has gradually evolved based on the accumulation of extensive family resilience research and the development of associated theories.

Overall, there are two different perspectives in defining and understanding family resilience. The first point of view considers family resilience as the strengths, protective factors, promotive factors, characteristics, recovery factors, and capabilities that families possess which help them to deal with adverse situations (Henry, Morris & Harrist 2015; MacPhee, Lunkenheimer & Riggs 2015). For instance, McCubbin and McCubbin (1988, p. 247) defined family resilience as the "*characteristics, dimensions, and properties of families which help families to be resistant to disruption in the face of change and adaptive in the face of crisis situations*". McDermott et al. (2010a, p. 385) referred to family resilience as "*the ability of a family to respond positively to an*

adverse situation and emerge from the situation feeling strengthened, more resourceful, and more confident compared to the prior state". Recently, based on a concept analysis study, Oh and Chang (2014, p. 986) defined family resilience as "*the family's capabilities to regain its psychological and functional integrity after adversity*".

Generally, the critical family resilience factors described by different literature reviews on the topic overlap with each other. McCubbin and McCubbin (1988, p. 248) proposed 11 family strengths based on reviewing and summarizing the findings from studies conducted on resilient families, including *"accord, celebrations, communication, financial management, hardiness, health, leisure activities, personality, support networks, time and routines, and traditions".* Black and Lobo (2008, p. 38) pointed to 10 family resilience factors through a review of the family research literature. This review confirmed the family resilience factors as accord, support, communication, financial stability, family traditions and celebrations, time together, and leisure activities, as indicated in McCubbin and McCubbin's (1988) review and, in addition, also suggesting positive outlook, spirituality and belief, and flexibility as important factors for family resilience. Benzies and Mychasiuk (2009, pp. 104-9) identified the protective factors that contribute to family resilience through an integrative review of family resilience from 13 peer-reviewed databases. Their review yielded 24 protective factors at three different but interactive levels: individual, family, and community. The family-level protective factors included family cohesion, social support, and stable and adequate income, as indicated by McCubbin and McCubbin, and by Benzies and Mychasiuk. Other family-level protective factors included *"family structure, intimate partner relationship stability, supportive parent-child interaction, a stimulating environment, family of origin influences, and adequate housing"*. In addition, according to Benzies and Mychasiuk (2009, p. 105), the factors contributing to family resilience at an individual level included *"internal locus of control, emotional regulation, belief systems, self-efficacy, effective coping skills, increased education, skills and training, health, temperament, and gender".* The factors contributing to family resilience at the community level included *"involvement in the community, peer acceptance, supportive mentors, safe neighbourhoods, access to quality schools and child care, and access to quality healthcare"* (Benzies & Mychasiuk 2009, p. 105). Recently, Oh and Chang (2014, p. 983) advanced the concept of family resilience guided by Rodgers' evolutionary concept analysis. Six attributes of family resilience were identified in the concept analysis, four of which were consistent with previous reviews, including interconnectedness, a positive view of life, resourcefulness, and open communication patterns. In addition, collective confidence and collaborative problem-solving were emphasized by Oh and Chang (2014, p. 983). Overall, this perspective mainly focuses on the attributes of families and how they contribute to family resilience, thereby ignoring the possibilities of dynamic changes in these assets.The findings are summarised in Table 2-3.

Table 2-3: Strengths of a resilient family

Family strengths	Literature sources	Literature type
Accord: family cohesion; balanced relationship among family members which facilitates the family to solve conflicts	(McCubbin & McCubbin 1988, p. 248) (Black & Lobo 2008, p. 38) (Benzies & Mychasiuk 2009, p. 105) (Oh & Chang 2014, p. 983)	Literature review Conceptual review Integrative review Concept analysis
Support: support from relatives and friends; share resources with individual, familial, and community networks	(McCubbin & McCubbin 1988, p. 248) (Black & Lobo 2008, p. 38) (Benzies & Mychasiuk 2009, p. 105) (Oh & Chang 2014, p. 983)	Literature review Conceptual review Integrative review Concept analysis
Communication: sharing beliefs and emotions with one another; exchanging information; open emotional expression	(McCubbin & McCubbin 1988, p. 248) (Black & Lobo 2008, p. 38) (Oh & Chang 2014, p. 983)	Literature review Conceptual review Concept analysis
Financial stability: sound money management; stable and adequate income	(McCubbin & McCubbin 1988, p. 248) (Black & Lobo 2008, p. 38) (Benzies & Mychasiuk 2009, p. 105)	Literature review Conceptual review Integrative review
Family traditions and celebrations: acknowledging birthdays, religious occasions, and other special events; honouring holidays and important family experiences carried through generations	(McCubbin & McCubbin 1988, p. 248) (Black & Lobo 2008, p. 38)	Literature review Conceptual review
Time together and family routines: make the most of togetherness with daily tasks to promote close family relationships	(McCubbin & McCubbin 1988, p. 248) (Black & Lobo 2008, p. 38)	Literature review Conceptual review
Positive outlook: confidence and optimism; sense of humour	(Black & Lobo 2008, p. 38) (Oh & Chang 2014, p. 983)	Conceptual review Concept analysis
Spirituality and belief: shared interval values; making meaning of adversity	(Black & Lobo 2008, p. 38) (Oh & Chang 2014, p. 982)	Conceptual review Concept analysis
Leisure activities/shared recreation: focuses on similarities and differences of family member preferences for ways to spend free time; do family members prefer active or passive interests, social or personal activities; develops child's social and cognitive skills; cohesion and adaptability	(McCubbin & McCubbin 1988, p. 248) (Black & Lobo 2008, p. 38)	Literature review Conceptual review
Health: the physical and psychological well-being of family members	(McCubbin & McCubbin 1988, p. 248)	Literature review

Hardiness: a basic strength through which families find the capacity to cope; emphasises family members' sense of control over their lives; commitment to the family; confidence that the family will survive no matter what; and the ability to grow, learn from, and challenge each other	(McCubbin & McCubbin 1988, p. 248)	Literature review
Personality: involves acceptance of a partner's traits, behaviours, general outlook, and dependability	(McCubbin & McCubbin 1988, p. 248)	Literature review
Flexibility: stable family roles with situational and developmental adjustments	(Black & Lobo 2008, p. 38)	Conceptual review
Family structure: certain family characteristics associated with protective advantages	(Benzies & Mychasiuk 2009, p. 106)	Integrative review
Intimate partner relationship stability	(Benzies & Mychasiuk 2009, p. 106)	Integrative review
Supportive parent-child interaction	(Benzies & Mychasiuk 2009, p. 107)	Integrative review
Stimulating environment	(Benzies & Mychasiuk 2009, p. 106)	Integrative review
Family of origin influence: children acquire their parents' traits by mimicking, copying, and reinforcement	(Benzies & Mychasiuk 2009, p. 107)	Integrative review
Adequate housing	(Benzies & Mychasiuk 2009, p. 108)	Integrative review
Collective confidence: the strong beliefs that the family is able to manage the hardships they are facing	(Oh & Chang 2014, p. 982)	Concept analysis
Collective problem-solving	(Oh & Chang 2014, p. 983)	Concept analysis

The second point of view highlights the dynamic process of family resilience while taking account of the strengths of the family (Henry, Morris & Harrist 2015, p. 22; MacPhee, Lunkenheimer & Riggs 2015). In this view, family resilience is not only the static traits that exist at the family unit level, but is also a process that allows families to resist disruption, adapt to situations, and become more resourceful and stronger. Hawley and DeHaan (1996, p 7) defined family resilience as "*the path a family follows as it adapts and prospers in the face of stress, both in the present and over time. Resilient families respond positively to these conditions in unique ways, depending on the context, developmental level, the interactive combination of risk and protective factors, and the family's shared outlook*". This definition stresses that family resilience is a developmental process that results in adaptive outcomes rather than simply being a number of static attributes (Hawley & DeHaan 1996). Patterson (2002b, p. 237) supported the idea that family resilience was an ongoing and emergent process rather than a set of stable traits. Walsh (2002, p. 132) outlined three major processes of family resilience based on an overview from a research-informed family resilience framework, including: *"(1) Belief Systems: making meaning of adversity, positive outlook, and transcendence and spirituality; (2) Organizational Patterns: flexibility, connectedness, social and economic resources; and (3) Communication Processes: clarity, open emotional sharing; and collaborative problem-solving".* Walsh's definition of family resilience addressed the dynamic processes of changeable actions and behaviours in the course of dealing with an adverse situation (Mullina & Arcea 2008, p. 426). Recently, MacPhee, Lunkenheimer and Riggs (2015, p. 167) advanced the concept of family resilience as "*establishing equilibrium in a system due to perturbations caused by significant adversity*" from a resilience-as-regulation perspective, further supporting the changeable nature of family resilience. Apart from the evolution of the family resilience concept, a number of family resilience models have been proposed in order to gain deeper insights into the concept.

2.4.2 Family resilience models

There are six relevant family resilience models presented and analysed in this literature review. These family resilience models have been developed based on theoretical syntheses and empirical studies, some of them have served as the theoretical frameworks guiding the current research in identifying or measuring family resilience, and developing and evaluating resilience-oriented interventions.

2.4.2.1 The Resiliency Model of Family Stress, Adjustment and Adaptation

The Resiliency Model of Family Stress, Adjustment and Adaptation was developed by McCubbin and McCubbin (1993) (cited in Rungreangkulkij & Gilliss 2000, p. 354), and is rooted in family stress theory developed by Hill (Hill & Boulding 1949), and expanded from the Double ABCX Model and Typology Model of Family Adjustment and Adaptation (Rungreangkulkij & Gilliss 2000, p. 354). This model comprises both adjustment and adaptation phases with an emphasis on

adaptation (Robinson 1997). In terms of the adjustment phase, there are six factors involved, including the stressor; family vulnerability; family type; the family's existing resources; the family's appraisal of the stressor; and the family's problem-solving and coping strategies. The interaction between these factors contributes to the different adjustment levels of the family (Rungreangkulkij & Gilliss 2000, pp. 354-5). If the stressor is overcome by the family successfully and results in positive outcomes, it is called bonadjustment. Conversely, if the stressors pile up and overwhelm the functioning of the family, it will cause maladjustment and shift from the adjustment phase to the adaptation phase. The elements of the adaptation phase include: (1) the accumulation of demands; (2) family typology; (3) family resources; (4) the family's social support; (5) a situational appraisal; (6) the family's schema appraisal and the meaning they attach to it; and (7) the family's problem-solving and coping skills (Rungreangkulkij & Gilliss 2000, pp. 355-6). A successful adaptation (bonadaptation) demonstrates the achievement of individual family members' needs and the functioning of the family unit, while an unsuccessful adaptation (maladaptation) is characterized by the failure of family members' personal achievements and family functions (Robinson 1997; Rungreangkulkij & Gilliss 2000).

The Resiliency Model of Family Stress, Adjustment and Adaptation helps to explain families' behaviours under stressful conditions and the impacts of family strengths on family adaptation and well-being. Family resources, strengths, and coping strategies interact with each other and result in adjustment or adaptation (Vandsburger, Harrigan & Biggerstaff 2008). This model has primarily been used as the conceptual framework for family resilience research which focuses on identifying and understanding family resilience factors under a range of adverse situations, such as post-divorce families, military families, and families who have lost their home in a fire (Chapin 2009, 2011; Greeff & Lawrence 2012; Simon, Murphy & Smith 2005). In addition, this model has been used to study the relationship between stress and resilience in families. For example, research looking at families undergoing various stressors caused by a family member's illness, physical disability, raising a child with special needs, or minority youth and their families living under risky conditions, have employed McCubbin's Resiliency Model of Family Stress, Adjustment and Adaptation as the underpinning theoretical framework to explore the association between family resilience and the corresponding stressors (Svavarsdottir, Rayens & McCubbin 2005).

2.4.2.2 Family Adjustment and Adaptation Response (FAAR) model

The Family Adjustment and Adaptation Response (FAAR) model originated from the family stress and coping theory and was developed by Patterson (1988) based on a review of various stress models. This model stresses the active processes families engage in to reach a balance between family demands and capabilities in an ecological context (Patterson 1988, 2002b). Family demands consist of stressors (normative and non-normative), ongoing family strains, and daily difficulties, while their capabilities include their tangible psycho-social resources and coping

behaviours (Patterson 2002b, p. 236). Demands and capabilities can emerge from individual family members, a family unit, and community (Patterson 2002a, p. 350; Patterson 2002b, p. 236). Moreover, this model highlights the interaction of family demands with family capabilities through three levels of meaning within the family, ranging from a family's view of their demands and capabilities to a family's perspective towards the world (Patterson 2002b). Similar to McCubbin's model, the FAAR model addresses the adjustment and the adaptation phases. Overwhelming demands will result in a crisis and subsequent adaptation, while only adjustment will occur if the family is capable of dealing with the risk factors.

Patterson suggested that the FAAR model could be applied to various research problems, particularly in primary prevention, and for acute episodes of illness, chronic illness, and compliance problems (Patterson 1988, p. 231). However, there is only a small number of studies that have applied this model.

2.4.2.3 The Family Resilience Framework

The Family Resilience Framework was proposed by Walsh (1996) in a review paper which started with a reflection on the concept of individual resilience, before moving on to a systemic view of resilience, shifting the emphasis from individual traits to an interactional process. This framework is rooted in family systems theory which emphasises that the family is a system (unit) with unique boundaries, disciplines, and interactions (Walsh 2006). In addition, it incorporates the accumulated findings from social science studies and clinical practice pertaining to understanding and identifying significant factors which contribute to effective family functioning (Walsh 1996, 1998, 2002). Furthermore, ecological and developmental perspectives are blended in this model to illustrate family function in the context of social, cultural, and lifespan development.

Walsh's (2006) Family Resilience Framework comprises two underpinning assumptions and three major domains. The assumptions are that, firstly, only if we take into consideration the entire family and the social world can individual resilience be completely understood. Secondly, each family has a number of potential resilience factors; therefore, the identification and promotion of these will facilitate families in using them more effectively (Simon, Murphy & Smith 2005, p. 428). The three main domains of this conceptual framework include *"Family belief systems", "Organizational patterns", and "Communication processes"* (Walsh 2006, p. 26). Family belief systems comprise the values, beliefs, and attitudes of a family. A positive belief system results in an optimistic perspective on the stressors, thereby facilitating positive coping behaviours. Family organizational patterns illustrate how families are structured to fulfil their tasks. Good organizational patterns such as flexibility, connectedness, and awareness of available resources may improve family resilience under difficult conditions. Family communication processes include the exchange or sharing of information. Open communication between individual family members may result in better understanding and greater trust (Isserman et al. 2014, p. 258; Simon, Murphy

& Smith 2005; Walsh 1998). In summary, Walsh's model significantly highlights the capacities (protective factors/strengths) of families to deal with existing or future adverse situations, and outlines the processes that build family resilience.

Walsh's Family Resilience Model has been applied extensively by healthcare professionals to guide their clinical practice (Walsh 1996, 1998, 2002, 2003). The model has also been used to foster recovery from major traumatic events, such as refugee experiences, war, and acts of terrorism like the Oklahoma City bombing and the September 11 World Trade Centre Attacks (Walsh 2006). Furthermore, this model has been used as a conceptual framework to provide a theoretical underpinning for studies related to understanding the resilience of families experiencing adverse situations, measuring the capabilities of families in the face of austere situations, and conducting resilience-oriented practice (Walsh 2016). For example, West et al. (2012) employed Walsh's Family Resilience Framework as the conceptual framework for a study which aimed to measure family resilience for families with a member living with chronic pain. As well, Faqurudheen, Mathew and Kumar (2014) used the model as a framework to understand family resilience of families whose family members underwent treatment at a community mental health clinic.

2.4.2.4 Lee's Family Resilience Model

Lee et al. (2004) employed a hybrid model of concept development method (HMCD) to develop a family resilience model. "*The HMCD is oriented to developing concepts through an approach that integrates theoretical and empirical investigations, and it comprises three phases: theoretical, empirical (fieldwork) and analytical*" (Lee et al. 2004, p. 637). The initial phase of theoretical investigation involved identifying existing knowledge about the concept of family resilience. The second field investigation phase was conducted via 11 in-depth interviews, informed by phenomenology, with the parents of children diagnosed with cancer with an uncertain medical prognosis in Korea. The expanded knowledge resulting from the earlier theoretical and fieldwork phases, was used in the final analytical phase to more clearly understand the concept of family resilience (Lee et al. 2004). According to the analysis of the findings from the literature and the interview data, Lee et al. (2004, p. 643) proposed four main dimensions of family resilience, including *"Intrinsic family characteristics, Family member orientation, Externally-directed, and Responsiveness to stress".* Again, 21 attributes were presented under these dimensions, including *"coherence, faith, positive outlook, mature thinking, family self-esteem, flexibility in reorganising the family, attachment among family members, open communication and emotional expression among family members, mutual understanding, maintaining a balance in the family members demands, economic resources, pro-activeness toward information, maintaining cooperative relations with health-care professionals, ability to maintain good social relations, family member leadership, adaptability, desire to maintain normal states, patience for attainment*

of goals, ability to control stress, readiness to accept critical situations, responsibility for causing trouble".

This model adds new information to the concept of family resilience as it integrates the attributes of resilience found in the literature with the findings of the empirical fieldwork, building on new understandings of family resilience in the face of special stressors (families with a chronically-ill child) and in the socio-cultural context of South Korea. Nevertheless, the model has not been applied in other studies and may need further investigation.

2.4.2.5 The Process of Family Resilience Model

The Process of Family Resilience model was developed by Lietz (2007) based on a mixed-methods study of resilient families. In total, 182 participants were recruited from the Phoenix metropolitan area, and a 'family strength' scale was established to measure the strengths that families possessed to help them as part of the first quantitative stage of the research. The results of the quantitative research identified 16 resilient families as being high-risk and high-functioning. Six of these families participated in the in-depth interviews in the second stage qualitative research guided by the theoretical perspective of narrative inquiry. The Process of Family Resilience model was created through the process of narrative reconstruction (Lietz 2006, pp. 576-81). Ten family strengths were identified from the study, including *"Insight, Boundary setting, Taking charge, Creativity/flexibility, Humour, Internal social support, External social support, Morality/spirituality, Appraisal, and Communication"*. Furthermore, five stages of family resilience were presented in this model, including *"Survival, Adaptation, Acceptance, Growing stronger, and Helping others"* (Lietz 2007, p. 149). Different family strengths were employed to help these families deal with adverse situations at varying stages. For instance, at the survival stage, internal and external social support, taking charge, and morality/spirituality presented as the protective factors which helped the families cope with relevant difficulties (Lietz 2006, 2007).

This model further confirms eight protective factors proposed by previous research (Lietz 2007, p. 154), with the expansion and clarification of social support and the value of both giving and receiving support. Furthermore, it modifies the concept of 'independence' as 'boundary setting', and develops a new family strength entitled 'taking charge'. More importantly, Lietz's Family Resilience Model incorporates family strengths into various stages following adverse situations, with an emphasis on the dynamic phases of family difficulties and the unique and somehow overlapping protective factors within each stage.

Overall, this model provides new understandings of resilient factors and the process of family resilience. It expands the scope of the protective factor of 'social support' into internal family support and external support, and places a stronger emphasis on the support that comes from within the family. This challenges the prevalent assumption around the definition of social support

with the focus on support coming from outside of the family. Again, the valuing of both receiving and giving support provides a new way of understanding social support. However, most of the participants in this study were from Caucasian families, which might affect the results and conclusions (Lietz 2006, 2007). No evidence could be found of this model being utilized to guide other research.

2.4.2.6 Henry's Family Resilience Model (FRM)

Henry, Morris and Harrist (2015) proposed a family resilience model through a review paper which analysed previous family resilience models and family resilience research, and which consolidated and refined the terminology around family resilience. Key concepts from individual and family resilience are integrated into their model from a systems perspective. Four basic elements are presented in the model, including: "*(1) the presence of family risk; (2) family protection that facilitates families' abilities to restore balance between demands and capabilities after risk and may protect against future risks; (3) family vulnerability that heightens potential of significant risk or a pile-up of risks; and (4) short adjustment and long-term-adaptation*" (Henry, Morris & Harrist 2015, p. 30). In the context of family meaning, human adaptive systems, and ecosystems, crucial variables such as family risk, protection, vulnerability, and adaptation can be conceptualized via this universal model (Henry, Morris & Harrist 2015, p. 36). This newly developed model is expected to guide multi-level, multi-system, and multi-disciplinary research and application (Henry, Morris & Harrist 2015).

2.4.2.7 Summary of family models (similarities and differences)

Overall, each individual model has a distinct emphasis and makes a unique contribution to the research on family resilience. McCubbin's Resiliency Model of Family Stress, Adjustment and Adaptation, and Patterson's Family Adjustment and Adaptation Response (FAAR) model have the same theoretical origin with both emphasising stress, coping, and subsequent consequences, mainly from the psychological perspective. McCubbin's model proposes that a family's adaptation to a crisis could be predicted according to the interaction of multiple factors, including vulnerability, family type, resources, appraisal of the stressful situation, and problem-solving and coping skills. McCubbin's model points to the pivotal roles of environmental and social factors, and the family's attitude toward the stressors in building resilience. For example, families that have an optimistic outlook and overcome an unfavourable situation cohesively are likely to be more resilient while experiencing the stressors. In line with McCubbin's model, Patterson's Family Adjustment and Adaptation Response model highlights the mutual process and interaction of multiple factors, including family demands, family meaning, and the capabilities of the family. Overall, McCubbin's and Patterson's models depict the dynamic process of families coping with stressors and outline the major elements which contribute to potential outcomes. However, although these models seek to present resilience factors at the family level, they do not specify family functioning during the

coping process and tend to ignore the unique role of the entire family.

Walsh's model, which is quite different from McCubbin's and Patterson's models, originated from family system theory and highlights the functioning of the entire family. Nevertheless, whether Walsh's model represents a process or not is still open to debate. Although Walsh herself, and some other researchers, consider that this model contains three major processes, McDermott argues that Walsh's model is merely a description of three characteristics of the resilient family (McDermott et al. 2010a), which raises concerns about whether Walsh's Family Resilience Model is robust enough to present the process of dynamic change in family resilience. Lee's Family Resilience Model (Lee et al. 2004) identified 21 attributes in their fieldwork (through 11 in-depth interviews with parents of chronically-ill children in South Korea). Of the 21 attributes, 14 are similar to those found in western studies, whereas 7 attributes evolved from the fieldwork, including family self-esteem, readiness to accept critical situations, the taking of responsibility for causing trouble, maintaining good social relations, family member leadership, and a proactive approach towards information. The difference might be attributed to the specific type of stress in this study (families with chronically-ill children) and the unique context of South Korea. Lee's Family Resilience Model (Lee et al. 2004) provides an Eastern cultural perspective to understand family resilience compared with dominant Western studies. Lietz's model is consistent with the characteristics identified by Walsh, and both Walsh's and Lietz's models emphasise a sense of belonging and connectedness. Slightly different from Walsh's model, Lietz presents a non-sequential process model which fits the experience of resilient families, and which demonstrates the different foci of the family at different stages following adverse events (McDermott et al. 2010a). Furthermore, Lee's Family Resilience Model contributes to advancing the concept of family resilience; however, its application remains unclear. Henry's Family Resilience Model has only recently been developed, and therefore, has not yet been applied.

In conclusion, most of the family resilience models have a number of aspects in common which overlap with each other to some extent. Most importantly, in contrast to individual resilience, all of them focus on resilience at the family level (McDermott et al. 2010b; Simon, Murphy & Smith 2005). Family resilience models can serve as valuable theoretical frameworks to guide research which looks into different aspects of family resilience and the development of prevention and intervention approaches for strengthening family resilience. In recent years, there have been a number of studies looking into different aspects of family resilience according to these frameworks (Chen & Clark 2010; Shin et al. 2010; Zauszniewski, Bekhet & Suresky 2010). However, family resilience is context-based, and most of the family resilience models are based on an analysis of the western literature, and therefore, they may not fit a specific situation or culture, especially non-Western cultures. Moreover, although Lee's Family Resilience Model was developed through a combination of a synthesis of the literature and the Korean-based research, it does not conceptualize this model from a socio-cultural perspective, but simply compares the similarities

and differences between the prior models with a focus on validating the attributes developed from the theoretical phase. Therefore, further investigation should be conducted to refine and modify these models, or to contribute to a deeper understanding of family resilience, especially in specific cultures and situations. Table 2-4 summarises these models.

Table 2-4 Similarities and Differences of family resilience models

Name of Family Resilience Models & Developer(s)	Theoretical Origins	Attributes	Emphases	Application	Literature sources
The Resiliency Model of Family Stress, Adjustment and Adaptation Developed by McCubbin and McCubbin (1993)	Family Stress Theory; the Double ABCX Model; the Typology Model of Family Adjustment and Adaptation	• Family type • Family meaning and schema • Situation appraisal • Family resources • Social support • Family problem-solving and coping skills	Adjustment and Adaptation	Widely	(Rungreangkulkij & Gilliss 2000, pp. 354-5)
Family Adjustment and Adaptation Response (FAAR) model Developed by Patterson (1988) based on review of empirical findings	Family Stress and Coping Theory	• Meaning (situational; global) • Capabilities (resources; coping)	Adjustment and Adaptation	A few	(Patterson 1988, pp. 202-37; 2002b, pp. 233-46)
The Family Resilience Framework Developed by Walsh (1996a) through reviewing individual resilience and shifting emphasis from individual traits to the family as a unit	Family System Theory	• Organizational pattern • Flexibility • Connectedness • Social and economic resources • Communication clarity • Collaborative open emotional expression	Family system	Widely	(Walsh 1996, pp. 261-81; 1998; 2002, pp. 130-7; 2006)
The Family Resilience Model Developed by integrating the results of a comprehensive review of the literature on resilience and empirical data through in-depth interviews with the parents of chronically-ill children in South Korea through applying the HMCD (hybrid model of concept development)		• Coherence • Faith • Positive outlook • Mature thinking • Family self-esteem • Flexibility in reorganizing the family • Attachment among family members • Open communication and emotional expression among family members • Mutual understanding • Maintaining a balance in the family		None	Lee et al. (2004, pp. 636-44)

		members demands • Economic resources • Proactiveness towards information • Maintaining cooperative relations with healthcare professionals • Ability to maintain good social relations • Family member leadership • Adaptability • Desire to maintain normal states • Patience for attainment of goals • Ability to control stress • Readiness to accept critical situations • Responsibility for causing trouble			
The Process of Family Resilience Developed by Lietz through a mixed-methods study		• Insight • Boundary setting • Taking charge • Creativity/flexibility • Humour • Internal social support • External social support • Morality/spirituality • Appraisal • Communication	The dynamic phases of family difficulties and the unique and overlapping protective factors within each stage	None	(Lietz 2006, pp. 575-81; 2007, pp. 147-55)
Family Resilience Model (FRM) Developed by analysing previous family resilience models and family resilience research		• Family risk • Family protection • Family adaptation • Family vulnerability	Integrates key concepts from individual and family resilience and systems perspectives	None	Henry, Morris and Harrist (2015, pp. 22-43)

2.4.3 Family resilience in the context of adverse situations

Initially, much of the work on family resilience has been presented at the theoretical level. Nonetheless, there is a burgeoning of studies being conducted to explore and identify family resilience factors, understand family resilience in different contexts, assess family resilience levels as a predictor, and to develop intervention programs to promote family resilience.

2.4.3.1 Identification and understanding family resilience factors

Both quantitative and qualitative approaches have been employed to explore and identify elements or factors of family resilience in different contexts, such as families living with autism (Bayat 2007; Kapp & Brown 2011), spectrum disorders (Jonker & Greeff 2009), schizophrenia (Bishop & Greeff 2015), a child with cancer (Greeff, Vansteenwegen & Geldhof 2014), families in which a child is being bullied (Greeff & Van den Berg 2013), families of children with disabilities (Greeff & Nolting 2013; Greeff, Vansteenwegen & Gillard 2012), families of husbands with prostate cancer (Greeff & Thiel 2012), deaf and hard-of-hearing children (Ahlert & Greeff 2012), families in which a parent has depression (Maenhout, Rober & Greeff 2014), family caring for a family member diagnosed with dementia (Deist & Greeff 2015), families experiencing heart-related trauma (Greeff & Wentworth 2009), parents who have remarried (Greeff & Toit 2009), families in which a child has been abused (Vermeulen & Greeff 2015), after the death of a child (Greeff, Vansteenwegen & Herbiest 2011), families in which a parent has died (Greeff & Human 2004; Greeff & Joubert 2007), families of different ethnicities (Greeff & Loubser 2008), migrant families (Greeff & Holtzkamp 2007), divorced families (Greeff, Vansteenwegen & DeMot 2006), and families living in poverty (Mullina & Arcea 2008). The relevant family resilience factors are listed in Table 2-5.

Table 2-5 Family resilience factors

Family resilience factors	Literature sources
Making meaning	(Ahlert & Greeff 2012; Bayat 2007; Greeff & Toit 2009; Greeff, Vansteenwegen & Geldhof 2014; Greeff, Vansteenwegen & Gillard 2012)
Resources	
• mobilization of resources	(Bayat 2007)
• social support	(Deist & Greeff 2015; Greeff & Holtzkamp 2007; Greeff & Thiel 2012; Greeff & Toit 2009; Greeff, Vansteenwegen & DeMot 2006; Greeff, Vansteenwegen & Gillard 2012; Greeff, Vansteenwegen & Herbiest 2011; Greeff & Wentworth 2009; Kapp & Brown 2011; Mullina & Arcea 2008; Vermeulen & Greeff 2015)
• intrafamilial support	(Greeff & Holtzkamp 2007; Greeff & Human 2004; Greeff & Thiel 2012; Greeff & Toit 2009)
• professional support and knowledge	(Greeff & Thiel 2012)
Family cohesion	(Bayat 2007; Deist & Greeff 2015; Greeff & Nolting 2013; Greeff, Vansteenwegen & Geldhof 2014; Greeff, Vansteenwegen & Herbiest 2011)
Family relationship	(Greeff & Toit 2009)
• spousal relationship	(Greeff & Toit 2009; Kapp & Brown 2011)
• parents' relationship with their children	(Vermeulen & Greeff 2015)
• sibling relationships	(Vermeulen & Greeff 2015)
Familial integration	(Greeff & Holtzkamp 2007)
Religion and spirituality	(Ahlert & Greeff 2012; Bayat 2007; Greeff & Loubser 2008; Greeff & Thiel 2012; Greeff & Toit 2009; Jonker & Greeff 2009; Mullina & Arcea 2008)
Family time and routines	(Ahlert & Greeff 2012; Greeff & Toit 2009; Greeff, Vansteenwegen & Geldhof 2014; Kapp & Brown 2011)
Family characteristics	
• personal characteristics of individual family members	(Greeff & Holtzkamp 2007; Jonker & Greeff 2009)
• education level of parents	(Greeff, Vansteenwegen & DeMot 2006; Greeff, Vansteenwegen & Gillard 2012)
Family communication	(Ahlert & Greeff 2012; Deist & Greeff 2015; Greeff & Nolting 2013; Greeff & Thiel 2012; Greeff & Toit 2009; Greeff, Vansteenwegen & Geldhof 2014; Greeff & Wentworth 2009; Maenhout, Rober & Greeff 2014)
Family hardiness	(Ahlert & Greeff 2012; Deist & Greeff 2015; Greeff & Human 2004; Greeff, Vansteenwegen & DeMot 2006; Greeff, Vansteenwegen & Gillard 2012; Greeff & Wentworth 2009)
Family's internal strengths and durability	(Greeff & Thiel 2012; Greeff, Vansteenwegen & Herbiest 2011)
Family coping	
• coping style	(Greeff & Holtzkamp 2007; Greeff & Wentworth 2009)

• problem-solving skills	(Ahlert & Greeff 2012)
• effective management of symptoms	(Deist & Greeff 2015)
• coping ability	(Vermeulen & Greeff 2015)
Acceptance of the adverse situation	(Ahlert & Greeff 2012; Deist & Greeff 2015; Greeff & Nolting 2013)
Positive attitude	(Deist & Greeff 2015; Greeff & Nolting 2013; Greeff, Vansteenwegen & DeMot 2006; Greeff, Vansteenwegen & Herbiest 2011)
Locus of control	(Greeff & Toit 2009; Greeff, Vansteenwegen & Geldhof 2014)
Avoidance strategies	(Greeff, Vansteenwegen & DeMot 2006)

2.4.3.2 Measurement or assessment of family resilience

A number of studies have been conducted to measure or assess family resilience in order to find the linkage between family resilience and certain circumstances, such as adjustment, adaptation, and mental illness. Family resilience factors have been used as predictors to evaluate family resilience levels and the positive or negative outcomes when families confront adversity. For example, family resilience factors have been identified as predictors of sibling adjustment for siblings of children with a disability (Giallo & Gavidia-Payne 2006). The role of social support was also examined to predict PTSD (Banks & Weems 2014). Overall, there are three persepctives used in measuring family resilience.

The most common way to measure family resilience is to use different measures to evaluate different dimensions of family resilience, based on family resilience models which provide theoretical variables guiding the selection of corresponding measurements. For instance, Greeff conducted a series of studies identifying resilience factors in families experiencing a range of adverse situations. His studies used a cross-sectional survey research design, and were guided by McCubbin's Family Stress, Adjustment and Adaptation Model. Multiple factors indicated in McCubbin's Resiliency Model were considered and relevant scales or inventories used to measure these factors. The Family Hardiness Index, the Family Crisis Oriented Personal Evaluation Scales, the Relative and Friend Support Index, the Social Support Index, and the Family Sense of Coherence Scale were chosen to explore the resilience factors that enabled families to adjust and adapt successfully in Greeff's research (Greeff & Holtzkamp 2007; Greeff & Toit 2009; Greeff, Vansteenwegen & DeMot 2006; Greeff, Vansteenwegen & Herbiest 2011; Greeff & Wentworth 2009; Jonker & Greeff 2009). Shin et al. (2010) also employed the Resiliency Model of Family Stress, Adjustment and Adaptation as the conceptual framework to guide their study to examine the association between family hardiness (Family Hardiness Index, FHI), problem-solving/coping skills-seeking help (Family Crisis Oriented Personal Evaluation Scale, F-COPES), family communication (Parent-Adolescent Communication Inventory, PACI), social support (Social Support Appraisal Scale, SSAS), family beliefs (Children's Beliefs About Parental

Divorce Scale, CBAPDS), self-esteem (Self-Esteem Scale, SES), and adjustment (Child Behaviour Checklist, CBCL) through different standard scales indicated in the parentheses above.

In addition, West et al. (2012) used the Connor-Davidson Resilience Scale, the Medical Outcomes Study Short Form 36, and the Medical Outcomes Study Social Support Survey to measure and explore the nature of family resilience in the context of families with a member with chronic pain by employing Walsh's Family Resilience Model as the theoretical framework for his study. Furthermore, the Family Inventory of Life Events and Change (FILE), the Family Inventory of Resources for Management (FIRM), and the Inventory of Family Protective Factors (Augusto et al. 2014; Gardner et al. 2008) were also used for measuring different dimensions of family resilience. Again, these instruments were adapted to the cultural context to measure family resilience in non-English speaking countries. For instance, the Inventory of Family Protective Factors (IFPF) was adapted and validated for the Portuguese culture, and was expected to be applied to the Portuguese context to help nurses to assess protective factors that contribute to family resilience, thereby enabling more efficient nursing interventions (Augusto et al. 2014). Overall, these scales have been used to measure different components of family resilience.

The second way to measure family resilience is to consider family resilience factors as a whole. Apart from individual scales aiming to identify single dimensions of family resilience, researchers have made efforts to establish an instrument to quantitatively assess all family resilience factors in one measure. For instance, Sixbey (2005) employed Walsh's (1998) Family Resilience Model as a framework and developed a Family Resilience Assessment Scale (FRAS). A survey using the FRAS was conducted with 418 participants. The findings demonstrated that the sub-scale reliability coefficients were *"between a = 0.96 and a = 0.70, a total scale reliability coefficient of a = 0.96, and an individual item factor loading at 0.30 or higher on only one sub-scale"*, which showed that the six factor FRAS was a valid and reliable measure of family resilience (Sixbey 2005, p. 85). A recent research reported that FRAS has been evaluated for use in the Chinese context (Li et al. 2016). Isserman et al. (2014) refined a Family Resilience Template by integrating the concepts of the original FRT (Family Resilience Template) and the QFDP (a qualitative research tool for analysing parent-child dynamics). He then used the revised FRT to analyse the transcripts of three parent-child dyads and, in turn, developed a 5-point Likert scale quantitative instrument which aimed to measure family resilience. The first section of the FRT instrument is the ecological-systems section while the second is based on attachment theory. Initial reliability and face validity of the FRT were identified, and the author suggested that further work needed to be undertaken before using this FRT as a quantitative instrument or scale (Isserman et al. 2014). Distelberg et al. (2015) developed a multi-dimensional assessment of family resilience (the Individual, Family, and Community Resilience Profile, IFCR) by considering individual-, family-, and community-level resilience. The initial reliability of the 75-item IFCR was

demonstrated based on a sample of 650 low-income families. In addition, the IFCR showed *"strong reliability with inter-item reliability coefficients ranging from α = .71 to. 93".* The IFCR also presented *"strong predictive abilities for education levels, employment, and mental health"* (Distelberg et al. 2015, p. 552).

The third way to measure family resilience is from a dynamic perspective. In general, most of the extant studies employ cross-sectional research design and use standardized instruments which measure resilience as a set of static traits to assess the characteristics associated with family resilience (Becvar 2013; De Haan, Hawley & Deal 2002). De Haan, Hawley and Deal (2002) proposed to examine family resilience as a process and suggested that a longitudinal research design should be employed to assess family resilience before, during, and after the occurrence of a particular stressor (Becvar 2013). Patterson (2002a) also suggested the consideration of longitudinal research designs to better understand how unique family traits interact as time goes by. Walsh further supported using longitudinal research to measure family resilience over time (McDonald 2013). However, there is a dearth of studies evaluating family resilience through a longitudinal research design.

2.4.3.3 Interventions into family resilience

Family-focused resilience enhancement programs or initiatives have been developed to promote family resilience in the face of adverse situations, many of which have achieved positive outcomes. In addition, family resilience frameworks have been integrated with other relevant theories into a number of family-centred programs, such as the Chicago Center for Family Health Approach (Vandsburger, Harrigan & Biggerstaff 2008), and have also been synthesized into nursing research frameworks, such as the Guiding Children's Oncology nursing research group (Kelly et al. 2014).

The value of the application of family resilience is evident in the development of several resilience-oriented initiatives in family therapy (De Haan, Hawley & Deal 2002). For instance, Johnson et al. (1998) reported that a family resilience theory guided community-based program could prevent and reduce alcohol and other drug use among high-risk youth by promoting family resilience. Saltzman et al. (2011, pp. 220-2) proposed eight interventions to enhance familial resilience, including: "*providing psychoeducation and developmental guidance; developing shared family narrative; enhancing family awareness and understanding; improving family empathy and communication; fostering confidence and hope; supporting open and effective communication; enhancing selected family resiliency skills; supporting effective and coordinated parent leadership."* A FOCUS (Families OverComing Under Stress) program was established by integrating these interventions, and the implementation of this program facilitated improvements in communication, affective responsiveness and involvement, role clarity, and problem-solving which, in turn, enhanced resilient functioning of military families (Saltzman et al. 2011). Lester et

al. (2013) evaluated the impacts of the aforementioned family-centred FOCUS prevention program on military families facing wartime deployment and reunion, and found that it improved family functioning and significantly reduced child distress at follow-up. Jarrett (2013) described the application of WRT (Warrior Resilience and Thriving) and WFRT (Warrior Family Resilience and Thriving) as pilot combat resilience programs for the U.S. Army during Operation Iraqi Freedom (OIF) 2005-2009, and confirmed that these programs made great contributions to the wellbeing of the army families. From a different focus, Irie and Tsumura (2011) examined the applicability of a family intervention model for families of children with intellectual/developmental disabilities, and found that the model facilitated the family resilience process. Foster, O'Brien and Korhonen (2012) provided a framework for family-focused care for children and families with parental mental illness which could help nurses to identify families' strengths and vulnerabilities, thereby facilitating families to build individual and family resilience. Family resilience has also been suggested as a new model of care for chronic pain management (West, Usher & Foster 2011a), as well as for the care of children of parents with mental illness (COPMI) in order to strengthen individual and family resilience (Foster, O'Brien & Korhonen 2012). A family resilience perspective provides deeper insight into the role of resilience played in successful aging and contributes to guiding the development of strength-based interventions of aging families (Martin, Distelberg & Elahad 2015). Heru suggested that caregiver burden can be reduced and caregiver reward maximized by conducting family interventions to improve family resilience. In addition, it would optimize outcomes for patients with chronic psychiatric illnesses (Heru & Drury 2011).

2.4.4 Family resilience in the context of disaster

Disaster is a significant risk for families and results in unusual stressors which have a severe impact upon family functioning (Patterson 2002b). Overall, there is only limited literature which is relevant to family resilience in the disaster context, with few studies relating to the measurement of, and interventions to enhance, family disaster resilience. The key areas of family disaster resilience research include understanding the adjustment and adaptation of families in the aftermath of disaster; examining the relationships of family-level resilience factors and individual family members' well-being; and identifying or exploring family resilience factors to disasters.

2.4.4.1 Family adjustment model in the wake of disaster

There has only been one study to date that has developed a model to understand the process involved in displaced families' adjustment in the wake of disaster. Peek, Morrissey and Marlatt (2011) explored the different adjustment processes of parents and children through in-depth interviews with 23 families who were displaced to Colorado after Hurricane Katrina. An inductive model of displaced family adjustment was developed and presented in four stages. Interestingly, parents and children's adjustment were different in the second and third stages, whereas they were very similar in the first and last stages. Family members staying together assisted the first

stage of adjustment, known as the 'family unity stage'. The second stage divided into the parents' 'prioritizing safety stage' and the children's 'missing home stage', in which consideration of the entire family's health and wellbeing helped the parents to make the decision to settle down in a new place. The third stage was also divided, this time into the parents' 'confronting reality stage' and the children's 'feeling settled stage', in which financial problems and loss of social support networks resulted in parental stress, while reconnection with old friends, the establishment of new relationships, and the support of teachers and other supportive adults helped the children to adjust positively during this stage. The final stage was the 'reaching resolution stage' in which the parents made the decision to stay or return according to their perception of maintaining stability and the willingness of the children to accept the alternatives. This model outlined the recovery process for displaced families and identified the factors which influenced families' adjustment processes after Hurricane Katrina from both the parents' and the children's perspectives. This model has the potential to provide evidence for the development of a disaster planning strategy for families. However, it should be noted that the model focused only on the recovery phase after Hurricane Katrina and did not explore the entire disaster experiences of families, such as their preparedness and responses. Furthermore, Botey and Kulig (2014) applied their research results in light of the work of Peek, Morrissey and Marlatt (2011) Displaced Family Adjustment Model, although the participants in their study experienced a different type of disaster and a different period of displacement. Their findings provided an insight into the value of this model being applied to the wildfire context (Botey & Kulig 2014).

2.4.4.2 Family resilience and family member's health

In recent years, the role of family-level factors in individual family member's health in the wake of disaster has drawn the attention of researchers. A number of studies have been conducted to identify and explore the relationship between family resilience and the mental health of young people. Sprague et al. (2015) explored the relationship between fire-related stress, family protective factors, and youth mental health and wellbeing after wildfire. The results showed that emotional support from the parents was significantly associated with young people's emotional symptoms. However, McDermott et al. (2010b) reported that disaster-induced child PTSD was not related to low family resilience. The research has also examined the association between family resilience and adult survivors. Cao et al. (2013) explored the relationship between perceived family functioning and the depressive symptoms of bereaved parents who experienced a devastating earthquake. Findings showed that the strongest predictor for low levels of depression was positive family functioning which assisted communication and support among the family, in turn promoted family adaptability and diminished depressive symptoms. Augustine (2014) suggested that family employment, religion, family type, family flexibility, and family communication were significant predictors of post-traumatic growth of adult survivors after experiencing the 2004 Indian Ocean tsunami.

2.4.4.3 Factors that help families or households to deal with disasters

Based on the literature search in both the English and Chinese databases, only a small number of studies were found to have explored and identified the resilience factors of families in disaster situations (the detailed information related to the relevant studies is shown in Appendix 1: Literature characteristics). The major family- or household-level resilience factors to disaster are summarized in Table 2-6.

Table 2-6 Family/household resilience factors to disaster

Family/household resilience factors		Literature sources (the number is based on Appendix 1)
Resources	Social resources:	
	• Social networks	4
	• Household links with NGOs	3
	• Outside help	6
	• Government assistance, particularly for the most vulnerable households	15
	• Community as a resource	18
	• Professional help	20
	• Community acts of caring	18
	Family resources:	
	• Access to resources such as farms, gardens, livestock	4
	• Family members providing crucial support	8
	• Family organizational patterns - economic resources and emergency supplies	11
	• Support from partners and children	18
	• Having internal strengths and dependability	14
Family/household characteristics	Households with smaller size and a higher proportion of working-age members	5
	Household with high education levels	1, 5
	Financial status:	
	• Micro-credit, internal remittances, and social allowances	5
	• More sources of income and more savings	7
	• Income diversity	21
	• Livelihood diversification	15
	• Income from migrant labour	22
	• Insurance	20
Family adjustment & adaptation	Coping and adjusting to a new reality	5
	Different life goals and priorities	9
	New routines	9
	Changes in attitudes	9
	Response mechanisms expanding from short-term adjustment to long-term adaptation	12
	Focus of responses switch from securing reliable water sources to improving irrigation efficiency and diversifying both on- and off-farm prodcution	12
	Long-term mobility	15
	Coping and protective actions	20
Family cohesion/collaboration	Family hardship	13
	Acting together as a cohesive unit	2
	Cooperation and togetherness	6
	Working together as a family	14

Family/household resilience factors		**Literature sources (the number is based on Appendix 1)**
Attitudes toward disasters	Positive attitude:	
	• Positive appraisals	18
	• Optimism	18
	• Hope	13
	Avoidance:	
	• Avoidance of negative social influences	18
	• Avoidance	20
Locus of control	A sense of being in control	14
	Households' confidence in securing their homes and thereby not being affected by a large flood event, such as the 2000 flood	10
	Households' confidence in securing food, income, health, and evacuation during floods and in recovery after floods	10
Knowledge	Knowledge	1
	Flooding experience and indigenous knowledge	2
	Information	20
Training/Learning	Training and preparedness	6
	Training in non-agricultural skills	15
	Households' interests in learning and practicing new flood-based farming practices that are fully adapted to floods for improving household income during the flood season	10
Spirituality	Spirituality/religiosity	13
	Religiousness	20
Communication	Supportive communication	14
Housing	Housing condition (before and after disaster)	1

In summary, social and family resources, family/household characteristics, family adjustment and adaptation, family cohesion/collaboration, attitudes towards disaster, locus of control, knowledge, training/learning, spirituality, communication, and housing all contribute to families' or households' resilience in the face of disasters. Among them, resources, family/household characteristics especially family financial status, and family adjustment and adaptation play the most important roles in helping families deal with disaster, according to the evidence from the literature.

2.5 Section 3: Conclusion

Overall, disaster resilience is a relatively new research area in the disaster discipline. Research pertaining to individual- and community-level disaster resilience has dominated the field (Doorn 2015), while the literature regarding disaster resilience at the family level is very limited. On the other hand, family resilience research has primarily been focused on normative stress situations, such as families living with sick family members, or going through poverty, violence, aging, or military deployment. It should also be noted that family resilience varies according to the different context of adverse situations, such as threats from inside the family (e.g. domestic violence or illness) and from outside of the family (e.g. disaster) (Masten & Obradovic 2008). Therefore, based on this review of the extant literature, there is a gap in the resilience research area which looks at the family-level in the context of disaster.

Indeed, families represent the crucial link between communities and individuals (Landau, Mittal & Wieling 2008). Family resilience plays a vital role in improving both community- and individual-level resilience in disaster situations (Ronan & Johnston 2005). On one hand, family resilience and community resilience are inextricably linked (Landau 2010), with families acting as an important element in contributing to the community recovery process in the aftermath of disasters (Botey & Kulig 2014). Improvement of family-level resilience to disaster will promote the entire community's levels of disaster resilience (Price-Robertson & Knight 2012). On the other hand, family resilience is positively associated with family member's health, while positive family functioning was related to decreased levels of individuals' mental health problems (Cao et al. 2013; McDermott & Cobham 2012), which demonstrates that family-level resilience can positively influence individual-level resilience. Hence, it is important to develop family resilience-oriented approaches to improve family-level disaster resilience which would, in turn, improve both community and individual disaster resilience, thus contributing to local- and national-level disaster resilience.

While relatively few studies have looked at family- or household-level resilience in the disaster area, there is an increasing trend in the research which aims to explore and examine family disaster resilience, particularly studies relating to the factors that influence families or households to cope with, and recover from, various disasters in a range of different settings. Based on this

review, around 80% of the literature sources related to family- or household-level disaster resilience have been published since 2010, which was approximately five years after the study of community- and individual-level disaster resilience started. While the measurement of, and interventions to enhance, community- and individual-level disaster resilience have been explored extensively, the measurement of, and interventions to enhance, family-level disaster resilience remain sparse.

Indeed, identifying and understanding family resilience to disaster is the first step in developing relevant measures to evaluate family-level disaster resilience and establishing resilience-oriented approaches to promote family resilience. There is still a dearth of literature regarding the factors which help families to prepare for, respond to, recover from, and thrive in the face of disaster. To the best knowledge of the author, there is no family disaster resilience model being developed to achieve a better understanding of family-level resilience in the disaster context.

As indicated in Chapter One, China has suffered almost all types of natural disasters and presents as one of the top five countries that have most frequently experienced natural disasters over the last decade (Guha-Sapir, Hoyois & Below 2015; Yi et al. 2012). The literature shows that disasters have resulted in significant negative effects on Chinese families, particularly severe economic losses (Guo 2002; Jiang 2008; Yuan 2007), death of family members or the physical and psychological impact of family members' health (Guo 2002; Yuan 2007), damage to family housing (Guo 2002), decreased family functioning (Cao et al. 2013; Guo 2002), damage to the family structure (Guo 2002; Xiong & Ma 2009), and the breakdown of the marital relationship (Xu & Feng 2016). Therefore, it is important for Chinese policy-makers, disaster management practitioners, disaster researchers, social workers, healthcare workers, and other professionals to gain deep insights into family resilience in order to help families to improve their resilience to disaster which would, in turn, reduce the potential damage caused by disasters. It should also be noted that socio-cultural factors play a significant role in resilience (Buse, Bernacchio & Burker 2013; Shenk & Covan 2010), and that resilience is a context-based concept (Walters 2015). Although the extant research results from other settings might provide a certain knowledge-base of family disaster resilience, it is important to conduct further research in order to understand family disaster resilience in the Chinese socio-cultural context.

However, disaster resilience research is still relatively new in China, with only three case studies having investigated the factors that facilitate farming households living in the remote rural areas of China in dealing with drought, published in the English and Chinese databases with a focus on farming households' economic adaptation. This dominant focus on farming household resilience might be attributed to a consideration of the tremendous damage that natural disasters have had on the natural resources of rural areas and the corresponding severe negative influence on farmer households' livelihoods (Yu & Zhuang 2012). Nevertheless, it should be noted that although urban

families might not primarily rely on natural resources for a living, disasters also threaten their safety, and have a negative influence on family functioning, income, family routines, and also result in severe negative impacts.

Over the past decade, a variety of disasters have struck Chinese urban areas which have resulted in much trauma and loss, such as the SARS incident in 2003, southern snow storms, and the Wenchuan earthquake (Zhang, Yi & Zhao 2013). Increasingly, cities are facing more extreme weather events and have experienced rapid urbanization and population growth in China. Due to a developing awareness of the importance of urban resilience, the Chinese central government and local governments have produced and implemented relevant legislation and programs to improve urban resilience to disaster (Zhai, Li & Chen 2015). In addition, the enhancement of community capabilities in disaster preparedness, reduction, response, and recovery has become an important component of the national disaster reduction strategy in China (Zhang, Yi & Zhao 2013). Families living in urban areas are important components of urban communities. Therefore, it is of great value to enhance the disaster resilience levels of the family due to its vital role in building the entire community's disaster resilience and, in turn, positively influencing urban disaster resilience.

Nevertheless, there is a dearth of research exploring family disaster resilience in the urban areas of China, as well as only limited research on family resilience in rural areas. The factors that help urban families to cope with, and recover from, disasters might be different from rural farming households due to the urban social environment and family characteristics. Research in both contexts will benefit both rural and urban communities and contribute to national family resilience. However, what these family resilience factors to disaster actually are, and how they interact with each other and contribute to family-level disaster resilience in both urban and rural Chinese settings, still remains largely unknown.

To fill the gaps in the current knowledge, the present research has identified the family resilience factors in the disaster context, and in the Chinese socio-cultural context, and has developed a family disaster resilience model to provide deeper insights into family-level disaster resilience. This research is expected to not only contribute to building on the current knowledge of family disaster resilience, but might also potentially lead to the corresponding application of a theoretical framework to guide the development of socio-culturally appropriate evaluation measures or interventions to enhance disaster resilience at the family-level in Chinese communities, thus improving community and individual disaster resilience in urban areas, and thereby contributing to national disaster resilience in China.

2.6 Summary

This background discussion, based on a comprehensive review of the literature, provides a sound

outline of resilience, disaster resilience, disaster resilience research at the community and individual levels, the concept of family resilience, family resilience models, and family resilience research. Moreover, this chapter has, in particular, analysed the factors that help families to deal with disaster through the extant study findings pertaining to family disaster resilience, and has identified a gap in the research indicating that there is a dearth of literature regarding the factors that help families to deal with disaster and how these factors are related to each other and contribute to family-level disaster resilience in both urban and rural Chinese settings. Most importantly, the extensive knowledge-base established by this literature review has been integrated into the discussion chapter, thereby contributing to a thorough and conceptual discussion of the present study, and helping to build a theoretical model to understand family resilience in both the disaster and the Chinese socio-cultural contexts. The next chapter will describe the methodology and methods in detail, which led to the development of the family disaster resilience model.

CHAPTER 3 METHODOLOGY AND METHOD

3.1 Introduction

This chapter describes the research methodology which informs this study in developing a family disaster resilience model, and presents the details of the research methods used. Firstly, the rationale for choosing a qualitative approach and grounded theory methodology is addressed. Secondly, an overview of grounded theory methodology is provided, and the justification for choosing constructivist grounded theory is outlined. Thirdly, the underpinning philosophy of constructivist grounded theory methodology is illustrated, followed by the research methods described in detail, and finally, the reflection on the evaluation of grounded theory research is presented in the last part of the chapter.

3.2 Rationale for choosing grounded theory methodology

To reiterate, the research question for this study is: *What is family resilience to disaster in China?* The sub-questions are: *What factors help the family prepare for, cope with, recover from, and become stronger in the face of disaster?* and *How do these factors interact with each other?*

After the research gaps had been identified and the research question and sub-questions had been raised, the methodology employed to answer these research questions was carefully considered.

The starting point for choosing a suitable methodology is to comprehend how people explore and understand reality. Ontology refers to the question of *"what is the nature of reality?"* (Creswell 2013, p. 21), and to the characteristics of reality (Creswell 2013). These characteristics can be seen in the following ways: *"reality is multiple as seen through many views"* (Creswell 2013, p. 21) and *"whether or not there is a single objective reality"* (Liamputtong 2013 p.10). Instead of adopting a single objective reality, I believe that reality is multiple and subjective, consisting of human beings' own beliefs, values, and emotions which all contribute to individuals' understandings of reality. Liamputtong (2013) indicated that a qualitative approach is most suitable for researchers who adopt a subjective reality, because when they conducted research on people's experiences, it was impossible to separate them from their own subjectivities. Indeed, my ontological standpoint of subjective reality leads to the use of a qualitative research approach.

Apart from my personal ontological position, there are a number of advantages of undertaking qualitative research to answer the research questions for the present study. Firstly, a qualitative research approach allows the gaining of deep insights into human behaviour, the nature of human complexity, and the lived human experience (Polit & Beck 2008; Schneider et al. 2008). Again, qualitative research approaches emphasise the understanding and interpretation of a particular

phenomenon. This research focuses on the phenomenon of the disaster experiences of families, and intends to achieve a better understanding of the factors that facilitate families' behaviours in disaster situations; therefore, a qualitative approach is considered to be optimal to explore this phenomenon. Moreover, qualitative research methods have special benefits for studying the family. Daly (1984) pointed out that qualitative methods could contribute to an understanding of the process of how families create, maintain, and explore their own realities (Greenstein 2001, p. 98). Walsh (1996) further supported the suitability of qualitative approaches in family research by suggesting that qualitative methods were valuable for exploring family belief systems and dynamic processes when families are facing adverse situations. Greenstein (2001) indicated that families are formed by different individuals, namely, groups or systems of individuals; thus, the focus on a holistic understanding of the family makes qualitative methods more suitable for family research. The present study considers the family unit as a whole, and the focus is to understand disaster resilience at the family level; therefore, a qualitative approach is suitable for holistically understanding family disaster experiences and the actions they take pre-, during-, and post-disaster.

A range of methodologies available within qualitative approaches have been considered for this study, such as the phenomenological approach, ethnography, and grounded theory. The phenomenological approach *"explores the experience and meaning of phenomena"* (Schneider et al. 2008, p. 107); however, it focuses on meaning and generates themes rather than explaining the interaction between the themes. Ethnography is *"concerned with describing a custom, group or culture"* (Schneider et al. 2008, p. 114); *"inherent in ethnography is the concept of culture"* (Schneider et al. 2008, p. 115), whereas the focus of the present study is to explain the phenomenon through the construct of a model; therefore, ethnography was not considered to be appropriate.

Grounded theory was chosen as the methodology to inform the present research due to its suitability for the research questions and objectives of this project. The grounded theory approach *"identifies and relates factors that might be used to define and explain relatively unknown situations"* (Taylor, Kermode & Roberts 2006, p. 331). The *"grounded theory research approach is most useful when the goal is a framework or theory that explains human behaviour in context"* (Wuest 2007, p. 244). The objectives of the present research are: (1) to identify and understand significant factors of family disaster resilience in China; and (2) to develop a family disaster resilience model for the Chinese context. Hence, a grounded theory methodology enables the achievement of these objectives. In addition, L.Munhall (2007) indicated that grounded theory is beneficial when little is known about the research area, or when the theoretical frameworks described in the extant literature appear not to fit the phenomenon being researched. As indicated in the preceding chapters, there was limited knowledge regarding family disaster resilience, let alone family disaster resilience models, which demonstrates that a grounded theory methodology

strongly fits this research.

3.3 Rationale for choosing constructivist grounded theory

3.3.1 Overview of grounded theory methodology

There are three main versions of grounded theory methodology according to the different epistemological positions of their originators, including Glaser's classic grounded theory, Strauss and Corbin's grounded theory, and Charmaz's constructivist grounded theory.

3.3.1.1 Glaser's classic grounded theory

Grounded theory method was initially developed by Barney Glaser and Anselm Strauss in 1967 (Glaser & Strauss 1967). At this time, most sociological research methods were primarily focused on testing an existing theory, whereas Glaser and Strauss highlighted the method of developing a theory from the obtained data. Glaser's grounded theory emphasised two primary principles: (1) the application of theoretical sampling; and (2) the generation of theory by employing constant comparative analysis and a simultaneous data collection and analysis process (Glaser & Strauss 1967). Theoretical sampling refers to the data collection process by which researchers collect and analyse data simultaneously and decide where to find data to further develop the emergent theory. Concurrent data analysis informs the direction of the further data collection (Glaser & Strauss 1967). The constant comparative method comprises the following steps: 1) comparing incident with incident which apply to the category constantly; 2) integrating categories and their relevant properties accordingly; 3) clarifying the emerging categories and eliminating the non-relevant properties; and 4) generating substantive theory based on the retained and linked categories (Glaser & Strauss 1967). Overall, the fundamental component of Glaser and Strauss' grounded theory is that categories must emerge from the data in order to develop the subsequent theory (Glaser & Strauss 1967).

Glaser's grounded theory was strongly influenced by mid-20th-century positivism with an emphasis on objectivity, generality, and the replication of research. Glaser stated that researchers should hold a neutral position when conducting a grounded theory study, and that having a pre-conceptualised framework before embarking on grounded theory research defeats the purpose of the approach (Artinina, Giske & Cone 2009). In addition, he advocated delaying the literature review until the completion of the data collection and analysis, and advised the researcher to take field notes rather than to audio-record interviews. The importance of memo-writing (Glaser (1978, p. 83) defines memos as the *"theorizing write-up of ideas about codes and their relationships as they strike the analysis while coding"*) is addressed especially during the development process of categories, their associated properties and potential relationships (Glaser 1998). Again, Glaser argued that it is not necessary to collect and use demographic data of the participants, because findings are abstract of time, place and people. Glaser also

advised researchers to avoid using computer programs because the researcher's analytical processes could not be replaced by such programs (Artinina, Giske & Cone 2009, pp. 36-46). Glaser positions the researcher as an observer during the research process rather than actively interacting with the participants. The researcher is supposed to discover a theory from the emergent categories that arise from the data without any contamination from their previous understandings of the phenomenon being studied. According to Glaser's statements, the researcher should regard themselves as an unbiased observer and should utilise logical, systematic guidelines to develop the theory (Artinina, Giske & Cone 2009).

3.3.1.2 Strauss and Corbin's grounded theory

Strauss and Corbin further explicated Glaser's original grounded theory (Strauss & Corbin 1990). They emphasized that the theory is inductively derived from the data representing the phenomenon being studied, and is discovered, developed, and provisionally verified through systematic and simultaneous data collection and analysis during the research process. Again, they pointed out that a grounded theory approach differs from other qualitative research methods because it aims to discover and formulate a theory containing the relevant categories and the linkages among them based on investigation of the studied phenomenon, rather than creating a set of disconnected themes. Furthermore, they supported Glaser's claim that the researcher should not have a preconceived framework before starting their research. They also recommended employing theoretical sampling to guide further data generation and using memo writing to facilitate the data analysis process (Strauss & Corbin 1990; Taylor & Francis 2013).

However, Glaser's classic grounded theory approach was adapted by Strauss due to Strauss's pragmatist and symbolic interactionist position. Strauss regarded humans as active rather than passive individuals in their world. In this sense, individuals create meaning by interacting within the world. Therefore, in contrast with Glaser's entire objection to the use of existing frameworks and literature, Strauss and Corbin recognized the value of previous theories and research, and advocated using the literature as an analytical tool to facilitate theory generation, and to carefully evaluate the 'fitness' of the theory and the data. As well, Strauss and Corbin suggested to use the literature to enhance theoretical sensitivity and develop an initial interview schedule to guide the theoretical sampling, and that this should be integrated as a source of data to facilitate and validate the final developed theory. In addition, Strauss and Corbin introduced new technical procedures for data analysis which provide more detailed strategies to follow. According to their suggestions, the first step in the data analysis process is to conduct detailed line-by-line coding to generate the initial categories, which is then followed by open coding to identify the concepts and their relevant properties; after which axial coding is undertaken to explore the linkages between the categories and their related properties. Finally, selective coding is conducted to determine the major categories and to integrate them in order to eventually develop the theory

(Holloway & Wheeler 2010; Strauss & Corbin 1990, 1998; Taylor & Francis 2013).

In summary, Strauss and Corbin's grounded theory highlights meaning, action, and process which is heavily influenced by the underpinning philosophical positions of pragmatism and symbolic interactionism. More importantly, Strauss and Corbin's grounded theory emphasises verification and advises researchers to test their working propositions during the process of their research, while Glaser argued that grounded theory should be inductive rather than verificational (Holloway & Wheeler 2010, p. 187).

3.3.1.3 Charmaz's constructivist grounded theory

Constructivist grounded theory accepts the grounded theory guidelines as useful tools; however, it opposes the positivist premises described in the early grounded theory procedures. A constructivist grounded theory approach pays more attention to the specific phenomenon being studied rather than the verification of the methods for studying it. Constructivist grounded theorists tend to interpret the data rather than to simply report it in an objective manner.

Charmaz (2006) is considered as the originator of constructivist grounded theory, regarding grounded theory methods as a set of general principles and practices rather than strict rules. Charmaz (2006, 2014) suggested that researchers could modify the guidelines according to their own context. From a constructivist perspective, Charmaz pointed out that *"social reality is multiple, processual, and constructed. Therefore, researchers' position, privileges, perspective and interactions are also part of constructed reality"* (Taylor & Francis 2013, pp. 45-6). In contrast with the claim from Glaser and Strauss that theory entirely emerges from, and is revealed through, the data, Charmaz positioned the researcher as part of the world they study and the data they collect. She emphasised the active engagement and interaction of the researchers, their participants, and the data during the theory generation process. She also stressed that the theory is constructed rather than an objective description of the data. These differences can be seen in the language that Charmaz used. For instance, Glaser used the language of emergence and discovery (Glaser & Strauss 1967), whereas Charmaz (2006, 2014) employed the words 'construct' and 'develop' to describe the process of theory generation.

Overall, although different theoretical perspectives guide various grounded theory approaches, and slightly different terminologies are used in a particular grounded theory method, the principal foundations of grounded theory methods are similar and are accepted broadly by grounded theorists. The essential elements of grounded theory methods include: initial coding and categorization of data; a simultaneous process of data collection and analysis; constant comparative analysis; theoretical sampling that guides the data collection process; concurrent memo-writing that informs the entire process of theory development; and the principle of theoretical saturation (Birks & Mills 2011, p. 9).

3.3.2 Why choose constructivist grounded theory?

Weighing the advantages and disadvantages of both objectivist and constructivist grounded theory approaches, a constructivist grounded theory method was eventually employed to inform the present research for the reasons outlined below.

The key reason is due to the epistemological standpoint of the author. *"Epistemology is concerned with the nature of knowledge and how knowledge is obtained"* (Liamputtong 2013, p. 10). Constructivism is one of the five fundamental epistemological paradigms (the other four are: positivism, post-positivism, and the critical and participatory approaches) employed to explain what reality is and how human beings understand reality in the natural and social worlds (Denzin & LincoIn 2011, p. 101; Liamputtong 2013, p. 11). Constructivism suggests that *"reality is socially constructed"* (Liamputtong 2013, p. 11) and is influenced by social factors such as gender, ethnicity, and culture. Constructivism is underpinned by the ontological belief that truths are multiple and that reality is the product of social and individual construction (Liamputtong 2013). This epistemological paradigm is consistent with my understanding of reality and the way I explore and understand 'truths'. I believe that truths are multiple and subjective rather than objective. As well, I prefer to actively interact with my research thereby gaining deep insights into the researched phenomenon. I regard data analysis as a creative interpretation process rather than simply a descriptive process of a particular phenomenon. Research that is situated in the paradigm of constructivism focuses on *"exploration of the way people interpret and make sense of their experiences in the worlds in which they live, and how the contexts of events and situations and the placement of these within wider social environments have impacted on constructed understanding"* (Liamputtong 2013, p. 11). Preparing for, coping with, and recovering from the actions of a family are interactive processes in disaster situations; hence, the focus of constructivist grounded theory on interaction, communication, and active engagement according to the particular social situation fits this research context very well. Charmaz' constructivist grounded theory provides structured procedures for the grounded theory researcher to generate the subsequent substantive theory in a flexible way.

In order to utilize constructivist grounded theory strategies, the underlying philosophy of the methodology is outlined below in order to gain a thorough understanding of the methodology and to guide the subsequent data collection and analysis process.

3.3.3 The underpinning philosophy of constructivist grounded theory

Symbolic interactionism is regarded as the underpinning philosophy that informs constructivist grounded theory methods (Birks & Mills 2011, p. 5). Symbolic interactionism is *"a dynamic theoretical perspective that views human actions as constructing self, situation, and society"* (Charmaz 2014, p. 262). It emphasises the pivotal roles of language and symbols in creating and exchanging human meaning and action. From the symbolic interactionist perspective,

interpretation and action are reciprocal processes which interact with, and influence, each other. An individual's response depends on how they view their own situations which are changeable because they are based on individual actions and those of other people around them, which may result in different subsequent interpretations (Charmaz 2014). Symbolic interactionism highlights the nature of interaction and the changing circumstances during social activities. Individuals are not acting alone; instead, they engage with each other through communication, interpretation, and reaction (Charon 1979).

Symbolic interactionism was initially derived from pragmatism, as developed by George Herbert Mead. Pragmatism comprises four basic principles: firstly, truth only exists when individuals are involved in it and define it; secondly, knowledge is changeable due to its usefulness; thirdly, objects are defined by human beings according to their usefulness, and only useful objects can be recognised as objects; and the fourth principle states that the underpinning meanings of individuals' behaviours provide the basis for comprehending human beings. Mead highlighted the process of change and assumed that everything involving humans is changeable rather than a static set of characteristics (Charon 1979, pp. 27-31). Mead suggested that symbolic interaction presents an active process of reaction within individuals. When one person expresses gestures with underpinning meanings, another person who receives these gestures reacts based on their understanding of the meanings of the gestures. The effectiveness of communication between individuals predominantly depends on the meanings they convey and their understanding of these meanings (Blumer 1969, p. 9).

Mead's work was successfully integrated and interpreted by his student Blumer (Charon 1979). Blumer (1969, p. 2) described three features of symbolic interactionism: (1) individuals respond to things based on their meanings; (2) meanings emerge from engaging and interacting with others as social products; and (3) meanings are modified during the interpretation process. Snow (2001, p. 374) expanded these features into four principles: *"interactive determination, symbolization, emergence, and human agency."* Interactive determination means that *"phenomena exist only in relation to each other and can be understood only by considering interactions and interactional context"* (L.Munhall 2007, p. 242). Symbolization refers to *"the process of ascribing meaning to things, people, events and so on such that they elicit particular feelings and actions"* (L.Munhall 2007, p. 242). Emergence suggests that social, emotional, and cognitive change can be identified as it emerges by focusing on what is going on in a particular social context (L.Munhall 2007, p. 242). Human agency refers to the *"active, willful character of human actors"* (Snow 2001, p. 373). Blumer's emphasis on meaning and interpretation was encompassed and blended in the principle of symbolization proposed by Snow. The other three remaining principles proposed by Snow are implied in Blumer's conceptualization (Snow 2001). Charmaz (2014) further confirmed the premises of symbolic interactionism proposed by Blumer, and clarified and extended Blumer's position by adding three premises, with the last one being

combined with Snow's idea.

> *(1) Meanings are interpreted through shared language and communication; (2) The mediation of meaning in social interaction is distinguished by a continually emerging processual nature; and (3) The interpretive process becomes explicit when people's meanings and/or actions become problematic or their situations change (Charmaz (2014, pp. 270-1).*

To summarize, symbolic interactionism emphasises that meaning is derived from social interaction and altered accordingly through the process of interpretation (Munhall 2007). The purpose of symbolic interactionism is to understand the reasons for human action; therefore, it highlights the active and complicated nature of human being. The occurrence of action is based on the symbolic interaction between and within individuals. The symbolic interactionist perspective emphasises a focus on the present, especially the ways in which individuals define the situations they encounter. Charmaz (2014) pointed out that symbolic interactionism provides a theoretical perspective for researchers to view meanings, actions, and events in the world they study. It encourages researchers to learn about people, places, times, and actions. Everyday experiences and practices can be theoretically understood and analysed through a symbolic interactionist approach. The present research aims to understand families' experiences of flooding and to gain deep insights into family resilience to disaster. Therefore, the premises of symbolic interactionism proposed by Charmaz are employed as the theoretical perspective informing this constructivist grounded theory research.

3.4 Study method

The research processes for this project are based on the constructivist grounded theory methods described by Charmaz (2006). However, the methods were adapted into a realistic and practical approach for the particular Chinese context of this study. The major constructivist grounded theory methods and processes of the present study are presented in Figure 3-1 below, followed by an in-depth discussion of the major processes.

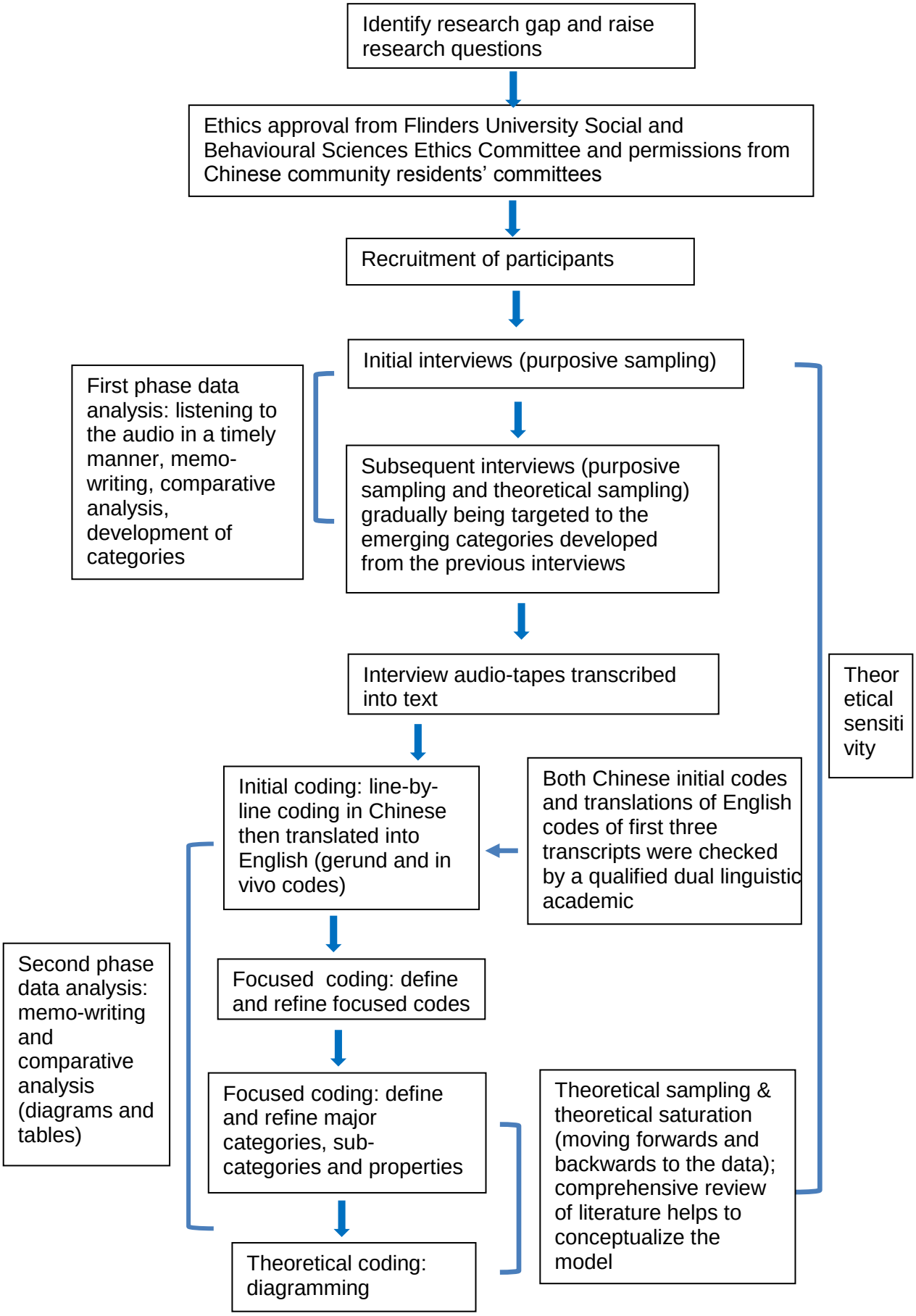


Figure 3-1: Constructivist grounded theory methods and processes

3.4.1 Ethical considerations

In order to conduct ethical research, the ethical principles of integrity, beneficence, justice, and respect (Australia Government 2007) were complied with throughout the entire research process. The National Statement on Ethical Conduct in Human Research (NHaMR 2007) and the Australian Code for the Responsible Conduct of Research (Australia Government 2007) were followed during this study.

Before embarking on the recruitment of potential participants, ethics approval was sought to conduct the research. The project was subsequently approved by the Flinders University Social and Behavioural Sciences Ethics Committee, Project No. 5953, as evidenced in Appendix 2. Because there is no specific ethics board in Chinese communities, the permission for access to the study communities and recruitment of the participants in the community settings were granted by the Chinese community residents' committees after a full review of the research proposal and relevant documents (Appendix 3). All the participants voluntarily joined the research by signing an informed consent form. More importantly, the participants' autonomy, confidentiality, privacy, anonymity, and welfare were ensured during the research process. The details of the ethical considerations during the data collection process are described in the relevant sections below.

3.4.2 Setting

One of the most common and costly types of natural disaster occurring worldwide is that of floods. Guha-Sapir (2013) reported that floods were the most frequent natural disasters globally from 1993 to 2012, affecting 2,480 million people based on EM-DAT records. The cost of the damage caused by floods over the last two decades has been estimated at US$625 billion. As a result of global climate change, the risks and scope of floods have steadily increased (Li et al. 2012). In China, it is estimated that over half of the total population, approximately 2/3 of the land area, and 2/3 of the output value of industry and agriculture are threatened by floods (Li et al. 2012). Therefore, flooding has been selected as the disaster which has had a major collective impact on society, the community, the family, and individuals for the purposes of this study. The geographical areas of China in which flooding is the major type of disaster has been chosen as the study setting.

Chongqing is an inland mega-city located in south-western China in the middle reaches of the Yangtze River. Chongqing is regarded as a flood-prone area due to its unique geographical location. In recent years, Chongqing has experienced various degrees of flooding which has resulted in severe economic damage and has heavily affected the lives of the local residents. X district, located in the northern part of Chongqing Municipality, is one of the largest districts under the administration of Chongqing City. As the meeting point of the Jialing River (the second largest branch of the Yangtze River), the Fu River, and the Qu river, X district, which has been suffering severe floods since the Qing dynasty (Han 2014), is still at high risk of flooding compared with

other districts in Chongqing. In 2010 and 2011, devastating floods struck X district, causing severe financial loss and heavily disrupting normal life. In September 2011, approximately 125 streets were flooded in the downtown area of this district and along the river, 325,000 people were negatively affected, and the direct economic loss reached more than 1 billion Yuan (around US$157 million) (Xinhua News Agency 2011). Over the last three decades, floods have been the main disaster that have affected large numbers of families in X district. Hence, X district was chosen as the research setting for the recruitment of potential participants for this study.

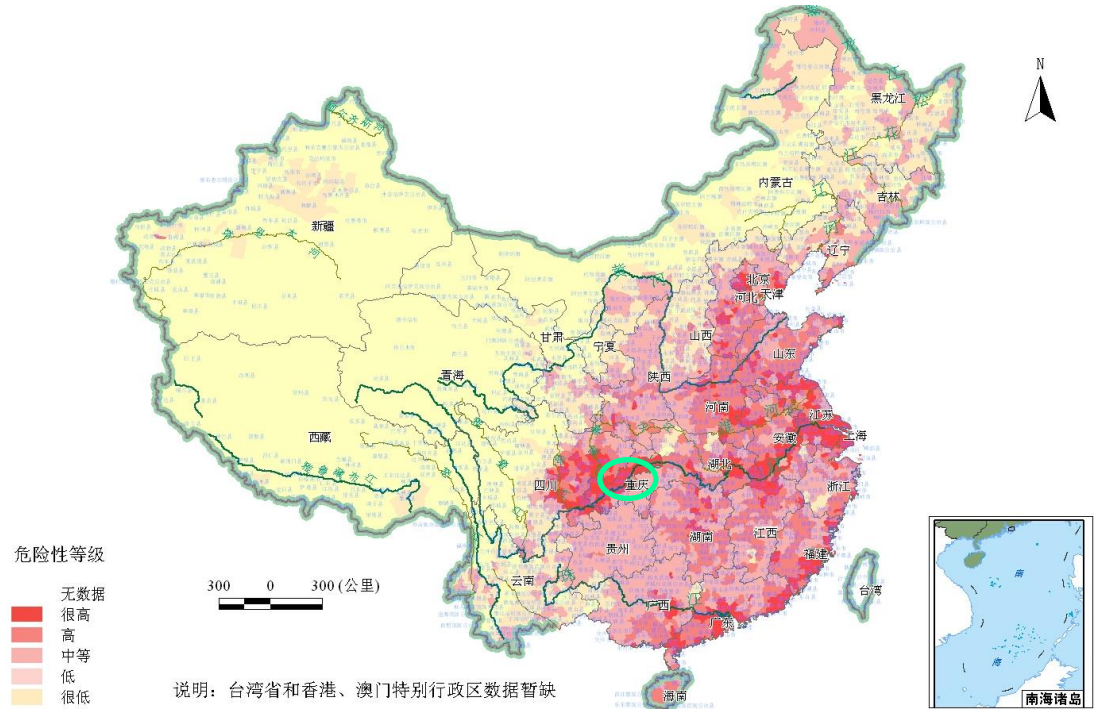


Figure 3-2. Risk map of flooding in China with the city of Chongqing circled in green
Legend: red: high risk
(Source: http://www.un-spider.org/sites/default/files/LiFlood.pdf)

3.4.3 Recruitment of participants

The recruitment of potential participants in China started in April 2013 and completed in June 2013. All the information and relevant forms were translated into Chinese. Two recruitment strategies based on the snowballing technique have been employed in this study. The initial recruitment of the potential participants was through the contacts provided by the community residents' committees. These contacts helped to distribute the flyer containing information about the research project (see Appendix 4) to other community residents who met the initial sample criteria. The inclusion criteria were defined as follows: the participants should be part of a family (a group of two or more people, one of whom is the householder) related by birth, marriage, or

adoption, and residing together (a single person living alone was not considered as a family for the present study), who had experienced flooding within the last 5 years, not including the last 12 months, and were over 18 years old. Furthermore, the potential participants were required to articulate their experiences clearly. After reading the information on the flyer, if the potential participants were interested in participating and were willing to share their experiences, they then contacted the researcher directly to indicate their willingness to take part. The potential participants were then given the Letter of Introduction (see Appendix 5), the Information Sheet (see Appendix 6), and a Consent Form (see Appendix 7) for review. The information was clarified for them accordingly if they raised any concerns. If the participants were willing to take part in an interview, an appointment was made, with the participants also deciding on a convenient time and a comfortable venue in which to participate in the interview. Before conducting the interview, the researcher briefly introduced the project to the participants and clarified their rights during the research, advising them that they were free to decline to participate and to withdraw from the study at any time. In addition, it was emphasised that their participation was entirely voluntary and that their confidentiality and anonymity would be protected. The participants were then asked to sign the consent form after which the interview was conducted. After the interview, a demographic questionnaire was filled out by the participants and returned to the researcher immediately. Another recruitment strategy was for the researcher to express appreciation for the participants' time and contribution, and to ask them to circulate the flyer for the project to other families in the community after the interview.

3.4.4 Data collection and analysis

3.4.4.1 Interview process

In total, 14 participants who met the selection criteria voluntarily joined this project and shared their family's experiences of flooding. This project is based on the Chinese context and all the participants were Chinese native residents; therefore, all the interviews were conducted in the local Chinese dialect. In addition, all the interviews were audio-taped for further analysis. The interviews were conducted either in the participants' homes or in venues close to their homes at their convenience. Hence, the researcher had a good opportunity to observe the participants' residential environment, thereby gaining a better understanding of the participants' disaster experiences.

3.4.4.1.1 Initial interviews

The initial interviews were conducted according to the interview schedule (see Appendix 8), which was developed based on the method described by Charmaz (2006, pp. 30-1) and in the literature (Simon, Murphy & Smith 2005). The interview started with general questions about the participant's family to encourage them to start talking and engaging in the interview process, which was then followed by the open question "Please tell me about you and your family's

experiences of the flooding". Subsequent prompts were asked accordingly in order to further explore the participant's opinions and to ensure that the interview covered the preparation, coping, and recovery strategies that the participant's family employed in the face of the flooding. The interview schedule was flexible, so not all the questions on the schedule were asked and neither was it followed in a linear fashion, which was recommended by Charmaz (2006). Instead, the interviews aimed to reveal the assumptions and meanings that the participants' attributed to the situations and events they had experienced (Charmaz 2006, p. 32). During the interview, the participants' dignity and well-being were respected, and none of them felt uncomfortable in the interview process or withdrew from the interview. The interviews proceeded smoothly with the participants and the researcher engaging in a relaxing and friendly atmosphere, with relevant meanings being clarified through the use of prompt questions. Soon after the interview, a brief demographic information sheet (see Appendix 9) was administered to the participant which was then collected by the researcher directly after being completed by the participant. Memo writing also commenced as a reflection tool when the first interview was undertaken, and field notes were taken to help the researcher to fully understand the context of the interviews.

3.4.4.1.2 Subsequent interviews

An adapted theoretical sampling technique was used in the subsequent interviews, which guided the modification of the interview questions and the focus of the interviews as the study progressed. However, the purposive sampling criteria were still maintained as the guidance for participant selection.

The subsequent interviews were conducted with great attention to the emerging categories, and were also gradually targeted to the emerging categories developed from the previous interviews; this was consistent with Charmaz's suggestions about theoretical sampling (Charmaz 2006). On the one hand, in order to maintain openness and avoid missing other potential categories which might emerge in the following interviews, the subsequent interview still started with the broad open question similar to the initial interviews, to allow the participants to be explicit about their flooding experiences. In addition, the researcher's theoretical sensitivity facilitated the exploration of the new categories from the meanings conveyed by the participants. On the other hand, the categories developed from the previous interviews were further clarified when they were referred to by the participants, or were intentionally prompted by the researcher. For instance, the concept of 'information' was often mentioned by the initial participants; therefore, when the following participants mentioned incidents regarding 'information', the researcher listened carefully and compared the data with the previous participants' descriptions, and asked prompt questions to clarify the meaning the participant ascribed to 'information'. These prompts included asking the participants what kind of information they received, how they gained the relevant information, what their attitude was towards the information, why they trusted the received information, and how the information influenced their actions accordingly. Again, closed questions which might lure

the participants into preconceived concepts were carefully avoided. As the interviews went forward, the flooding experiences of the different participants became increasingly similar and eventually no new categories and relevant properties emerged, so theoretical saturation was considered to have been reached and the interviews stopped accordingly. Meanwhile, memo writing continued after each interview with a focus on the reflection of emerging categories and their properties.

3.4.4.2 First phase data analysis

The initial phase of the data analysis was conducted via concurrent memo writing during the data collection process. Constant comparison of the similarities and differences between the participants was conducted while the interviews proceeded. It should be noted that a concurrent data collection and analysis process was adapted in this research to suit the study situation as well as the time available for the researcher to be located in the field. Due to the reasons mentioned above, it was impossible for the researcher to transcribe the entire individual interview audio and to conduct the coding in text form immediately after each interview, which is recommended by some grounded theorists such as Strauss and Corbin (1990). However, listening to the audio-tapes as soon as practicable and writing timely memos facilitated the researcher to reflect upon, and rethink, the interview process and the meanings derived from the data, which allowed the potential categories to be created accordingly.

Basically, the contents of the memos included information about the interview skills, the reactions of the participants, a holistic impression of the participants' flooding experiences, the meanings the participants conveyed in their descriptions and the emerging categories from the data, and the similarities and differences between the different interviews.The incidents that were presenting frequently and repeatedly were highlighted in order to create meaningful categories. The interview tape was listened to by the researcher carefully and repeatedly to grasp the meanings within the participant's descriptions. As well, the research question was constantly considered during the memo writing process. The categories developed through the memo writing process were then integrated into the next interview which also guided the prompt questions to help the researcher to clarify and explore the existing and the potential categories and their properties.

The categories that had emerged from the previous participants were either further illuminated or compared with the ongoing interviews during the interview process. For instance, 'previous flooding experience' had been labelled as a category; in the next interview, the participant was asked about their family's past flooding experiences and how these experiences influenced their preparation, response, and recovery strategies and their ability to deal with the flooding in order to clarify and explore the possible properties of this category. The comparison of meanings within each single interview and the comparison of different interviews was maintained during the

interview process. Views and meanings drawn from the previous interview were then compared with the next interview, and the following interviews. The process of comparison was presented and identified through continuous memo writing. Overall, the implementation of constant comparative analysis and the development of relevant categories advanced the progress of the study. Furthermore, mutual communication between the researcher and her supervisors continued via Skype meetings and email while the data collection proceeded in China which ensured that appropriate guidance and sufficient supervision continued throughout the study. Suggestions and recommendations from the supervisors were considered carefully and applied accordingly.

In summary, the interview process and the initial phase of the data analysis took account of the critical principles of the grounded theory approach and adapted them accordingly to fit the context of this study. In the first place, subsequent interviews focusing on emerging categories, and the transformation of interview questions, represented the theoretical sampling technique. Most importantly, the data collection along with the simultaneous memo writing enabled the constant comparison data analysis process.

3.4.4.3 Second phase data analysis

The second phase of the data analysis encompassed a comprehensive and deeper data analysis process which was performed after the completion of all the interviews. The second phase data analysis was mainly based on the coding process suggested by Charmaz (2006).

3.4.4.3.1 Initial coding

The initial coding was conducted after all the interview audio-tapes had been transcribed into Chinese text by the researcher and then printed. According to Charmaz (2006, p. 48), researchers should maintain an open mind during the initial coding process even though they might have previous opinions and strategies in relation to the data. Good codes should be simple, precise, open, close to the data, and contain actions (Charmaz 2006, p. 49). Therefore, coding with gerunds (a gerund is *"A word that ends in 'ing' that is made from a verb and used like a noun"* (McIntosh 2013, p. 648)), as recommended by Charmaz (2006, p. 49), was used as the format of the codes in order to maintain a strong sense of actions instead of topics. Again, in vivo codes (*"the codes of participants' special terms"* (Charmaz 2006, p. 55)) originated from the participants' words and phrases were grasped as the codes to capture the meanings granted by the participants.

All the initial codes used to label each line were written in the margin of the text. By doing so, every part of the transcript was considered, and the codes were created directly from the interview data rather than from preconceived concepts (Bazeley 2013, p. 162). In order to stick closely to the data and to define the meanings conveyed by the participants, line-by-line coding was

conducted in Chinese based on the original Chinese transcripts to ensure fittingness, and then translated into English accordingly. Importantly, the initial line-by-line coding of the first three transcripts were checked independently by a qualified dual-language academic in another university who was experienced in qualitative research and familiar with the disaster research area. The accuracy of the initial Chinese codes and the subsequent English translation were checked with caution to ensure the fitness and reliability of the coding and translation undertaken by the researcher. The feedback showed that, overall, the initial coding arose from the data, relevant actions were captured and well-defined by the original Chinese codes, and the codes were compatibly translated into English. Consequently, only minor changes were made afterwards. After this part of the process had been completed, the same coding strategies were applied to the rest of the transcripts. The initial line-by-line codes were defined and refined through active engagement with the data.

3.4.4.3.2 Focused coding

All the initial codes were translated into English and the subsequent focused coding was conducted based on the translated English initial codes. Focused coding is a higher level of the coding process. Compared to the initial coding, focused coding is more focused, selective, and conceptual (Charmaz 2006, p. 57). The initial codes were grouped into focused codes and the most significant or frequent codes were retained based on the research questions. Most of the focused codes were also described through the use of gerunds with an emphasis on actions, while some were interpreted through the meanings conveyed in the participants' statements. Furthermore, the in vivo codes were retained as the focused codes if they were considered as the most suitable way to convey the meanings from the participants' perspectives. The transcripts and initial codes were read carefully to develop the focused codes which aimed to categorize the data concisely and thoroughly. Maintaining consistence as well as interpreting the meanings from the data guided the focused coding procedures.

Again, analytical memo writing was part of the second phase of data analysis to facilitate the identification of the conceptual categories and their properties. An analytical memo was written subsequently after the completion of the focused coding for each interview. An analytical memo was also written after the completion of the focused coding of every three transcripts to generate potential categories and properties. The content of the memos ranged from a holistic impression of the interview, the key codes created based on the transcript, and the emerging categories and their properties. The memos also involved reflections on the categories that had been developed, the potential categories, and their possible relationships. Memo writing helped the researcher to refine and transform the developed categories, rethink the meanings that arose from the data, and compare the categories within an individual interview and among the different interviews. The categories were modified and illuminated through the subsequently added information, and the properties of each category were enlarged and clarified accordingly. After all the transcripts had

been coded and comparatively analysed, a memo relevant to the major categories and their properties was developed. Indeed, the preliminary categories and properties recorded in the memo after the focused coding of fourteen transcripts were similar to those presented in the memo after the focused coding of nine transcripts, no new categories and only few properties were added, suggesting the potential achievement of theoretical saturation.

Because the developed focused codes were tentative and provisional, modification and transformation were needed during the process of analysis (Holloway & Wheeler 2010, p. 179; Saldana 2013). Therefore, after the initial round of focused coding and comparative data analysis, the second round of focused coding and comparative data analysis was commenced to further conceptualise, clarify, and refine the existing focused codes, as well as to develop the major categories and their properties. The focused codes were checked cautiously against the initial codes and every single transcript. Some of the focused codes were refined and reworded accordingly by considering the research questions and the meanings from the data. Compared to the first round of focused codes, the modified second round focused codes were more conceptual.

A table containing the list of second round focused codes from the different participants was established to constantly compare the similarities and differences while the coding proceeded with the transcripts that followed. The detailed comparative analysis was embarked upon and continued through the process of revising the table. The table started with the list of the focused codes from the first participant. After this, if the focused codes from the second participant were the same as those from the first, they were accordingly ticked off in the focused codes list column in the table. Meanwhile, if the focused codes were generated from the second participant and had not been mentioned by the first, they were correspondingly added into the row of the table below the existing focused codes developed from the first participant. The same procedure was applied to the rest of the data. As a result, similarities and differences were identified by ticking off the column parallel to the existing focused codes list and adding the successive emergent focused codes to the focused codes list in the table. The table clearly illustrates the similarities and differences in all the interviews, advances the engagement of the researcher and the data, and ensures the performance of constant comparison. The researcher moved backward and forward between the focused codes from the different participants presented in the table, compared the similarities and differences constantly, and refined and clarified the meanings granted by the participants. In general, the table enabled the researcher to gain deeper insights into the data.

The checked and refined focused codes were then grouped into sub-categories and corresponding categories based on their inner relationships and the links among them. Excel tables were established to facilitate the sorting and grouping. Major categories were created according to the significance and frequencies, and were named according to the interpretations

of the underpinning meanings embedded in the data and the actions taken by the participants. Symbolic interactionism was considered and employed to facilitate the data analysis process, and was particularly important for the transformation from the concrete initial coding to the development of the abstract categories. Again, analytical memos were written to reflect on the defining and refining process of focused coding. Eventually, major categories, sub-categories, and properties were developed through the focused coding process of selecting, interpreting, and conceptualising meaning from the data. The tentative categories, sub-categories, and properties developed from the first round focused coding and second round focused coding were defined, refined, and reordered. A decision about which categories were to be retained as major categories, and which categories were to be subsumed by others, was facilitated by memo-writing, diagramming, and revisiting the interview data, initial codes, and focused codes. Eventually, major categories and related properties were developed through the focused coding process of selecting, interpreting, and conceptualising meaning from the data.

3.4.4.3.3 Theoretical coding

Charmaz argued that the axial coding proposed by Strauss and Corbin is a cumbersome step which might result in the restriction of the codes constructed by the researcher (Charmaz 2006); therefore, theoretical coding was conducted subsequently after the focused coding process to explain the potential relationships among the major categories, and to develop a core category and a model accordingly.

After the major categories and their associated properties emerged and were identified, theoretical coding was commenced and relationships among the major categories were explored through further reflection and diagramming. During the theoretical coding process, meanings and actions were further identified and clarified through the interaction of the data and the researcher. Links between the categories were firmly established based on the presentation of the data (Holloway & Wheeler 2010, p. 181). The core category ‘acting and easing’ was identified and the linkage of all the major categories to the core category was clarified and developed, and then integrated into a model known as ‘Acting and Easing: the process of family disaster resilience’ (Holloway & Wheeler 2010, p. 181). This model shows the patterns and connections of the major categories rather than a linear form of reasoning (Charmaz 2006, p. 126). Meanwhile, the relevant literature was utilised and integrated to assist with conceptualizing the model. The Chinese socio-cultural context was also taken into account to interpret the meaning of the major categories and the core category. The categories developed in this study were compared with the existing family resilience factors that had been identified in other research and family resilience models for their conceptual similarities and differences. All these strategies contributed to the final achievement of theoretical saturation.

Finally, an emergent model was developed and constructed through the theoretical coding

process. More importantly, it was constructed under the particular circumstances of this study such as place, culture, and situation (Charmaz 2006, pp. 130-1).

3.5 Reflection on the evaluation of grounded theory research

Charmaz (2014) pointed out that the grounded theory process is likely to be judged as a part of a project, and the usefulness of the methods is evaluated by the quality of the final product. Therefore, the criteria for evaluating grounded theory are important to take into account. The originators of different grounded theory methodologies formed unique criteria for evaluating their particular grounded theory research (Charmaz 2014). This study is based on Charmaz' (Charmaz 2006, 2014) constructivist grounded theory as the approach guiding the process of data collection and analysis; however, the researcher adapted this approach to fit the particular study context. Nevertheless, the fundamental criteria for evaluating grounded theory studies, as recommended by Charmaz (Charmaz 2006, 2014), are relevant and were applied to justify the quality of this grounded theory research. Charmaz suggested grounded theory studies can be evaluated according to the criteria of credibility, originality, resonance, and usefulness. These four criteria were used to evaluate this study.

3.5.1 Credibility

Credibility refers to the fit of the theory, sufficiency of the data, systematic comparisons of each interview, suitability and coverage of the constructed substantive theory based on the data, the logical linkage of data, the analysis process and the corresponding argument, and the transparency of the study process (Charmaz 2006, 2014).

3.5.1.1 Fit of the developed model

In terms of the fit, this family disaster resilience model rooted in the Chinese setting, and developed from the data in the field, allowed categories and relevant properties to be clearly defined and evidenced by the empirical data. In addition, Charmaz (2006, p. 50) indicated that the 'fit and relevance' of fulfilling a grounded theory analysis can be achieved through careful line-by-line coding (Charmaz 2006, p. 50). Therefore, employment of line-by-line coding as the initial coding process, to identify implicit meanings and explicit statements from the transcripts and the usage of in vivo codes to capture the meanings conveyed by the participants, enabled the fit of this developed model.

3.5.1.2 Sufficiency of data

In considering the sufficiency of the data, there are no set rules for the number of participants in qualitative research. Sample size varies depending on the purpose of the inquiry, the quality of the informants, the informational needs, and the type of sampling strategy used. Hence, a guiding principle in sampling is data saturation which is reached when there is no new information arising

from the analysis of the data (Polit & Beck 2008, p. 357). There is no assumed sample size for grounded theory method (Liamputtong 2013, p. 108); however, the emergent categories and the properties of the categories being saturated differs from the data being saturated, and repetition of the same stories only does not result in theoretical saturation (Charmaz 2014). Charmaz (2006, p. 113) suggested that the time to stop gathering data was when there were no new categories emerging from the data, or when the participants indicated the same categories in similar ways, and when there were no more properties of the categories being identified in the subsequent interviews. Furthermore, Charmaz (2014, pp. 107-8) argued that a substantial amount of data did not ensure an original contribution. A very small sample can produce data from in-depth interviews of lasting significance which depend on the initial and emergent research questions and how the researcher conducts the study and constructs the analysis. Liamputtong (2013, p. 108) pointed out that the number of participants in a grounded theory study varies widely across different studies and provided an example of the sample sizes in the speech pathology grounded theory literature which range from 6 to 30 participants. In the present study, purposeful sampling and subsequent theoretical sampling, rich data from in-depth interviews, concurrent and constant comparative data analysis, as well as detailed memo-writing ensured the achievement of theoretical saturation.

3.5.1.3 Adapted theoretical sampling

Theoretical sampling is considered as a fundamental principle of grounded theory research (Birks & Mills 2011). Theoretical sampling means that the participants are chosen because they can further clarify the emerging categories (Glaser & Strauss 1967). Theoretical sampling and purposive sampling tend to overlap with each other and are sometimes confused because some researchers refer to them as the same concept (Tappen 2011), while others argue that they are different (Coyne 1997). Coyne (1997) pointed out that theoretical sampling is a variation of purposive sampling as the samples are selected based on the emerging categories and theory rather than a concern for variables such as the economic and social status, or the education level of the sample. Although the ideal procedure for theoretical sampling is to collect data from people who are most likely to contribute to the achievement of the categories and related properties, it is difficult to achieve under certain circumstances. Charmaz and other grounded theorists pointed out that the research situation is different and, on occasions, it is impossible to transcribe the audio material in a timely manner and complete the detailed analysis before selecting other participants due to the timeframe and the financial issues associated with a project (Charmaz 2006; Larossa 2005). Therefore, Charmaz accepted the variation of theoretical sampling methods and indicated that researchers can modify the methods by considering the fitness for their particular research, and their purpose for employing this method (Charmaz 2006, p. 107).

Theoretical sampling methods were adapted in the present study to fit the study context while

maintaining the essential principles of grounded theory (Larossa 2005, p. 840). Because the interviews in this study were carried out in China within a limited time period and budget, along with a priority for the participants' convenience, it was impractical to conduct conventional theoretical sampling. The adapted application of theoretical sampling methods was illuminated by the gradually developed category-based prompt questions and the transformed focus of the following interviews during the data collection process. Timely memos were written to assist with the development of the emerging categories, clarification of their properties, and the transformation of the interview questions. In addition, Charmaz (2006, p. 107) stated that the study documents, observations, interviewing or reinterviewing with a focus on the emerging theoretical categories all belong to the process of theoretical sampling. Therefore, revisiting and checking the raw data while defining and refining the major categories and their properties during the data analysis process was presented as another strategy of the adapted theoretical sampling methods.

3.5.1.4 Concurrent data collection and analysis and comparative data analysis

The simultaneous conduct of data collection and analysis and comparative data analysis are regarded as other essential principles in grounded theory research (Birks & Mills 2011; Charmaz 2006). Strauss and Corbin (1990, p. 30) suggested that the transcription of the entire recorded initial interview should be performed early in the data collection process, after which the analysis should take place before the commencement of the next interview which should be guided by the early coding. However, Charmaz indicated that the detailed procedures of grounded theory method could be adapted by researchers using it according to the specifications of their own particular research (Charmaz 2006; Larossa 2005). Schneider et al. (2008, p. 114) supported the variation of grounded theory method because it provided a justification for researchers to adopt or adapt the analysis process and theorisation procedures to ensure the fitness of their own philosophical, cognitive, and meaning-making process while conducting a grounded theory study. The concurrent data collection and analysis and comparative data analysis in the present study were achieved through simultaneous memo writing. In the initial data analysis phase, memo writing accompanied the data collection process, which facilitated reflection on the research procedures, comparison of the differences and similarities in the different interviews, the guiding of the theoretical sampling, and contributing to the development of the categories and their properties. In the second phase of data analysis, the accompanied analytical memo writing enabled the comparison of focused codes from different interviews or within interviews, the development of major categories and their properties, the development of linkages among the major categories, the development of the core category, and the development of the model. Moreover, the table created during the data analysis process systematically assisted with a comparison of the similarities and differences of the emerging focused codes which enabled a comparative analysis between interviews. All these procedures enabled the achievement of a

concurrent and comparative data analysis.

3.5.1.5 Other considerations

Furthermore, Charmaz (2014, p. 308) pointed out that a comprehensive, in-depth, and sharply focused literature review can strengthen the argument and credibility of a grounded theory study. In the present study, an extensive review of extant literature sources was conducted at the final stage of thesis writing to help conceptualize the study findings and the development of the model. The utilization of a large amount of relevant theories and literature in the discussion chapter further enhanced the credibility of the study.

3.5.1.6 Supervision and language validation

Credibility was enhanced through PhD supervision discussions over the course of the data gathering and analysis process at least once or twice per month. The initial coding process was validated by a bilingual researcher who was experienced in both qualitative research and the disaster research area. The initial coding was conducted in Chinese based on the original Chinese transcript, which was then translated into English. The initial codes (both the Chinese and the English codes) from the first three transcripts were verified by the bilingual researcher. In addition, during the entire data analysis process, PhD supervision meetings were held regularly to discuss any coding difference and discrepancies, and to verify the emergent categories and their properties, the links to major categories, and the development of the model, thus enhancing the rigour of the analysis (Morse 2008).

3.5.2 Originality

Charmaz (2014, p. 337) indicated that if the research offered a fresh or deeper understanding of the studied phenomena, an original contribution would be considered to have been made. Commonly adopted strategies to claim originality include: *"(1) an analysis in a new area; (2) an original treatise in an established or fading area; or (3) an extension of current ideas"* (Charmaz 2014, p. 289).

The family disaster resilience model developed in the present study provides a deeper understanding of Chinese families' disaster experiences in a flood zone in the south-west of China. This study has identified the factors which help families to prepare, respond, recover, and become stronger in the face of disaster, and has developed a model explaining how these factors interact with each other and illustrate the process of family resilience to disaster in the Chinese socio-cultural environment, which offers a new insight into family resilience in the disaster context.

This study develops a family disaster resilience model through grounded theory methodology, with the model developed to fit the Chinese setting and disaster context. Disaster is an event which has a collective impact on every individual family member within a family as well as the

functioning of the family as a whole unit. Therefore, the adverse situation in this study is different from research identifying resilience factors in other difficult situations, especially families with a family member suffering various diseases that might influence one family member more than the others. In a disaster situation, each single family member confronts the same threat, and every family in the disaster zone faces similar risks which might be maintained over a family's entire lifetime. Thus, identifying family resilience factors under these unique circumstances will be invaluable in refining family resilience concept as well as contributing new knowledge to the extant family resilience research. Furthermore, this family disaster resilience model has been developed in a collectivist cultural context, with the cultural background and environment of the families presented as important aspects which influence their behaviours and forms of meaning-making during a disaster. Cultural factors have also been found to influence family resilience. Overall, this study is the first time that a family resilience model has been proposed grounded in an adverse event which has a collective impact in a collectivistic cultural setting.

3.5.3 Resonance

Resonance refers to whether the findings genuinely depict the lived experiences of the participants, and if the findings make sense to them (Charmaz 2014, pp. 337-8). Overall, the developed categories and the associated properties presented in this study portray a complete picture of families' disaster experiences in the south-west of China. These categories cover families' experiences during all phases of disaster, and the developed model explains how the categories interact with each other and help families to deal with disaster. Most importantly, gerunds were used as the initial codes, focused codes, and major categories, which recorded the actions taken by the families. One major category was derived from an in vivo code which maintained the meaning granted by the participants. On the other hand, resonance was ensured through the clarification of meanings granted by the participants while conducting the interviews during the data collection process, the constant comparative data analysis, and moving backward and forward through the data while conducting the data analysis.

3.5.4 Usefulness

Usefulness is about how the study has contributed to the knowledge-base (Charmaz 2014, p. 338). This study has offered interpretations of families' disaster experiences, depicted five family disaster resilience factors, and developed the "Acting and Easing: the process of family disaster resilience" model in the Chinese context. The findings from this research could be potentially used as a framework by disaster management practitioners, health professionals, social workers, or other related professionals to develop relevant interventions to improve family resilience in disaster situations or to develop corresponding measurements to evaluate disaster resilience at the family level. This model could also be integrated into current disaster management practices in China, which would help families to be better prepared for, to respond to, and to recover from,

future disasters, which would in turn contribute to reducing disruptions to family functioning and mitigating the severe negative consequences on families caused by disaster.

In addition, comparing the universality and contextual factors with other family resilience models, the family disaster resilience model proposed by the present research complements the current models, and provides pilot evidence for further research exploring family resilience in other disaster situations in other geographic locations. This model also expands knowledge of the concept of family resilience.

3.6 Summary

This chapter has provided a justification for choosing constructivist grounded theory methodology to inform the present study. In addition, the fundamental principles of the grounded theory approach have been introduced and clarified. After this, the application of an adapted version of Charmaz's constructivist grounded theory was presented in detail, followed by a reflection on the grounded theory methods for this study with a focus on the rigour of the methods. The next chapter will present the research findings yielded through the constructivist grounded theory methods.

CHAPTER 4 FINDINGS

4.1 Introduction

This chapter presents excerpts from the data in relation to the major categories, their properties, and the overarching core category for the study. Firstly, the background data, composed of the demographic characteristics of the participants and their families, and the adverse impacts of flooding on families, are introduced to provide a context for the study. Following this, the five major categories (Having social resources and connections; Having family inner resources; Communicating; Solving problems; and Easing minds) and the overarching core category (Acting and Easing) will be explored.

4.2 Background data of the study

4.2.1 Demographic information

The demographic information of participants has been presented to help understand the study families' characteristics and the context of the study. In total, 14 participants from families residing in one of the selected districts in Chongqing, in the south-west of China, participated in this research (see Table 4-1 below).

Table 4-1 Demographic information of participants

Item	Category	Participants
Gender	Female	12 (85.7%)
	Male	2 (14.3%)
Ethnic identity	Han	14 (100%)
Occupation	Employed	3 (21.4%)
	Self-employed	5 (35.7 %)
	Retired	1 (7.1%)
	Unemployed	4 (28.6%)
	Farmer	1 (7.1%)
Education attainment	High school	2 (14.3%)
	Below high school	12 (85.7%)
Household family type	Couple only	6 (42.9%)
	Single parent and dependent children	1 (7.1%)
	Couple and dependent children	2 (14.3%)
	Grandparent, couple, and dependent children	4 (28.6%)
	Grandparent and dependent grandchildren	1 (7.1%)
Approximate annual per capita income of families RMB (Yuan)	Below 10,000	11 (78.6%)
	10,000-49,999	2 (14.3%)
	Above 100,000	1 (7.1%)

The number of household family members ranged from 2 to 5, with a mean of 3.1. Most of the participants were female (n=12, 85.7%), compared to males (n=2, 14.3%). All the participants' ethnic identities were Han. Participants' occupations varied considerably, with 35.7% being self-employed, 21.4% employed by a range of different employers, and 28.6% being unemployed. The overall education level of the participants was low, with 85.7% being below the high school level. Household family type varied, with 42.9% being couple only, and 28.6% made up of grandparents, a couple, and dependent children. In addition, 78.6% of participants' family annual per capita income was below 10,000 Yuan (RMB). Based on the findings from a comprehensive survey of Chinese family wealth and living habits conducted by Peking University, Wong (2013) reported that the average family income in urban areas in 2012 in China was about USD$2,600, or roughly 17,000 Yuan (RMB). Data from Statista (2016) showed that the annual per capita income of urban households in 2013 in China was 26,955.1 Yuan (RMB). The ages of the participants ranged from 43 to 81, with an average of 55; therefore, their opinions stem from a middle-aged and aged generations' perspective, rather than representing the younger generations' views in China.

Overall, the majority of the participants: had very low educational attainment levels (below high school); were female; and were from low-income families living in an urban area in south-west China. These characteristics were taken into account in the interpretation of their experiences and behaviours during flooding episodes, such as the main concerns of the participant families, the perspectives that the participants held in describing their family's flooding experiences, and the underpinning meanings they conveyed by their own language.

4.2.2 Negative impacts of flooding on families

The adverse situations families experienced in the face of the flooding have been presented in order to provide an insight into the disaster context, and in turn, to contribute to an understanding of the family resilience factors identified in the present study. Based on the participants' descriptions, flooding had a wide range of adverse impacts on families, such as causing financial loss, threatening family members' safety, influencing families' mental and physical health, and changing of family routines.

Some participants complained that the flooding caused severe financial loss for their families, especially those whose home and family businesses were flooded with water. Participant A's apartment was flooded twice; hence, she strongly pointed out her family's financial losses.

My family experienced a lot of financial loss! (PA).

A number of family-run restaurants were flooded, which resulted in a reduction to the family income.

We would not have any income for one month when we experienced flooding, and the income of the whole year was reduced by the flooding (PD).

We encountered some difficulties after the flooding, including the life and finance. We experienced financial loss ... (PE).

In addition, many of the participants indicated that flooding threatened their families' safety and possessions, and made them feel scared and insecure.

… it was definitely frightening for me the first time I underwent flooding (PA).

Yeah, we were scared. If the water went up and reached to our apartment, our blankets, bedding and mattress would be destroyed, we would not have them anymore (PL).

We were so frightened when we heard the warning information ... we were scared, how could we deal with it if the water went into our home? We only could move the personal belongs, but the bed, cupboard, how could we manage that? (PG).

Flooding also resulted in a range of mental health issues, such as anxiety and insomnia.

We worried about our properties … we did not sleep overnight ... (PF).

We worried about flooding, especially when we were stranded in the building. Even after the flooding, we still worried about the disease such as dysentery (PL).

We could not sleep (PG).

Again, the physical health of many of the families was compromised by the flooding. For example, some participants said that the floods caused physical fatigue.

Yes, it was so tired during that time, we had to move all the watered furniture out of the rooms and cleaned them, then moved back. Lots of physical activities, extremely tired! (PA).

We were extremely tired during the flooding (PD).

The participants also pointed out that they caught diseases due to the flooding. From participant D's point of view, her physical disease was attributed to the physical fatigue and stress caused by the flooding.

You see, I got facial paralysis. I suffered facial paralysis during the flooding, the reason might be too busy and the body immune system's function reduced (PD).

Participant J explained that her skin irritation was associated with the poor hygiene of her flooded home.

I suffered skin irritation due to returning home too early and the rooms were still wet (PJ).

Furthermore, the flooding changed family routines which resulted in difficulties and

inconveniences in daily life. Some of the participants' families had to evacuate and shelter in their relatives' homes, while others were stranded in residential buildings without water and electricity. Many of the adults could not go to work and their children could not attend school.

> *The power was off, and there was no water supply during the flooding. It was annoying! (PA).*
>
> *We were stranded in the building in 2011 for around 2 days. No electricity and gas (PE).*
>
> *When the water went up, there was no electricity and gas (PJ).*
>
> *After the flooding, it was difficult to buy some vegetables (PL).*
>
> *I could not go to work during flooding, I had to call my boss to request for the work leave permission (PA).*
>
> *My daughter did not go to the school due to the flooding (PB).*

Overall, the flooding resulted in significant negative impacts on families. The following section presents the major family resilience factors identified in the present study to explain how these factors helped these families to prepare for, respond to, recover from, and thrive in the face of the flooding.

4.3 Family disaster resilience factors

Overall, "Having social resources and connections", "Having family inner resources", "Communicating", "Solving problems", and "Easing minds" were five resilience factors families have which helped them to deal with the flooding and to emerge stronger after the crisis.

4.3.1 Having Social Resources and Connections

'Having social resources and connections' emerged as a major category because this was important for families while they coped with and recovered from the flooding. Social resources, including community residents' committees, family social networks (neighbours, friends, employers and colleagues, and paid workers), as well as family networks (relatives and household family members), helped these families in the difficult situations caused by the flooding. Among these resources, community residents' committees, neighbours, relatives, and household family members were identified as the main resources which provided assistance to families when they were needed. Community residents' committees played an important role in providing warning information, helping preparation activities, and restoring normality after the floods. Furthermore, neighbours provided mutual assistance for many families, particularly in the exchange of information, the sharing of coping strategies, and in providing instrumental assistance. Relatives were also major resources in providing shelter for families when they had to evacuate to safety outside of their flooded homes. In addition, household family members, whether facing the

flooding together or not, provided mutual emotional and practical support for each other.

4.3.1.1 Community residents' committees

In the Chinese context, an urban community residents' committee is similar to a government service, and is in charge of various residential neighbourhood affairs. Every residential community has a community residents' committee which is under the administration of the Street Office (detailed information is presented in the Discussion chapter). Assistance from the community residents' committees included the provision of information, physical and psychological support, financial aid, and shelter.

4.3.1.1.1 Providing information

Flood warning information delivered by the community residents' committees helped the families to judge the potential risks of the upcoming floods and to make decisions about evacuation and packing and moving their possessions. The community residents' committees disseminated flooding information to the families before the flooding which helped them to prepare and, in the end, to reduce financial losses. The community residents' committee announced water level information repeatedly to ensure that the families had information about the potential risks they might encounter. For instance, participants A and E stated that:

> *The community residents' committee informed us the water level information by loudspeakers every day soon after the water started to rise from the river (PA).*

> *The community residents' committee members provided information for us, such as getting ready earlier and the estimated water level. Soon after they received information, they began to inform us (PE).*

Participant C's description further confirmed the constant delivery of information from the community residents' committee.

> *The community residents' committee members informed us in advance. They used loudspeakers to tell us the estimated peak water level, and urged people who lived at the lower place to move their possessions to a safer place. They repeated the announcement by loudspeakers several times from daytime to night-time (PC).*

Various strategies were employed by the community residents' committees to disseminate information, which helped the families to easily access the information. Announcements through loudspeakers were an effective way of delivering warning information to the residents, and 'word of mouth' proved to be another useful method.

> *The community residents' committee members came to our home to tell us the flooding information soon after they received the information. They informed us door-by-door (PE).*

The community residents' committee members also delivered water level information through

phone calls.

> *The community committee … also called us to let us know the water level information and urged us to get ready. They have our phone numbers (PE).*

In addition, the committees phoned the contact people living in the residential communities and asked them to spread the information to their neighbours. Participant F described her experience as a contact person acting between the community residents' committee and the residents.

> *I have the contact number of the community residents' committee and they also have my number. They called me and told me the water level information, and I passed the information to my neighbours because I was the Louzhang (the closest translation in English might be residential leader of the building) (PF).*

Participant F depicted that their family received warning information from the community residents' committee in a range of ways.

> *The community residents' committee members informed us in advance. They told us the estimated maximum water level and the severity of the flooding. Also, they urged people whose apartments were at risks to move their possessions to safer places ... the community committee member went to our apartment to tell us the information. They went to every resident's apartment door-by-door. In addition, they made phone call to us to tell us the information. When the water went up, they used loudspeakers to provide information for us (PF).*

When some residents were stranded in their apartments after their buildings had been surrounded by water, the community residents' committees still provided information for them by loudspeaker, which helped them to stay informed about the updated water level information and have a sense of being connected to the community residents' committees.

> *When we were trapped at home, the power was cut off. The community residents' committee members used loudspeakers to let us know whether the water level would go up or drop down. Under that circumstance, we relied on the community residents' committee to update information for us (PE).*

4.3.1.1.2 Providing practical assistance

Providing timely physical assistance protected family property from being damaged by water and reduced financial losses. For most of the families, moving possessions was a frustrating and exhausting task, and it was particularly difficult for them to move heavy furniture and electrical equipment often by themselves. As a result, the physical assistance provided by the community residents' committees was very helpful for families in these types of stressful situations. The community residents' committees organized Min Bin *(the closest translation for the word in English would be militia),* or sent people to help families move heavy possessions, as indicated by many of the participants.

> *Min Bin, organized by the community residents' committee, helped us move some huge and heavy items (PF).*

The community residents' committee sent people to help us move possessions (PI).

The director of community residents' committee arranged people to help us move heavy items (PH).

The provision of appropriate and effective infection control support helped the families reduce the possibility of catching diseases, particularly gastrointestinal diseases, insect-borne diseases, and dermatitis, due to poor hygiene and the contaminated environment after the flooding receded. The community residents' committees organized people to disinfect the flooded streets and helped families to disinfect their flooded apartments in order to protect them from flood-related contagious diseases. Several of the participants mentioned these effective infection control strategies.

The community residents' committee sent people to help us disinfect flooded rooms, including all the cupboards, corners of walls, fairly thorough. We didn't suffer any disease (PA).

The community residents' committee sent people to disinfect flooded streets (PD).

Soon after the water started going down, we began cleaning. After that, the community residents' committee sent people to help us disinfect flooded rooms (PE).

4.3.1.1.3 Providing emotional support

Providing emotional support helped many of the families to have a sense of being cared for by the community. Their strong ties with the community residents' committees, built during their daily lives, was maintained during the floods, as seen in participant H's account.

I and my husband trust the community residents' committee members, they are absolutely caring people ... the director of community residents' committee was very kind to us. He called us to let us know the water level information. He cared about us very much during flooding (PH).

4.3.1.1.4 Providing supplies and financial support

The community residents' committees offered shelter and food for families during the flooding and provided small amounts of money for some families afterwards. Although supplies and financial support provided by the community residents' committees were limited, they were still appreciated by the participants.

For instance, some families had to evacuate and move their possessions to safer places because the maximum water level would reach their residences. Therefore, safe and convenient shelter was important for them in these circumstances. The community residents' committees offered shelter for residents whose apartments were likely to be flooded, as indicated by some participants.

The community residents' committee contacted the principal of a nearby high school and asked him to provide some safer places for us to store our possessions (PE).

The community committee members arranged shelters for us in advance. They arranged a nearby high school for us to store our possessions (PH).

In addition, some families were stranded in their homes during the flooding and were low on food, so the community residents' committee delivered food to them during this period.

When we were trapped at home during flooding, the community residents' committee member delivered food and biscuits for us by boat (PF).

Families which suffered severe financial loss received limited amounts of financial aid from the community residents' committees.

The community residents' committee gave 100 Yuan to us for the compensation of our financial loss (PA).

4.3.1.1.5 Being available

'Being available' could be interpreted as a symbol of community residents' committee embeddedness in the normal routine of family life. Families showed their trust in the community residents' committees by suggesting that they knew and believed they could seek assistance from them if they were in danger. This belief helped them to reduce their mental and psychological stress. Indeed, the families regarded the community residents' committees as the representatives of the government, and they trusted and believed that the government would provide assistance for them if they needed it. The rationale for this level of trust was based on the families' trusting relationship with the committees which had been established during the routines of normal daily life. Many of the participants expressed their understandings and expectations about the availability of the community residents' committees during the floods.

If we have any urgent issues need assistance, they (the community residents' committees) will take us out by boat. They conducted boat patrol all the time during the flooding (PE).

The community residents' committee members conducted patrol day and night by boat. We did not worry about our safety, because we could seek help from them if we were in danger (PF).

Again, the families were confident that the community residents' committees would provide assistance for them whenever they needed it.

We believe that the community residents' committee will send members and people to help us. We know that if our family needs help, we can contact the community residents' committee and they will help our family to deal with difficulties (PH).

4.3.1.2 Family social networks

Family social networks included neighbours, friends, employers and colleagues, and paid workers. Many of the participants talked about the importance of the neighbourhood bond in coping with flooding. Many conveyed the meaning of neighbourhood solidarity as being embedded in traditional Chinese society. In addition, friends, employers and colleagues, and paid workers were other social networks which families could seek assistance, and receive support, from when the floods occurred; however, these resources remained only as potential options and were less important according to the participants' accounts.

4.3.1.2.1 Neighbours

Neighbours were defined as people living close to the family home, such as in the same building or in nearby streets. Many of the participants indicated that their families received assistance from their neighbours. More importantly, mutual assistance was presented as an effective way for families and neighbours to fight against the flooding together, thus demonstrating a range of collective coping strategies.

> *All of us being stranded in the building helped each other (PF).*

A friendly neighbourhood improved families' confidence in coping with the flooding; participant C used an old saying to express his feelings about the supportive nature of the neighbourhood relationship.

> *Fire and floods are merciless, but human being is fully of sympathy (PC).*

Furthermore, the reciprocal responsibilities of being neighbours, and the traditional Chinese neighbourhood solidarity, were illustrated in the following statement by participant L.

> *We and our neighbours shared information. We had an informal agreement that if someone saw water going up at night, they should let all the neighbours know. When we met each other in the building, we told each other if somebody knew anything about the water level, they should let all of others know as well, especially at night, some of them might fall into asleep. I told them if I saw water going up and decided to evacuate, I would definitely let them know. We are neighbours, we should look after each other (PL).*

Assistance from neighbours included exchanging information and coping strategies, sharing supplies, taking collective action, and providing physical and emotional support.

4.3.1.2.1.1 Exchanging information and knowledge

Water levels were the main concern raised by families during the flooding, due to this issue being pivotal in decision-making. The participants indicated that they shared, received, or provided information with their neighbours. As participant F said:

> *Our neighbours shared the information, such as where was flooded by the rising*

water and the height of the rising water (PF).

Participant C also emphasised that their families shared information with their neighbours.

> *Our family received information from neighbours, and we shared the information we knew with them as well (PC).*

Neighbours were one of the main information sources for some families. Some participants stated that they received information from their neighbours.

> *I received water level information from my neighbours (PA).*
>
> *My next door neighbour told me what the estimated peak water level was, so I knew that my apartment would be flooded (PI).*
>
> *My neighbours would tell me the estimated peak water level if they received any updated information (PL).*

On the other hand, the participants mentioned that they also provided information for their neighbours.

> *I preferred to go to the bank of the river to watch out the water level. I told my neighbours who did not go there that I would let them know the water level information after I came back (PL).*

In addition to sharing information with their neighbours, some of the participants indicated that they also exchanged ideas about how to cope with the upcoming flooding, which helped their families to make plans and take action accordingly.

> *We and our neighbours exchanged evacuation strategies. We discussed what should we do and where could we go if the water went up (PK).*
>
> *We discussed the coping strategies with our neighbours, what should we do if water went up (PH).*

4.3.1.2.1.2 Providing mutual assistance

The importance of solidarity and cooperation among neighbours was implied in many of the participants' statements. Mutual support in the flooding situation was often reciprocal, such as taking action collectively, facilitating physical activities, providing supplies and shelter, and helping to reduce psychological stress.

Participant E pointed to cases of mutual assistance with neighbours, and expressed their family's willingness to offer assistance to neighbours whenever they might need.

> *Neighbours helped us move possessions. Actually, we helped each other. If the water would go into our neighbours' home, we would like to help them to move possessions, the same if our home would be flooded (PE).*

Participant C addressed the importance of collaborative activities with neighbours several times

during the interview, and highlighted the close ties among neighbours that helped them to cope with the flooding.

> *In this kind of urgent situation, when we face natural disaster, we absolutely should help each other. We helped each other move possessions and shared water level information. We hated floods and we should take actions together to fight against it ... in that situation, neighbours helped each other and looked after each other (PC).*

In addition, the participants pointed out that their families received instrumental assistance from their neighbours that helped them to overcome difficulties caused by the flooding. The moving of heavy items was a difficult task for many families, especially those who lacked labour; however, the kindly assistance of their neighbours helped them to solve this problem effectively. For instance, both participants A and J's husbands were not at home for different reasons; however, their families needed to move their possessions to safer places during the flooding; therefore their neighbours' help was valuable for them. Participant J used an old Chinese saying to express her sincere appreciation for their neighbours' assistance, and described how their neighbours helped their family in some detail.

> *Our neighbours are very kind, as an old saying says "Far water does not put a fire." (Neighbours' assistance is timely when a fire occurs) … our neighbours saw we could not move the heavy items, so they helped us move the refrigerator and TV to the second floor of the building ... you know, only I and my daughter were at home during flooding, we could not move the heavy electricity appliances such as a refrigerator (PJ).*

Participants A and E further confirmed the importance of the assistance of their neighbours.

> *Our neighbours and relatives helped us move possessions; otherwise, I could not manage that. Our neighbours are very kind (PA).*
>
> *When water started to rise, my neighbours and daughter-in-law's mother helped our family move possessions (PE).*

Apart from helping to move possessions, shelter and food provided by neighbours proved to be valuable forms of assistance for the participants. For example, participant A emphasised the importance of the temporary shelter provided by her neighbour in reducing their family's financial losses.

> *We asked our neighbour if we could borrow his place for storing our possessions during the flooding, he was quite happy with that, then we moved some possessions to his place. At least moving the possessions reduced our financial loss (PA).*

Participant G's neighbour provided food for them because it was impossible for them to cook when their home was flooded.

> *Our neighbours are very kind. A girl lived upstairs cooked noodles for us (PG).*

Participant G explained that their close relationship with their neighbours in daily life contributed to receiving assistance in a time of need.

> *I get along well with my neighbours. When we sheltered at the stairwell, all the neighbours invited us for meal, that was pretty good (PG).*

The importance of well-established long-term reciprocal neighbour relationships was supported by participant H's statement.

> *Our neighbours are very kind, we are neighbouring for years. If their apartments have spare room, they will be more than happy to let us put the possessions in … we care about each other. For example, if somebody's family did not have food, others would provide food for them (PH).*

Furthermore, bonding and engaging with their neighbours helped the families to feel emotionally strong and reduced their sense of panic.

> *We were neighbouring for years in this building, and our family kept in touch with neighbours during the flooding, we did not fear (PE).*

Support from neighbours also included providing care for children. For example, participant G's grandchildren were offered a room and food by their neighbours while she and her husband were sheltered in the stairwell, which helped them to reduce the burden of taking care of their grandchildren in such a difficult situation.

> *My grandchildren were not scared. They stayed with our neighbour upstairs, and had meals there (PG).*

Participant E also mentioned that:

> *My neighbours helped me look after my grandson during flooding while we were busy in moving possessions (PE).*

Apart from receiving assistance, many families also provided help for their neighbours. For example, participant J mentioned that her family provided food for her upstairs neighbour.

> *Our upstairs neighbour told us he did not have any vegetables, we said we had some salted cowpeas, he could have some if he like. After that, we invited him to have meal with us (PJ).*

Participant E described the importance of mutual assistance among neighbours in some detail.

> *Actually, we were neighbours living close to each other, if somebody did not have food, I would like to provide food for them. If water entered into our neighbour's home, we would help them move possessions, if water entered into our home, they would help us as well. For example, our neighbour is a rice seller, we helped him to transfer his goods. In addition, I opened my private corridor to let neighbours pass through when the normal way was blocked by water. We helped each other, we were neighbouring for ages (PE).*

4.3.1.2.2 Friends

Friends were another part of the social network who helped these families during the flooding. However, only participant D mentioned that their family sought and received concrete assistance from their friends. The other participants did not mention receiving assistance from friends.

> *My friends are more than happy to help me during flooding ... I called my friends and asked them to help me move possessions … we should find a truck to move our possessions. I had a friend who owned a big truck, so we asked for his help, he assisted us to move our possessions (PD).*

4.3.1.2.3 Employers and colleagues

Employers and colleagues were another part of the social network which provided assistance for families during the flooding. However, only participant A indicated that her family received practical assistance from her employer and colleagues, including an offer of shelter, help with moving possessions, help with cleaning her flooded apartment, and the provision of emotional support.

> *Our leader cared for us after he knew our situation, and he offered us to shelter at the guest apartment for free … after our leader knew our situation, he called us and showed his care for us. He sent our colleagues to help us clean our watered rooms and move possessions back home. Our colleagues are very considerate (PA).*

Participant A expressed her gratitude to the assistance provided by her employer and colleagues.

> *I was very much appreciated to my colleagues' assistance in cleaning our flooded apartment. Otherwise, we could not return our home shortly ... (PA).*

On the other hand, participant A expressed her unwillingness to seek assistance from her employer because it was considered to be a family issue. The reasoning for this might be the boundaries established by her family in seeking help from official and/or informal resources.

> *I did not shelter at the place my employer offered. I did not want to bother the employer with our family issues (PA).*

4.3.1.2.4 Paid Workers

Paid workers were other optional resources that many families sought assistance from when they needed physical help. Some of the participants said that their families paid for the workers to help them move possessions before the water rose, and to renovate their flooded rooms.

Participant F indicated that their family paid for workers to help them with heavy items when they were moving their possessions.

> *If the furniture or electricity appliances were too heavy to carry by ourselves, we asked the workers to help us (PF).*

Paid workers also helped families with the renovation of their flooded homes.

> *I asked workers from a renovation company to renovate the watered rooms for us (PB).*
>
> *After the watered rooms were disinfected and dried … we paid the workers to help us to paint the rooms (PE).*

4.3.1.3 Family networks

Family networks included relatives (extended family members) who were members of a family connected through marriage or blood but did not live in the same dwelling, and household family members (individuals living in the same dwelling).

4.3.1.3.1 Relatives

Many of the participants indicated that their relatives, particularly their adult children, brothers, sisters, mothers-in-law, and uncles helped their families in the face of the flooding. Relatives represented the main source of shelter for families when they had to evacuate and live outside of their flooded home. Other assistance from relatives included warning information, help with cleaning and disinfecting flooded rooms, and providing financial and emotional support. This assistance helped families to overcome the difficulties resulting from the flooding, such as finding somewhere to store possessions, finding temporary shelter, cleaning the flood-affected homes, dealing with financial losses, and alleviating mental and psychological stress.

Many of the participants pointed out that their relatives should look after them because they were connected to each other in one big family, which illustrated the taken-for-granted meaning of relatives in Chinese culture.

> *Our relatives cared for us during flooding. Relatives must care for us, otherwise they should not be called relatives, isn't it? (PA).*
>
> *My adult children will care about us when the natural disaster occurs (PK).*
>
> *Our relatives will care for us, that's for sure, we are a family (PN).*

Relatives helped family members to gain relevant information under certain circumstances. Participant A mentioned that she received warning information from her brother who lived in another city by phone, because she was too busy packing to seek out the information. Her brother acknowledged the water level information from the television broadcast, and then informed her by phone.

> *My brother called me from XX city to let me know the estimated water level information (PA).*

Again, relatives were the major source of shelter for the families, as indicated by several of the participants.

It is desperately frustrating, the water maintained for 3 days, and did not go down. I lived at my mother-in-law's home during that time (PA).

I stayed at my uncle's place during flooding because our home was swamped … I and my husband stayed with my uncle and had meals there before we returned flooded home (PI).

I stayed with my sister in her apartment one night … my daughter stayed with my sister for around 1 week (PJ).

My daughter called me, she said it was going to be a flooding, would you like to stay with us? (PK).

In addition, relatives helped families move their possessions, and this physical support was timely and necessary when the families could not fulfill this difficult task.

My mother-in-law and brother-in-law came to help me move possessions … our neighbours and relatives helped us move possessions; otherwise I could not manage that (PA).

Both I and my husband's relatives helped us move possessions (PD).

When water started to rise up, my neighbours and daughter-in-law's mother helped our family move possessions (PE).

Relatives provided disinfectant for the families and helped them to disinfect the flooded rooms which reduced the risk of catching diseases after the flooding.

Before we returned our home, we disinfected the watered rooms. My daughter took disinfectants for us … soon after the water started to go down, I went back home to clean and disinfect it, my nephew helped me. After that, we opened all the doors and windows to let the wind go through the rooms and dry them (PI).

Relatives also helped families to clean their flooded apartments.

My sister helped me to clean our home (PJ).

Relatives provided financial support for the families which helped them to restore their routines.

I received money from my daughter so I could buy some necessaries after flooding (PI).

Many of the adult children of the families did not live with their parents; instead, they studied, worked, or lived in other cities. Therefore, they expressed their caring through phone calls during the floods. Their emotional support helped their parents to overcome the adverse situation with a strong sense of being connected and cared for. Several participants indicated that they received emotional support from their adult children.

My adult daughters called us and cared for us during flooding, they care about us a lot (PC).

My two adult daughters called me every day during flooding. They asked us to

pay attention to our safety and health, they cared about us (PG).

My son called us during flooding. He asked us to pay attention to our safety and don't go to the bank of the river. He cared about us (PL).

My daughter called us and cared about us. She asked us the water level and where was flooded, how about our apartment. She would like to know if we were safe or not (PN).

Apart from the community residents' committees, relatives were another available source for families to seek assistance from if they needed. Participant D indicated that her family sought help from relatives.

We sought assistance from friends and relatives (PD).

4.3.1.3.2 Household family members

Household family members were individuals from the same family living together in the same dwelling. Generally, each family member contributed to the entire coping and recovery processes of the family in response to the flooding. Individual family members bonded together to cope with the flooding and to support each other. The participants indicated that the designated roles of each family member helped their families to take action effectively and smoothly, as mentioned by PE.

I was mainly in charge of packing, my husband was responsible for ensuring electricity and gas safety, he was the last one to evacuate, and turned the electricity and gas meters off (PE).

Furthermore, emotional support was an important source of connection between family household members, especially when other family members were not able to take action together for various reasons. Participant A and J's husbands could not return home to help them deal with the flooding together; however, their husband's emotional support helped to lessen their worries and to retain a sense of being cared for and supported.

The first time we experienced flooding, my husband was on business, he could not come back home to deal with flooding with me. He made phone calls to me and offered me some emotional support (PA).

My husband could not return home when our apartment was swamped during flooding because he worked in another city. But he concerned about the flooding information, cared about me and my daughter, he made several phone calls to us every day … when my husband called me during flooding, I told him water went up quickly, I was in a big worrying about that. He comforted me and asked me to calm down (PJ).

Participant K was half-blind due to an eye disease. When she mentioned her experience during the floods, the strong feeling of attachment to her husband helped to reduce her fear.

My husband cares about me, this is the most important point for me. So, I don't feel scared when facing natural disaster (PK).

Another type of support for families was the respect and support from other family members, such as accepting their partners' decisions and opinions.

> *My husband supported my decision. After flooding, I decided to run our business again, my husband supported me (PD).*
>
> *If I can help others during the flooding, I will do it. My husband supports my idea (PL).*

4.3.2 Having Family Inner Resources

Considering the family as a unit rather than as separate individuals, family inner resources emerged as a major category due to their unique role in promoting the entire family's capabilities in dealing with the flooding. Different from the social resources which focused on a family's networks and the dynamic interactions with their external resources, a family's internal resources referred to the internal intangible resources existing within a family, including the entire family members' shared resources and each individual's personal resources. The shared resources were comprised of family norms, self-reliance, and values and beliefs. In addition, family members' personal values, characteristics, flooding or life experiences, and their knowledge were part of the family inner resources which facilitated the entire family's preparation, response, and recovery activities in the face of the flooding.

4.3.2.1 Family norms

Family norms were the behaviours accepted by most of the family members, including family roles and family unity.

4.3.2.1.1 Family roles

Family roles referred to the designated activities or tasks for each individual within a family. The participants depicted the different roles of their family members during the flooding which made the families' actions more organized and effective.

4.3.2.1.1.1 Gender-related roles

Family members performed different tasks based on their gender and took respective responsibility to ensure that relevant activities were effectively fulfilled. Traditional gender-related roles in Chinese culture were adhered to during the flooding.

According to the participants' statements, the wife was normally in charge of packing and food preparation, while the husband took responsibility for moving heavy items, checking electricity and gas, and ensuring the safety of family members. As participant H said:

> *I was the one who organized packing ... my husband did not involve in the packing activity. He just helped me move the possessions (PH).*

Participant C indicated that their family members' designated tasks during the preparation phase

were based on their routinely allocated roles within the family.

> *After receiving the warning information, one of the family members was in charge of guiding the actions. Family members had their own roles for preparation. We knew what task the individual needed to do, already took it for granted … I was in charge of organizing and managing actions towards the upcoming flooding. My wife did the packing (PC).*

Participant F further confirmed that, in day-to-day life, the family members performed different tasks, and these roles were applied accordingly in the actions they took during the flooding.

> *Our family members had clear roles in the family. My husband did the heavy work, and I did the light work ... my husband moved the heavy items, I moved the light items ... I bought the food, my husband moved the possessions ... (PF).*

Participant E pointed out that each individual in the family played particular roles during the flooding.

> *I was mainly in charge of packing, my husband was responsible for ensuring electricity and gas safety, he was the last one to evacuate, and turned the electricity and gas meters off. ... During the flooding … my daughter-in-law mainly looked after our grandchild, and she helped me with packing. I was mainly in charge of preparing food and communicating with others (PE).*

4.3.2.1.1.2 Care-giving roles

Some family members were responsible for taking care of other vulnerable family members both in day-to-day life and during any crises. Family caring roles demonstrated the responsibility of the family unit for their vulnerable family members and could promote the entire family's well-being through meeting the needs of vulnerable individuals. The family caring roles maintained in the flooding situation helped families to make decisions and to take actions in rational ways.

Different from most Western countries, in China, family members residing together sometimes comprise three generations, including the grandparents, parents, and children. Normally, the parents are simultaneously responsible for taking care of the grandparents and raising the children in this family structure. For instance, participant N's family took care of her sick mother whose daily activities required participant N and her husband's assistance. Therefore, participant N's reaction towards the potential risks caused by the flooding was to ensure her mother's safety, which implied the influence of the caring roles in a family's decision-making and action-taking during the flooding.

> *If the water goes up, and will potentially reach my home, I will definitely take my mum out first. Nothing is important except her safety under that circumstance … my mum's safety is our highest priority (PN).*

Nowadays, in remote areas and in the urban cities of China, it is common for the grandparents and grandchildren to live together because the grandchildren's parents might work in another city

and leave their children at home to live with the grandparents, with the grandparents being responsible for looking after the grandchildren. For instance, participant G's grandchildren lived with them because their parents, participant G's daughter and son-in-law, worked in another city; therefore, participant G and her husband took care of their grandchildren during the flooding. Their neighbour offered a safer shelter for the grandchildren while the grandparents sheltered in the stairwell, which helped to relieve them from their caring role.

> *After our apartment was swamped by water, I and my husband stayed at the stairwell in the building and kept observing the water level. My two grandchildren stayed with our neighbour X popo (a respected title for an aged person, the closest English translation was grandmother) who lived at the highest level of the building … we could not sleep, my two grandchildren stayed with X popo, they must sleep well (PG).*

In addition, in some families, one of the family members was old or was suffering from disease; thus, they relied on other family member's support and care. Participant I's husband was far older than her and suffered from chronic diseases, such as hypertension, so she looked after him. As a result, participant I conducted all the physical activities as well as taking care of her husband during the flooding.

> *I cleaned the watered rooms myself, my husband was over 80 years and caught a cold. Actually, I needed to look after him … normally, I did all the housework. I moved the possessions myself during the flooding (PI).*

Participant K has been half-blind for a long time because she contracted an eye disease earlier in her life, and her husband looked after her normally. Participant K indicated that her husband was the most important emotional and physical support for her during the flooding, as he helped to reduce her fear so that she could feel confident in coping with the adverse situation.

> *When we were stranded in the building, I did not feel scared, because my husband stayed with me. I did not need to worry, he was my protector (PK).*

Participant J performed different caring roles in her family. She was a wife as well as a mother; thus, her husband's medical condition and her children's situation were taken into consideration when she made decisions during the flooding.

> *I did not tell my husband when I decided to move the possessions. His heart condition was not good; if I told him this information, he would worry about that, I did not want to disturb him. I moved the possessions when I had spare time from my business. I did not tell my daughter as well. She was a high school student and she was busy in studying. She did ask me if we would move the possessions or not, I told her she should concentrate on her study, I could take our possessions to her aunt's place (PJ).*

4.3.2.1.1.3 Decision-making roles

The decision-maker was in charge of arranging preparation activities and conducting social communication during the crisis. Having a decision-maker in a family was normal for some

families, while other families were inclined to make decisions collectively. The normal decision-making style in each family was applied to the flooding situation and helped these families to reach agreement on effective corresponding actions.

Interestingly, either a male or a female in a family could play a leading role in decision-making. For example, in participant C's family, his wife supported his decisions and he was the only person who made decisions for the entire family during the flooding.

> *I was in charge of organizing and managing actions towards the upcoming flood. My wife did the packing. I was the decision-maker in our family. My wife followed and assisted me (PC).*

However, in participant G's family, she was the decision-maker, and her husband followed her instructions.

> *In our family, I am the decision-maker. I made all the decisions during the flooding. My husband just followed my instructions … my husband always supports my idea. If I told him we needed to move possessions, he would do it; if I told him we did not need to move, he would not do it. All depends on me. I am the decision-maker in the family, everyone knows that (PG).*

Nevertheless, although participant G had a strong role in family decision-making, she still discussed her ideas with her husband before she made the final decision, and she valued her husband's contributions.

> *I discussed with my husband and I made the moving decision eventually (PG).*

Again, some families did not have a single decision-maker; rather, family members, especially the couples, discussed and made decisions together. This can be seen in participant D, E, and F's statements.

> *I and my husband had the same idea. We always reach an agreement with the family issues (PD).*
>
> *Our family normally makes decision together (PE).*
>
> *I and my husband always discuss with each other regarding family issues. We don't have a fixed decision-maker; instead, we try to find a best way to solve the problem based on the discussion. For example, we moved the possessions and cleaned the flooded rooms together, then made the return decision together (PF).*

4.3.2.1.2 Family unity

4.3.2.1.2.1 Family cohesion/solidarity

Family cohesion or solidarity involved the engagement and contribution of every single family member during the crisis. Family cohesion illustrated the functioning of the family unit and promoted families' problem-solving capabilities. For example, many of the participants indicated that:

Our family always get together to deal with the difficulties (PG).

In my family, we always discuss family issues together, share our ideas, and eventually reach an agreement of the best option … this is helpful especially when our family experienced the difficult situation (PN).

I and my husband made the packing and moving decision together, we must unite to deal with the upcoming flooding, that was for sure (PE).

4.3.2.1.2.2 Family harmony

Family harmony facilitated the maintenance of family well-being and functioning. Maintaining harmony was an important principle that family members considered. Some of the participants expressed their ideas about the importance of maintaining harmony within the family during the flooding.

During the flooding, if your family members quarrelled with each other, it was not good. We must took actions together … a family should do things together (PA).

I didn't want to quarrel with my husband, therefore I obeyed his idea. You know, I could not argue with him. It was not good for a family ... my husband did not want to evacuate from our apartment in the first place, it took me a while to persuade him to go with me before the water went up and went into our apartment (PI).

Participant B mentioned the importance of harmony in a family by saying that:

Actually, I hate arguing in the family, family should be full of harmony. Harmony brings fortune. Harmony is from your heart, if you are knowledgeable, then you can be more understandable of some issues (PB).

4.3.2.2 Family self-reliance

Family self-reliance was defined as a family's mental and physical independence. In other words, a family prepared for, responded to, and recovered from flooding mainly through relying on the family itself as a unit. Indeed, family members were unwilling to seek assistance if they thought their family could probably manage the adverse situation themselves. Thus, families established boundaries between family self-reliance and help-seeking. This characteristic conveyed families' willingness to be independent and strong, and demonstrated their capabilities in overcoming difficulties by themselves.

Participant A revealed that her family only sought help from an employer when they could not deal with the difficult situation themselves. She expressed her unwillingness to bother her employer with family issues.

I did not shelter at the place my employer offered. I did not want to bother the employer with our family issues. If our family could solve the problems caused by the flooding, we preferred to figure them out on our own. We only sought for assistance from the employer when the difficult situation was beyond our capability in handling it (PA).

Other participants further supported participant A's opinion as they expressed their attitudes toward seeking help and relying on the family itself.

> *We do not want to mainly rely on the assistance from the government; for us, family self-reliance is the most important ... our family predominantly relies on ourselves during the flooding (PB).*
>
> *We can't just rely on others ... (PH).*
>
> *Yeah, I cleaned the watered room by myself, I didn't want to rely on others (PI).*

The participants explained the importance of family self-reliance under adverse conditions and how their families successfully dealt with the difficulties by themselves. From their perspective, in the long run, a family should be responsible for solving their own difficulties as a result of the flooding rather than relying on others. As participant A said:

> *I and my husband dealt with the difficulties together during the flooding. We could not rely on the employer too much. Our family issues needed to be solved by the family itself. Assistance from the employer, or the government, would not last forever; family itself should deal with the difficulties in the long run (PA).*

In addition, the participants indicated their understanding of being independent after the flooding and illustrated their families' efforts to reduce the burden it might cause for the government.

> *For us, the ordinary residents, we relied on ourselves, because they (community resident's committees) were very busy in helping more vulnerable people during that time ... our family can solve the difficulties on our own; therefore, we relied on ourselves. It is ridiculous if all of us do nothing but wait for the assistance from the government ... if our family can cope with the flooding, we just do it ourself (PD).*

The families took action on their own during the flooding which demonstrated their capabilities in being independent in the face of disaster. The participants mentioned that if their families could cope with the flooding on their own, they should rely on themselves.

> *The community residents' committee sent some people to help us move the possessions. But we mainly rely on ourselves. It is impossible that you just waited for the assistance from the community without doing anything yourself … we experienced financial loss caused by the flooding, and we had to spend money on cleaning and renovating the watered rooms. We used our savings to deal with this difficulty, which was very helpful (PE).*
>
> *… but we moved out most of the possessions ourselves if we could. If the items were too heavy to carry, we waited for the assistance … only if the difficulties are out of our control, we have to rely on the government. But we must deal with the difficulties by ourselves if it is possible ... and we used our savings to deal with the financial issues (PF).*
>
> *We did not seek assistance from our relatives. Our family moved the possessions by ourselves. My grandchild helped move the small items, I and my husband did the packing together. Then we moved the possessions to the higher place of the building we lived. We need to deal with the difficulties ourselves … (PG).*

The participants explained their understanding of family self-reliance in disaster situations in the context of the whole country.

> *The government gave 100 Yuan to our family after the flooding. You know, the government has its own difficulties because a lot of residents living in this area were influenced by the flooding and experienced financial loss, not just our family. We need to consider the overall situation. Other people might experience more severe financial loss than our family. If we consider a country as a big family, the government is the leader of the family, the leader has his own difficulties as well. Therefore, we should rely on ourselves … as an ordinary person, we need to think about our country, you know, we always have this kind of opinion (PG).*

> *Anyway, we don't want to put any pressure on the government. We did not experience major financial loss or damage, and we could deal with the difficulties by ourselves ... we can't only rely on the government because the government can't look after all the families during that situation ... yeah, we must rely on ourselves ... (PL).*

The participants also expressed their perceptions of family self-reliance in the face of future disaster.

> *If our family experience the flooding in the future, I think the most important thing is to deal with the difficulties by ourselves … only if we are severely influenced will we seek aids from the community residents' committees to help us solve the temporary difficulties. In the long run, we must rely on ourselves (PN).*

4.3.2.3 Family values and beliefs

4.3.2.3.1 Family values

Family values referred to the thoughts that family members shared, such as what was right and wrong, and what were the most important things in life. Family values influenced family behaviours, not only in normal life but also in their decision-making and action-taking activities during the floods.

Being kind and generous was one of the values mentioned by the participants. For example, participant G got along well with her neighbours due to her personal values, and her opinion was supported by her husband. In return, her neighbours offered assistance to her family during the flooding.

> *I am not a mean person. I prefer to share with others. I won't only consider myself. In my family, my husband always supports my idea (PG).*

Participant I also indicated that:

> *It is good to do good things, don't do the nasty things … I am a heart-loving person. I am sympathy to others if I see them in difficulties (PI).*

'Helping others brings joy and reward' was another value indicated by the participants. Some participants talked about their willingness to provide assistance to others because they valued

the idea that helping others would bring reward, especially emotional happiness.

> *If I can help others, I will feel very happy to do that. You know, helping others will make you feel joyful. That is true, it is really a good feeling to help others. If I can help others during the flooding, I will do it. My husband supports my idea (PL).*

In addition, being grateful was valued by some families. For instance, participant A expressed her appreciation to the people who helped her family.

> *I appreciate my colleagues' assistance in cleaning our flooded apartment very much. Without their help, we could not return our home in such a short time. ... Relatives provided shelter and meals for us during flooding, that was very helpful, we felt grateful to that … employer and colleagues already helped us, we really appreciate for that (PA).*

Furthermore, 'staying alive as a priority' was valued by some of the participants' families. The meaning they gave to safety was more significant than the material possessions of the family. Considering that life is the most important thing, families made evacuation decisions to ensure their safety, rather than worrying about potential financial losses which might result in delayed evacuations and unexpected severe consequences. In addition, the families comforted themselves by valuing their lives after they had experienced financial losses caused by the flooding.

> *Natural disaster can't be avoided ... life is the most important thing, if we are alive, we own everything ... take as much possessions as we can when facing flooding. If we can't, that is alright, at least we are still alive, life is the most important thing (PA).*

> *If we encounter a severe flooding again, ensuring our safety is the priority. Then, if it is possible, we try our best to move possessions to safer places. Anyway, if it is an urgent situation, we will evacuate shortly and leave possessions at home. I and my husband have the same idea. Life is the most important thing, if you lose your life, you lose everything (PN).*

4.3.2.3.2 Family beliefs

Family beliefs refer to issues that families believe are true, including the understanding of flooding and religious belief.

In terms of understanding the flooding, many of the participants' families recognized that it is a natural disaster which cannot be avoided. This understanding helped their families to accept the occurrence, and to face the reality, of the flooding.

> *I was born here, and I experienced several flooding in this area ... this is the natural disaster (PB).*

> *Flooding is a natural disaster, we have no way to escape from it (PG).*

> *Flooding belongs to natural disaster. We have to face it (PI).*

Religious beliefs were uncommon in the majority of the families and very few participants mentioned this. As participant N indicated:

> *We never believed Buddhism, we just solved problems as possible as we could (PN).*

Only participant G addressed her family's strong belief in Buddha, and went to the temples regularly to pray for happiness from Buddha. This family belief was embedded in their routine activities and guided their thoughts and activities during the flooding.

> *I believe in Buddha, I believe people will be rewarded if they are kind to others. If I experience disaster, I will definitely help others (PG).*

4.3.2.4 Having previous experiences

Having previous experiences helped the families build up their confidence in dealing with the flooding, and positively adjusted their psychological conditions. Again, the disaster-related knowledge of the families was gained through their previous experience, including flooding experience and life or work experience in the past. Having lived in the flood zone for a long time, some family members had experienced severe flooding. Their prior experiences had a long-term impact on them and helped them to become more knowledgeable and confident when facing subsequent floods. In addition, their previous experiences facilitated the families becoming accustomed to flooding, overcoming their psychological stress during the flooding season, and facing potential future floods positively. More importantly, in some families, only one family member had relevant experience, so they shared their experience with other family members, in turn, improving the entire family's capabilities in dealing with the flooding.

4.3.2.4.1 Building confidence

Previous flooding experience promoted family confidence in judging the potential risks of flooding, making appropriate decisions, and taking effective action. More importantly, after previously experiencing the most devastating flooding in their residential area, many of the families knew about the worst possible consequences, which helped to ease their psychological stress when encountering the less severe flooding of the following years.

Firstly, previous flooding experience helped families to have greater confidence in preparing and responding effectively.

> *We get ready in advance when the flood season comes. Our families' preparation absolutely became better and better after experienced flooding again and again (PE).*

> *Yeah, we had the first flooding experience, and then we know what we need to do the second time … we can evacuate if the water goes up. We have this kind of thought … (PN).*

Furthermore, previous experience mitigated families' anxiety and panic. For example, participant E compared her past and recent flooding experiences. She interpreted the first experience as one of "being shocked", while the following flooding experience was interpreted as "knowing what to do", which helped her family to adjust their psychological status to the circumstances.

> *After experienced the flooding, our family had some ideas regarding how to deal with flooding and we won't feel worried too much. We know we should move possessions to safer places when it is necessary. When the flooding occurred in 1981, we did not have any experience, really scared (PE).*

Participant N also valued her prior flooding experience in helping her family to stay calm. She interpreted her previous experience as "knowing the worst".

> *We experienced a severe flooding in 1981, almost our entire city was swamped in the water. When we encountered the flooding in 2011, we did not panic too much, because we had some experiences. We already had seen the most severe flooding and we should not be scared when facing less devastating flooding … the flooding experience in 1981 has positive influence on us … we were calm and not worried … you know, for some situations, if you had the first experience, you would not be panic if you experience the same situation the second time. But if you had never experienced, you would feel scared because you didn't know the consequences (PN).*

On the other hand, a lack of experience caused panic, which further supported the importance of previous flooding experience in helping families to reduce their fear.

> *I never experienced flooding, it was definitely frightening (PA).*

4.3.2.4.2 Gaining knowledge

Previous flooding or life experience facilitated the gaining of relevant knowledge and, in turn, families were able to apply these lessons to their flood preparation and coping activities. Overall, the families reflected upon their past flooding experiences and learnt from them. This kind of knowledge was accumulated directly through real-life experience and was presented as being practical and helpful.

Several participants mentioned that their previous life experience helped them to gain knowledge associated with the disinfection of the wet and polluted rooms. Most importantly, the experience-based knowledge was embedded in their families' daily lives and was transferable into other situations, such as flooding.

> *I know how to conduct infection control strategies ... my knowledge is based on my previous working experience. I run restaurant previously, therefore I knew how to disinfected rooms. To be honest, this kind of knowledge, namely our life experience, is already embedded in my whole life (PB).*

> *I previously worked in a school refectory, I knew how to disinfect rooms (PD).*

> *All of our family members did not have any health issues after flooding. We were*

very careful, and we only drunk boiled water, always washed our hands before eating. If you pay attention to prevention, you won't catch disease. I knew that from my previous work experience. When SARS occurred that year, I was in charge of disinfecting the workplace. I knew how to conduct disinfection strategies. With regards to flooding, I disinfected my home by disinfectant (PG).

Apart from the participants' personal life experience, their flooding experience also taught them a range of lessons which helped to advance their knowledge and apply it to their coping strategies accordingly.

Actually, after experiencing the first flooding, you had some strategies about how to deal with the flooding when you experienced the flooding the second time (PN).

After we experienced that severe flooding, we knew how to prepare. I knew how to sort and pack our possessions, as well as get ready earlier (PH).

The participants reflected upon their previous flooding experience, and summarised what they had learnt, which helped them to take action in the following flood, and which would be helpful for their families in the face of future flooding. Families learnt many lessons, such as how to react to flooding information, and how to appropriately prepare and respond to the flooding.

Several participants indicated their understanding of the flooding information based on their prior experience. They viewed the warning information as a sign to begin preparations.

We knew how to prepare through our previous experiences. If we receive the flooding information, we will prepare drinking water and food (PL).

What our family learnt after experienced flooding in 2011 is to move possessions to safer place earlier, take actions as soon as receiving information from the community residents' committee (PF).

What we have learnt from previous flooding experiences is to get ready earlier and trust the science. Once receiving water level information, we should move possessions shortly. This is the lesson for us (PG).

What I have learnt from previous flooding experience is to move possessions to safer places soon after receiving water level information. Also, we should prepare food, such as instant noodles, fruit, etc (PJ).

The participants pointed out that their actions were influenced by the constant water level readings they were taking, after they had experienced an unexpected and devastating flood in the past. Their response to flooding rested on their judgement of the potential risks caused by flooding.

After we experienced the severe flooding in 1981, we learnt that we should watch out the water level regularly and get ready once water started to rise up. We went to the bank of the river to check the water level several times every day (PK).

The participants' past experiences also taught them how to act properly. For example, participant N indicated how to make decisions and take action to ensure that priorities were met.

My experience is that we should ensure our safety first, then protect our possessions from being damaged. If time is limited for moving possessions, we should evacuate immediately and keep ourselves safe, rather than being trapped or flooded (PN).

Participant E described how to prepare life necessities for her family based on her prior experience.

We need to prepare eye drops, antibiotics for gastrointestinal, candles in case the power and water supply were off, as well as drinking water such as bottled spring water. In addition, common medication, first aid stuffs such as disinfectant and dressing should be prepared in case you were injured. I learnt this knowledge from the experience of 1981 flooding (PE).

There were two common ways in which families learnt and gained relevant knowledge. The first was to learn from the family's past mistakes and the associated negative consequences. For example, when the actions participant D's family took during the previous flooding proved to be problematic, they changed their understanding of the potential damage which might be caused by the flooding and altered their actions during the following flood.

We moved all the possessions otherwise they might be flushed. I left a big pickle jar in the room last time, and it was gone after we went back. So I know that I should take all the possessions out to the safer place (PD).

Several participants described their families' negative experiences in the past, and how and what they had learnt, as indicated by participants J and E.

The big lesson I have learnt from my previous flooding experience is to trust the information from official channel rather than believing the information from rumour. In addition, don't return to the flooded home in a hurry unless it is cleaned and disinfected, otherwise it is likely to catch diseases. I suffered skin irritation due to returning home too early and the rooms were still wet (PJ).

Cleaning dirty muddy rooms are very important after being flooded, otherwise it is easy to catch diseases, especially pink eyes due to the bacteria reproduction … we caught pink eyes during the devastating flooding in 1981, so we knew how to prevent it (PE).

Other people's flooding experiences were another effective way for families to gain relevant knowledge and to help them with their actions during the flooding. Families learnt lessons from their relatives or neighbours' stories, or what they saw in the past. In fact, the families reflected upon others' flooding experiences and either their mistakes or positive outcomes, and then avoided making the same mistakes, or they took action based on other people's strategies that had previously worked well. These reflections were helpful for families in coping with flooding more efficiently and appropriately. During the learning process, families interacted with people around them and made sense of other families' activities which, in turn, contributed to the positive changes in their families' actions.

On one hand, some participants learnt from others' negative experiences.

> *I learnt the cleaning strategies from my brother-in-law's family's experience. They experienced flooding twice; … They did not start to clean the flooded rooms until the water went down entirely. It was very difficult to clean at that time. So I kept watching the water level constantly without sleeping, then started to clean just after the water began to go down, it worked very well (PJ).*
>
> *Most of my neighbours moved their possessions to the safer place except one who denied that the water would enter into his home. He helped other neighbours move their possessions, however water went into his own apartment eventually, and his bed was swamped and destroyed. According to his story, we should follow the warning announcement from the community residents' committee members, move our possessions to safer places once we receive the flooding information (PL).*
>
> *One of my neighbours did not move possessions, their family thought the water would not reach their apartment, so they just put the possessions on the bed. But the water went up and they did not have time to move possessions, their air-conditioner was damaged (PG).*

On the other hand, many participants learnt from other people's positive experiences.

> *Our family choose Suiyang Mountain as our emergency evacuation place because it is a very high place, people evacuated to there during the devastating flooding in 1981, which maintained the highest water level record of previous flooding occurred in our city. So it should be safe enough for us to stay (PL).*
>
> *This is the common knowledge, I saw people did it when I was young experiencing the severe flooding in 1981 (PA).*
>
> *If I am trapped in the building, I won't be scared. Because I have seen people who were trapped in the blocks of their apartment during the previous flooding. I found that as long as you prepared enough food and water, you wouldn't be frightened even you were trapped in the building (PN).*

4.3.2.4.3 Getting used to the flooding

Many families had been living in the flood zone for a long time and had experienced flooding several times. Their homes were still at risk of being flooded. Previous experience proved to be helpful for their psychological adaption to future uncertainty. Indeed, their prior flooding experience helped to ease their minds and to move on.

> *To be honest, we already got used to it when the flooding occurred the second time after we experienced flooding the first time (PA).*
>
> *Flooding keeps striking us, but our life still needs to move on (PD).*
>
> *After experienced the severe flooding in 1981, we did not panic anymore when we encountered flooding in the following years. To be honest, I already get used to flooding (PM).*
>
> *The flooding did not influence my psychological condition, I did not fear about it. You know, there are too many disasters occurring nowadays (PN).*

4.3.2.5 Having knowledge

Having knowledge was identified as one of the families' inner resources due to its unique role in preparing for, coping with, and recovering from flooding. It should be noted that individuals shared their knowledge with other household family members and applied the relevant knowledge to their family's actions. Being knowledgeable helped the families to overcome their fear and anxiety, make correct decisions, take appropriate action, and prevent the catching of flood-related diseases. Individuals gained knowledge in many different ways, including learning from their previous experience, learning from other people's stories, watching television, and through workplace training. The knowledge described by the participants covered how to prepare for the floods, timing of the cleaning of flooded rooms, how to deal with wet electrical appliances, how to conduct infection control strategies, and families' understanding of flooding and other types of natural disasters.

4.3.2.5.1 Preparation

The participants mentioned their knowledge about how to prepare after receiving the information. For example, as previously quoted, participant E described what should be prepared in detail.

> *We need to prepare eye drops, antibiotics for gastrointestinal, candles in case the power and water supply were off, as well as drinking water such as bottled spring water. In addition, common medication, first aid stuffs such as disinfectant and dressing should be prepared in case you were injured (PE).*

4.3.2.5.2 Time for cleaning

The participants stated that finding the appropriate time to clean their flooded apartment was very important because the mud brought in by the flooded water was difficult to clean up if the water level dropped completely inside the apartment. It would take more time and physical effort to clean the flooded rooms if the ideal time was missed.

> *Though we stayed with relatives during the flooding, we went back to our residential area to monitor the water level regularly. When the water started to go down and we could step into our apartment, we began cleaning the flooded rooms. We know that only if we conducted cleaning while the water went down, could the heavy mud brought by the water in the rooms be swept thoroughly. Otherwise it would be very difficult to clean the mud if we waited until the water went out of the apartment (PA).*

> *We started to move possessions soon after the water started to go up. And we started to clean the watered rooms when water began to go down. It was easy to wash the mud away if you swept them in consistent of the direction which the water going down. Otherwise it was very annoying because it was very difficult to wash away the mud if we missed that time (PD).*

> *We started to clean our rooms when the water started to go down, we washed out the mud by the flooding water (PF).*

4.3.2.5.3 Dealing with wet electrical equipment

The participants also mentioned their knowledge of dealing with wet electrical appliances in order to restore them to working order.

> *I learnt how to deal with the air conditioner when I worked in the previous organization. Therefore, I knew how to disassemble it and assemble it (PB).*

4.3.2.5.4 Infection control strategies

The participants stated their understanding of the importance of infection control and mentioned the strategies their family employed to protect them from contracting potential infectious diseases caused by the poor hygiene situation after the flooding. For example, participant D said that:

> Yeah, the watered rooms needed to be disinfected, otherwise the germs might remain (PD).

Participant B described how his family disinfected the flooded apartment.

> *I know how to conduct infection control strategies. We bought bleach and mixed it with water, then sprayed them into the cleaned rooms (PB).*

4.3.2.5.5 Characteristics of flooding and other disasters

The participants mentioned their knowledge of the characteristics of the flooding they had experienced, as indicated by participant F:

> *Water went up and stepped down slowly, not like the flash flood, water went up suddenly (PF).*

Many participants pointed out that knowing the characteristics of the upcoming flood helped their family to overcome fear and to prepare in advance. For example, participant C said that:

> *The flooding we experienced was different from the flash flood which developed in a sudden. Indeed, water went up slowly, especially when the water went through a wide area, it took more time to rise … we did not fear ... different from the flash flood, the flooding we experienced was forecasted by the meteorological center, we knew the estimated peak water level and when it would pass our city. In other words, it did not occur in a sudden, normally we knew the information in advance. In terms of the flash flood, it happens in a rush, and we won't have time to prepare (PC).*

In addition, the participants described the difference between a flood and an earthquake. The meaning they tried to convey was that 'flooding is not the worst'.

> *In terms of earthquake, everyone's life is in danger. Though it is possible that flooding may cause death, however it is quite different from an earthquake. Earthquake occurs within seconds without any warning signs, however flooding does not happen immediately, it will take a while for the water to rise, it is not an earthquake, we still have opportunity to get ready (PD).*

> *Earthquake was unpredictable, however flooding could be predicted. Therefore, we were frightened by an earthquake rather than flooding. Earthquake occurred*

suddenly without previous warning, but we received flooding announcement in advance, and we knew the estimated peak water level (PF).

Also, the participants knew how to deal with an earthquake, and showed their concern about the frequent natural disasters occurring in China.

If we encounter an earthquake, we should stay in the toilet or stairwell, or hide under the table (PE).

I learnt from TV that if the earthquake occurs, you need to stay at the corner of the room, or stay under the table which could protect you from being buried by the falling constructions (PG).

Again, the participants described their understanding of the negative consequences of flooding and other disasters through an old Chinese saying*, "Nothing you can save from a fire however half of the properties can be saved from a flood."* Participant A further expressed the meaning they granted to flooding that "flooding is not the worst". Participant N explained the severity of flooding compared to other disasters:

Anyway, compared with the earthquake, the consequences of the flooding are minor. The old saying says that people can save half property when experience flooding, but nothing when experience fire. With regards to the earthquake, if you are buried by the falling building and lose your life, everything is gone ... isn't it? For flooding, anyway, you can save at least half of your possessions. and you have time to evacuate. The number of death caused by flooding is small, except the people who can't swim and don't have time to evacuate (PN).

4.3.2.5.6 Characteristics of residential buildings

Some participants understood the characteristics of their residential buildings which assisted their families to make evacuation decisions. They interpreted the quality of their residential buildings as 'safe to stay'.

Yeah, I paid attention to the structure of the building when we bought this apartment. I had previous experience related to architecture, therefore I knew the foundation of this building was strong enough to withstand the flood … we knew the structure of the building, it had good quality even could withstand earthquake (PC).

We did not worry about the building. We did not think it would collapse by the water. The foundation of the building was pretty good. I have been here for a long time, I knew how the building was built. This building has a long history of around 20 years. The foundation of this building was very strong; it would not be influenced by the water. I trust the quality of the building (PF).

The building we lived had high quality; it was strong enough to withstand water and would not be collapsed (PN).

4.3.3 Communicating

Communicating emerged as a major category in the study because it represented an important family capability in mobilising and utilizing their existing social and family inner resources.

Communication was not only the link between the families' existing resources and the usage of these resources, but also an effective way for them to create or establish new resources during the flooding. Communicating helped families to access information, share ideas, and provide emotional support for each other.

Communication included both one-way and mutual communication. One-way communication occurred when families received information from various sources through a range of means. The use of loudspeakers emerged as an important way through which families gained warning information and remained updated on the information from the community residents' committees. More importantly, mutual communication helped families connect with their social networks (external communication), such as community residents' committees, neighbours, friends, and other family members (internal communication), such as those residing in the same dwelling and relatives living in other places during the flooding. Family members exchanged ideas, developed coping strategies, sought assistance, and received emotional support through effective mutual communication.

Various mutual communication methods were used by families, including face-to-face conversations and phone calls, which were two common means of communication. Mobile phones were identified as effective instruments to keep families in touch with others during the flooding, because normally, the electricity supply was cut off to ensure safety during flooding. As a result, pre-charged mobile phones were essential for families to communicate with their connections. Mobile phone messaging and the Internet were other forms of communication used to maintain connection with others during the flooding. Overall, mutual communication was a dynamic process through which families engaged and interacted with their existing resources. Through mutual communication, not only were individuals in the family tied together, but also the family unit was bonded with their contacts. In this context, families were not isolated during the flooding; rather, they were a unified unit and, as a result, were able to fight against the flooding together with their networks.

4.3.3.1 Connecting to families' social resources

Mutual communication was an important way to develop or maintain connections with the families' external resources, and to interact with their social resources before, during, and after the flooding.

4.3.3.1.1 Connecting to the community residents' committees

Communicating helped the families to connect to the community residents' committees which, in turn, helped them to receive timely information, seek assistance, and maintain close connections with the community residents' committees. According to the participants' descriptions, families communicated with the community residents' committees mainly through face-to-face conversations and phone calls. The participants stated that, apart from loudspeakers, they usually

received information from the community residents' committee members through direct conversations, and kept in touch with these committees by mobile phone during and after the flooding.

For example, several participants indicated that their family had direct conversations with community residents' committee members while they provided information for them.

> *The community residents' committee members came to our home to tell us the flooding information soon after they received the information. They informed us door-by-door (PE).*

> *The community residents' committee members went to our place to let us know the flooding information. The director of community committee told me there was going to be a flooding, you should prepare some food. I asked him about the water peak level (PH).*

Mobile phone conversations were another important method of connection between the community residents' committees and families, as participant H stated:

> *The director of community committee had our phone number, we kept in touch by phone call during flooding (PH).*

Furthermore, according to participant E, the community residents' committee's patrol activities during the flood demonstrated a dynamic form of mutual communication with the residents.

> *The community residents' committee conducted 24-hour patrol to keep in touch with us during flooding (PE).*

Apart from the solo mutual communication with the community residents' committees, participant F indicated that she connected the community residents' committee with her neighbours through mutual communication with both of them. According to her description, at first, she would receive information from the community residents' committee through a phone call, after which she would deliver the information to her neighbours. On the other hand, via communicating with participant F on a continuous basis, the community residents' committee received information about the safety of, and difficulties facing, the residents trapped in the same building as participant F. Therefore, mutual communication was a bond which tied families, their neighbours, and the community residents' committees together during the flooding.

> *I have the contact number of the community residents' committee and the community residents' committee members also have my number. They called me to tell me the information, and as a leader of the residential building, I told my neighbours the information … when we were trapped in the building by the flooding, the director of community residents' committee called me and asked me if our family and my neighbours needed any help, or did we encounter any problems because I was the leader of the residential building, I was responsible for connecting community committee and the residents (PF).*

Participant H emphasised the importance of active communication with the community residents'

committee members.

> *You know, community residents' committee members were very busy during flooding, it was impossible for them to look after all of us if we did not let them know what kind of assistance we needed. Therefore, if we did need their help, we would call the director of community residents' committee or the leader of our residential group, and asked them to send some people to help us move possessions rather than keeping silence and waiting for them to provide assistance (PH).*

4.3.3.1.2 Connecting to neighbours

Furthermore, mutual communication helped families to maintain connections with their neighbours during the flooding. The participants indicated that they exchanged ideas and information, shared coping strategies with neighbours, and supported each other, which helped them to reduce their fear and panic.

A common way for families to communicate with their neighbours was through direct conversation. Discussions with neighbours proved to be a helpful way for families to make relevant decisions and to take corresponding actions.

> *We discussed the coping strategies with our neighbours, including what should we do if water went up (PH).*

> *We discussed the evacuation strategies with our neighbour who lived on the second floor, both of us were worried. Eventually we reached an agreement, we decided to evacuate once water reached the ground floor. We agreed that to ensure our life safety was more important than protecting the properties. If we would not have enough time and could not move our possessions to a safer place and they were damaged, that was fine as long as we were safe (PL).*

Furthermore, families consulted with neighbours when they were unsure of their situation.

> *I saw my neighbours moving their possessions. I asked them what the maximum water level was. They told me the water was likely to enter into my apartment and suggested me to move possessions (PA).*

> *I asked my neighbour if he would move the possessions or not, he said he preferred to wait until water went up. I said that my husband was not at home, therefore I had to move the possessions early (PJ).*

4.3.3.1.3 Connecting to others

Mutual communication also helped families to connect to their friends, the police, the patrol people, and the paid workers. Face-to-face conversations and phone calls were the two main forms of communication.

> *I called my friends and asked them to help me move possessions (PD).*

4.3.3.1.4 Connecting to relatives and other family members

Internal communication was an important way for family members to share their opinions, receive

mutual emotional support, and seek assistance from other family members. Again, it was an effective way of maintaining a close relationship with relatives. There were various methods of communication adopted by family members to stay in touch with each other, such as face-to-face conversations, phone calls, mobile phone messages, and the Internet. The contents of the communication ranged from sharing previous experiences and making decisions, to exchanging ideas and information. Individual family members and their relatives maintained engagement with each other through mutual communication, which helped the families to retain psychological strength and to take effective action. Indeed, frequent and effective communication with relatives and other family members helped the families to bond and improved their confidence in dealing with the flooding.

For example, participant F described how she and her son exchanged flooding information by mobile phone.

> *My son worked in another city, he was not at home when we experienced flooding in 2011. I took pictures and sent them to him by mobile phone to let him know how the flooding went (PF).*

Participant N mentioned that she and her daughter communicated through the Internet during the flooding, which was seen as another way for family members to communicate with each other when they were not physically together.

> *My daughter was not at home during flooding in 2011. I took pictures and sent them to her by Internet, and then she knew the situation (PN).*

4.3.3.2 Accessing information

The warning information played an important role in families' preparedness and responses to the flooding. A family's capacity to gain substantial information and to make good use of it reduced the potential risks to, and disruption of, their family lives during this crisis. The means of accessing such information varied, as did the information sources.

Families received information through formal channels, such as the community residents' committees, the police, the weather forecasts and the news on television, and through their employers. They also accessed information through their informal networks, such as their neighbours, relatives, friends, and even through people they did not know who they encountered in the street.

In addition, information was provided in a range of different ways, including through direct door-to-door conversations, loudspeaker announcements, the news on television, and through mobile phone conversations and email dissemination. Door-to-door conversations and loudspeaker announcements were the most effective and common ways for families to access information.

4.3.3.2.1 Information sources

Families accessed information through both formal and informal channels. The community residents' committee was the main formal channel through which families accessed information. Many participants indicated that they received warning information from the community residents' committees through loudspeaker announcements, direct door-to-door conversations, and phone calls.

> *Generally, we received information from the community residents' committee. If the water level would go up, they would inform us in advance constantly. Normally, they confirmed the reliability of the information first, and then started to inform us, because they wouldn't want to give us the wrong information and made us frightened (PD).*

> *Community residents' committee members used loudspeakers to tell us the information. Again, they called us to let us know the water level information, and urged us to get ready (PE).*

> *The main information source is the announcement from the loudspeakers (PK).*

Participant F claimed that the information from the community residents' committee was the only way they received information; in response, they made their decisions accordingly because her family did not have any other source of information.

> *I definitely trusted information from the community residents' committee. Their information was evidence-based, and they would not make joke with us. If the community residents' committee urged us to move our possessions, I would follow their suggestions. I did not watch TV and I did not have radio (PF).*

In addition, television was considered to be another formal channel through which families could access information because it was popular and accessible in urban China. Television news, especially the Meteorological Centre forecasts, was the traditional method through which families accessed information about heavy rain during the flooding season. Several participants indicated that their family received information through the television.

> *… TV, especially Chongqing News provided related flooding information (PK).*

> *I received the flooding information from the community residents' committee and TV. I did not listen to the radio, but I would love to watch news on TV, especially local news (PI).*

> *We received the water level information from the community residents' committee, and we watched TV as well (PM).*

Interestingly, few participants regarded radio as an important source of information.

> *We did not have a radio, our information was from the TV and neighbours (PJ).*

Only participant C indicated that information from radio might be an option.

Yeah, radios were one of the ways, especially the local radio station (PC).

Furthermore, some participants mentioned that their families accessed information through other formal channels, such as the police, the patrol people, and their employers.

Also, the rescuer from the patrol boat would let us know which place was unsafe (PN).

Policemen told us the water went up … sometimes the patrol people told us the water level information (PL).

The director of our department told us there was going to be a severe flooding and urged us to get ready. In addition, the local flood control headquarters sent an email regarding the estimated maximum water level to our employer, and our employer forwarded that email to us (PA).

Information accessed through informal channels was mainly from neighbours, because families preferred to share their received or collected information with their neighbours, or to get their information from them. Relatives or friends were not the major informal channels through which families accessed their information. This phenomenon, to some extent, represented the importance of neighbourhood for Chinese families in their residential communities, which was addressed in the previous section.

Our family received information from neighbours, and we shared the information we knew with them as well (PC).

4.3.3.2.2 Ways of accessing information

Face-to-face conversation was a very important and easy way for families to access information from the community residents' committees and other sources. In addition, vulnerable or illiterate populations, who were unlikely to receive information from other sources or through other means, could effectively access information through 'word of mouth' . For instance, participant G stated that:

I met the director of the community residents' committee when I went out to buy the food, he said that you should prepare food and prepare packing and moving the possessions. He told me the water would reach my apartment (PG).

Listening to announcements from the loudspeakers was another useful way for families to access information, as the loudspeaker would be sure to catch their attention.

The community residents' committee members used loudspeakers to tell us the information constantly (PE).

Again, loudspeakers turned out to be a useful way for families to get access to updates about the water levels, particularly when they were stranded in the apartment blocks. The particular merits of loudspeakers were emphasised by participants C and E.

When we were trapped at home during the flooding, though the electricity supply

was cut off, we still could receive information from loudspeakers several times each day, that was pretty helpful (PC).

When we were trapped at home, the power was cut off. Community residents' committee members used loudspeakers to let us know whether the water level would go up or go down. In that situation, we relied on community residents' committee to provide updated information for us (PE).

Phone calls were a supplementary method of accessing information because many families had a mobile phone or a fixed-line telephone.

I have the contact number of the community residents' committee and the community residents' committee members also have my number. They called me to tell me the information (PF).

In addition, many families received flooding information through the mass media, especially through television. However, very few families used radio to access information, which demonstrates that radio may not be a common way for families to access information in this study. Again, apart from participant A, who received flooding information through her work email, few participants mentioned using the Internet to seek information. This phenomenon might be attributed to the study participants being comprised of middle-aged and aged people with low levels of education. As a result, it might be difficult for these families to use Internet technologies.

I kept checking the information from TV before the power was cut off (PE).

Our information was from the TV (PJ).

I ... did not listen to the radio (PF).

4.3.3.3 Sharing ideas

4.3.3.3.1 Sharing previous experiences

Family members who had experienced previous floods shared their experiences with other family members to help them to reduce their psychological stress. For example, participant M discussed her prior flooding experience with her daughter.

I still keep my childhood flooding experience in mind, which was very impressive. During the flooding season every year, I always shared my previous flooding experience with my daughter. I told her how devastating that flooding was, and compared with the flooding in 1981, these flooding occurring in recent years were not scary (PM).

4.3.3.3.2 Sharing optimistic attitudes

Family members shared their positive attitudes towards the flooding and the difficulties they encountered. For example, participant B shared his optimistic attitude towards life and the difficulties he faced with his daughter.

I shared my optimistic attitude towards flooding with my daughter … I hope my daughter be positive when encounters difficulties (PB).

Participant D also shared her positive attitudes with her husband.

> *Yes, our family always has positive attitude towards difficulties or disasters … yes, being flooded was one of the big difficulties for our family; we were annoyed by the flooding. But I am a positive person ... yes, my husband was a positive person as well ... I always think in a positive way (PD).*

4.3.3.3.3 Sharing decision-making

Effective communication also led families to reach agreement on relevant problems and ways to efficiently solve them.

> *I and my husband discussed the evacuation time and place, and we decided that if the water level reached the third floor of our residential building, we would leave our apartment and evacuate to the highest floor of the building (PK).*

> *I and my husband discussed together to sort out the evacuation route and how to get ready before water went up (PL).*

4.3.3.3.4 Sharing understanding of flooding and coping strategies

Communication helped family members to exchange ideas, which promoted their understanding of the flooding and the development of coping strategies.

> *My husband agrees with me that flooding is the natural disaster (PD).*

> *I discussed the packing and moving strategies with my husband, and shared the idea together (PH).*

> *My husband also concerned about the information. Both of us believed that the water level would not reach our home; therefore we did not feel anxious. … My husband also experienced the flooding in 1981. My mum was not scared as well. In her opinion, if the water goes up, we might be trapped at home for a short time, maybe 2 or 3 days, what we need to do is to prepare food and drinking water in advance (PM).*

4.3.3.4 Providing emotional support

Family members depended on effective and constant communication to provide emotional support to each other and to reduce stress. The family members who were not at home during the flooding showed that they cared about their family through phone calls; in this way, they provided strong emotional support for the other family members. Through constant communication, their family ties were maintained tightly though they were not physically together.

> *My husband could not go back home when our apartment was swamped. But he concerned about the flooding information, and cared about me and my daughter by making several phone calls to us every day … my son sent message to me by mobile phone during flooding. He asked me where water reached. He cared about us a lot ... I eased his mind and told him we already moved all the possessions, he should concentrate on his study, don't worry about us (PJ).*

In addition, the family members who stayed together conveyed their care to each other. For instance, participant K indicated that:

My husband cares about me, this is the most important point for me (PK).

Communication also facilitated families gaining emotional support from their relatives, especially their adult children. Several participants indicated that:

My two adult daughters called me several times every day during flooding. They asked us to pay attention to our safety and health, they cared about us (PG).

My daughter called us and cared about us. She asked us the water level and where was flooded, how about our apartment. She wanted to know if we were safe or not … during the flooding, my sister called us and asked us the severity of flooding, I told her … (PN).

We kept in touch with our son by phone every day during flooding (PF).

4.3.4 Solving problems

Solving problems emerged as a major category based on its important roles in facilitating families to cope with, and rebound from, the flooding. According to the participants' statements, flooding resulted in negative impacts on families' normal lives. For instance, some families left their homes and relocated to temporary shelters; some were trapped in their apartments while their residential buildings were surrounded by water; and some could not maintain their everyday lives because their residential districts were flooded. Instead, they encountered various difficulties ranging from threats to their safety and property damage, to facing many inconveniences and the consequences of individuals' physical and psychological conditions (the detailed information has been presented in the background data). Family capabilities in problem-solving were considered as useful skills in maintaining family' functioning and individual well-being during and after the flooding. Results showed that these families confronted various problems caused by the flooding. Judging information they received appropriately, making good decisions, and taking actions collectively were three fundamental ways employed by families to help them solve their problems effectively.

4.3.4.1 Judging information

Judging information helped families to make proper decisions and take appropriate action. Good judgements contributed to sensible decisions, and thus, resulted in positive consequences. However, inappropriate judgements may cause unexpected financial loss or safety issues. The criteria for judging information were based on the original sources of received information and the families' own observations, experience, and knowledge. Many families trusted information from formal channels due to its scientific foundation and the reputation of the authority. Furthermore, some families kept monitoring local water levels to collect the water level information themselves, and then combined this with the received information to make their final decisions. Again, the consistency between the reality of the flooding situation and the information received through formal channels facilitated families becoming more confident in

using information from these sources.

4.3.4.1.1 Trusting

Many of the families in this study trusted the information from formal sources, such as the community residents' committees and the television broadcasts. The participants stressed their trust in the information from the community residents' committees. From their points of view, a community residents' committee was the representative of the government, and it was the official channel through which to access information about the flooding. The warnings and the water level information were delivered through the Street Office to the community residents' committees, and officially announced by the Flood Control and Drought Control Headquarters of the government, which conducted related scientific research on the issue, including accurate measurements and forecasts of heavy rain. The participants explained the reasons for their trust in the information, including the sources and the accuracy of the information.

The sources of the water level information were the fundamental criterion by which the families judged the reliability of the received information. Many of the participants indicated that their families trusted the information from the community residents' committees because they were administered by the government. It was considered that, as an official agency, it should protect the residents' safety and property during the flooding. Therefore, information from the community residents' committees should be accurate and reliable. The participants' statements illustrated their attitudes toward, and understandings of, the reliability of information provided by the community residents' committees.

> *Usually, we received information from the community residents' committee… Normally, they would confirm the information first, then started to inform us, because they wouldn't want to provide us with the wrong information and made us frightened (PD).*

> *I absolutely trusted information from the community residents' committee. Their information is evidence-based, and they would not make a joke with us. If the community residents' committee urged me to move our possessions, I would follow their suggestions (PF).*

> *Information from the director of the community residents' committee is absolutely accurate, because his information is from the government. The rumour is not reliable, you know, people said that it was going to be a big flooding last year, but no flooding occurred, so don't trust the information from the unknown people. The information from the community residents' committee comes from the higher-level officials, we must trust it (PG).*

As well, participant J pointed out her reasons for trusting the information from the television broadcasts.

> *In my opinion, the most reliable information is from TV. Because the information is based on the broadcaster's professional knowledge (PJ).*

However, participant J described her contradictory attitude towards information from unknown sources, which illustrated that psychological stress might play a role in interfering with family judgements, although they suspected where the information had come from.

> *The information from unknown way made us felt really worried. I did trust the information from unknown way and moved our possession because I was desperate to protect our properties. Sometimes people on the street discussed this kind of information which influenced our mood. We then decided that we'd better to move our possessions to the higher place otherwise we would not have enough time to move if the water did rise up (PJ).*

Information accuracy was another criterion employed to judge the reliability of the information. If the information turned out to coincide with the real flooding situation (for example, if the predicted peak water level was the same as what actually occurred), the participants believed that the information was reliable; therefore, they trusted the information from the same source in the following year. However, if it was not the truth, they would not trust the information from the same source any longer, or they would hesitate to believe it the next time they encountered flooding.

Families found that the warning information they received was consistent with reality, which confirmed their trust.

> *If the director of community residents' committee said the water would reach that place, it eventually did (PG).*

> *We trust the information from the community residents' committee … actually, the fact is the same like the predicted information … I trust the predicted information. Because I found it was consistent with the fact. If it was said the peak water would go through our district at 8 am tomorrow morning, the water arrived at that time. And the water went down at the same time they predicted. Therefore I trust the information (PL).*

> *We moved our possessions to the stairwell, and kept watching the water level, we found the time that water stopped rising was consistent with the predicted time from the information (PF).*

The participants also mentioned the negative consequences caused by mistrust, which further supported their judgement to trust the reliable information.

> *Normally, most of us trust the information, except a small number of residents, they thought the water would not reach their apartment, and moving possessions would cause damage and lose 30% of their properties, therefore they decided to stay at home and not move their possessions to the safe place. However, the fact was that their apartment was flooded, which was consistent with the warning information we received (PC).*

> *We trusted the information from community residents' committee members, this was the second time we experienced such a severe flooding. The information was based on science, we must trust it. Some aged people disbelieved the flooding information in 1981, such as my mother, she complained that she was 80 years old and lived here for a long time and she never seen a devastating flooding in the*

past, therefore she denied that the water level would rise sharply, this turned out to be horribly wrong (PH).

In addition, the participants judged the information based on the belief that its scientific foundations ensured the accuracy of the information.

We trust the information, because we should believe the scientific technology, the information we received is from the scientific measurement, so we believe it (PD).

People conduct research regarding the potential water level of flooding, it is the science, we should trust the water level information other than hesitating and missing out the best time for moving possessions … the information is based on the scientific evidence, that is for sure (PG).

We should prepare in advance. Generally, the information is accurate. To be honest, the forecast about the rain and water level are correct. Previously, we did not trust the information, especially in 1981, most of the residents disbelieved. After experienced two floods in 1981, 2010, people gradually trust the information. People measure water level regularly, and we knew the maximum water level. Normally, we believe the information. You could not suspect the science, otherwise which could you trust? We trust in the science (PE).

4.3.4.1.2 Monitoring water levels

As with an old Chinese saying which states, “what you hear may be false, but what you see is true”, the participants mentioned that they trusted the information from the community residents’ committee and from what was broadcast on television, and yet they still kept monitoring the water levels themselves during the flooding. This might be a self-protection strategy for families to ensure their safety and to facilitate appropriate decision-making. The meaning that families attached to the water levels was in relation to the potential risks and as a reference for taking self-protective action. The participants indicated that their families monitored the water levels constantly during the flooding.

We watched the water level day and night during the flooding (PE).

We went to the bank of the river to watch the water level several times every day (PK).

We stayed at the stairwell and observe the water level day and night (PG).

Indeed, monitoring the water levels helped the families to judge the potential risks and to make decisions accordingly. For example, the families who evacuated from their flooded homes described how they kept watching the water levels.

We did not sleep while we sheltered at the stairwell. We kept watching the water level, if the water went up, we would have to evacuate to the higher floor (PF).

Families who did not evacuate and were stranded in their homes were also alert to the changing water levels.

We kept watching the water level during flooding, if the water reached the second floor, we had to move to the third floor. Children could sleep while the adults were keeping an eye on the water level (PJ).

In addition, some families whose homes were temporarily safe during the flooding, paid great attention to the water levels. These actions emphasized the collective impact of disaster on people living in the disaster zones, although the impact might be direct or indirect, and major or minor.

My apartment was not flooded, but we kept observing the water level constantly, just in case (PH).

We went to Bingjiang Lu to observe the water level every night, then we could have some ideas about the flooding situation (PN).

Some families made their judgements about the information they received according to their observations of the actual water levels, showing the dynamic interpretation process involved in the combining of information with the details of the actual situation.

We did not move possessions immediately after we received the information. Instead, we went to the bank of the river to see how the water rose. Actually, lots of people went there to check water level (PI).

We did not evacuate during the flooding. We just went out to watch the water level every day … I trusted other sources of information, but I would like to go to the bank of the river to check the water level (PL).

4.3.4.2 Making decisions

According to the participants, the families needed to make various decisions in relation to the flooding, including the timing of packing and moving possessions, preparing supplies, evacuating, cleaning, and returning home, as well as how to manage all these activities. Making proper decisions could help the family to mitigate their financial losses, lessen physical fatigue, ensure safety, and to maintain good health. Many factors influenced family decision-making in which relevant information and water levels were identified as the major reasons for families deciding when to pack and move their possessions, evacuate, and undertake cleaning. Family members analysed the potential threats from the flooding on their family's safety and property after receiving information, discussed strategies they would take, and made decisions together. In addition, observing the actions of others was another important way in which families could make rational decisions. Indeed, the ways in which families viewed their situation during the flooding influenced their decision-making.

4.3.4.2.1 Making decisions according to warning information and water levels

Warning information from the community residents' committees was the foundation upon which families made their packing and moving decisions because they trusted the information and made decisions according to the committee's suggestions. The decisions made by the families were based on the importance they attached to the warning information from the community resident's

committee.

Participant A indicated that her family followed the suggestions from the community residents' committees' announcements.

> *We followed suggestions from the warning announcement made by the community residents' committee and moved our possessions … we knew the peak water level would be higher than the previous year, therefore we must move our possessions (PA).*

Several other participants also confirmed that their families' decisions were based on the warning information from the community residents' committee.

> *If the community residents' committee told us the water would reach our place, normally it would, and we should move our possessions to the safer place (PD).*
>
> *If the community residents' committee urged me to move our possessions, I would follow their suggestions … we did not hesitate to make the moving decision, as long as the information was from the community residents' committee, we decided to move (PF).*
>
> *We followed the moving warning announcement from the community residents' committee (PG).*

Again, the estimated peak water level of the flooding was the key reason for the families' decisions. The estimated peak water level helped the families to justify the potential threats to their safety and property, thereby assisting them to decide if they should pack and move their possessions or to evacuate.

> *We will make moving decision according to the water level … we decided we would not move possessions due to the peak water level, we knew that the water would only reach the second floor (PC).*
>
> *We moved our possessions to the second floor, kept them at the stair well. If the water went up, we would move them to the third floor, if it would not, we just left them alone. Actually, we knew the water level would not reach that height (PI).*
>
> *The moving decision was made by the information and the water level (PF).*

In addition, the constantly updated water level was another factor which helped some families to make their decisions. They kept watching the water levels after the water started to rise and made their moving decisions accordingly. In their opinion, the moving of possessions would cause unnecessary property damage and physical fatigue; therefore, although they trusted the information from the community residents' committees, they still had a leave-things-to chance attitude. In turn, they did not move their possessions immediately; instead, they monitored the water levels constantly and made their decisions later.

> *To be honest, we did not move our possessions soon after we received the information from the community residents' committee; instead, I kept watching the*

water level at the bus station, and I found the alley was flooded, then I run fast back home, and started to move our possessions. While we were moving, we still kept an eye on the water level, and we had sort of feeling, if the water level would not reach our apartment, we might waste our energy to move the possessions. We did trust the information, however we still kept watching (PG).

Making moving decision depends on the water level. If the water will reach our residential place, we will move; however, if it won't, it waste energy to do that (PM).

Some participants' families set up an 'in-danger' standard, signifying that if the water rose into the potential danger zone, they would make appropriate decisions.

I packed the valuable belongs. When the water reached the wine factory, we decided to move to the high place (PI).

We kept watching the water level during flooding, if the water reached the second floor, we had to move to the third floor (PJ).

We decided only if the water reached the certain level would we evacuate…We watched the water level, if the water kept rising, we had to evacuate as soon as possible. (PL)

In addition, a change in the water level was an indicator for families to make cleaning decisions because they knew that the best time to clean the muddy rooms was when the water started to recede.

The flooded rooms were very dirty. Once the water started to go down, we should begin to wash the rooms, otherwise it would be very difficult to clean the muddy clays. I kept watching the water level of our flooded apartment (PA).

I stayed with my sister in her apartment one night. The next night we went back home to clean the rooms. When the water started to go down, it was the best time to start cleaning, otherwise the muds would be very difficult to clean (PJ).

Before water went down thoroughly, we started to wash the muddy rooms (PF).

4.3.4.2.2 Making decisions according to other's suggestions and actions

Families considered other people's suggestions and actions, such as their neighbours, the police, and the patrol people, before they made their decisions. This strategy illustrated families' social interaction with people around them, which helped them to interpret their situation and to take action accordingly.

The suggestions and activities of neighbours were particularly valuable for many families. They observed the actions of their neighbours during the flooding and interpreted their behaviour as signs of the risks of the upcoming flooding. Therefore, they made decisions based on their neighbours' activities.

Actually, if everyone believes that the water level would go up, we will make the moving decision (PD).

I and my husband discussed when and where should we evacuate. We decided if we saw most of our neighbours started to evacuate, we would evacuate as well (PL).

We did not fear because all my neighbours stayed at home; however, if all of them evacuated, we might be scared. But all of them stayed. Yeah, we observed our neighbours' action (PK).

In addition, the interaction between families and their neighbours allowed them to exchange the meanings they attached to the water levels, which resulted in the subsequent actions they would take.

I saw my neighbours moving their possessions. I asked them the maximum water level. They told me the water might enter into my home and suggested me to move possessions (PA).

We need to consider our neighbours' ideas, observe if others move possessions or not. … However, if others suggested us to move the possessions, we should follow their suggestion (PC).

Families also received suggestions from other people, such as policemen and patrol people, and observed other people's behaviour during the flooding, and then made their decisions accordingly.

We started to move possessions after we saw policemen took actions … we saw others started to move possessions, yeah, lots of people began to move possessions, therefore we followed their actions (PA).

If the patrol people ask us to evacuate to ensure our safety, we should evacuate (PN).

4.3.4.2.3 Making decisions through own judgement

After accessing information through various channels, families made their own judgements on the potential threats of the upcoming flooding on their families' safety and possessions, and made their decisions accordingly. These judgements were influenced by each family's own situation and context. Indeed, it was a challenge for many families to make their final decisions according to their own judgement due to the uncertain consequences of their decisions.

Some families considered the potential financial losses and physical fatigue caused by moving possessions, whereas others worried about their possessions being damaged by the flood water, and the corresponding financial loss when making their packing and moving decisions. All these considerations affected the families' final decisions, which can be seen in participant C, D, and J's statements.

We kept updating the information every day. We decided not to move possessions, it will cause financial loss if move the possessions (PC).

Normally, we moved the possessions in advance. They would inform us. We need to make the decision ourselves. If the water did not rise to our place, we moved the possessions, which meant we wasted the energy (PD).

I worry about flooding during the flood season from July to August every year. Last year, we did not experience flooding. However, I heard the flooding information from other people, they said the street close to the bank of the river was flooded, and the water might rise up. Therefore, I decided to move the possessions. However, the water did not go up (PJ).

4.3.4.2.4 Making decisions according to safety and health

Some families made their decisions based on the safety and health of their family members.

Ensuring safety is the priority. If you can't evacuate, who can save your life? Lots of people need help at that time. If the water reach to the first floor, no, just this step, we will evacuate as soon as possible. If we can't evacuate and being trapped, what will happen if the building is collapsed? We worry that the building will be collapsed by the water. It is better to evacuate early. At least it will be much safer than being trapped at the building (PL).

We stayed with relatives for around 1 month. We have to wait until the wet apartment dry enough to return home. Otherwise it is easy to catch disease (PA).

4.3.4.2.5 Making decisions collaboratively

Apart from having a decision-maker in some families, quite often, decisions were made through extensive discussion. According to the participants' statements, many family members were involved in making decisions in a collective manner. Family members achieved agreement through their discussions. Even though some families had decision-makers, they still communicated with other family members and valued their ideas before they made their final decisions. Family members engaged with the problems and contributed their understandings and ideas to the difficulties through the discussion process. This interactive process promoted the possibility of achieving better solutions and adopting constructive strategies.

In several of the participants' families, decisions were made by the parent couples collectively through discussion.

I discussed the packing and moving strategies with my husband, and shared the idea together (PH).

I and my husband discuss together to decide the evacuation route and how to get ready before water went up … I and my husband made decision together. Both of us thought about the coping strategies of the flooding and reached an agreement eventually (PL).

I and my husband discussed and decided to pack and move our possessions to the safer place … (PK).

In many families, children and adolescents did not participate in the decision-making process, because they were too young or because it was thought that they should concentrate on their studies.

I discussed with my husband after receiving the warning information. My daughter is too young to join the discussion (PD).

My daughter was the second year high school student, she was busy in studying … she asked me when should we pack and move the possessions, I told her she should not think too much about that … (PJ).

Participant N's family often had open discussions with their adult daughter about family issues and she always took part in the family's decision-making processes.

In our family, we always discuss family issues together, share our ideas, and eventually reach an agreement with the best option. We don't have a single decision-maker. We normally discuss with each other. For example, if my daughter is not at home, we will call her and ask for her suggestion. We will consider all the ideas from the whole family members before we make the final decision. If one of the family members did not agree, you could raise your concern, or offer your suggestions. Then all the family members discussed again, and found the best way to solve the problem. This is helpful, especially when our family experienced difficult situations (PN).

4.3.4.3 Taking action

Taking action helped families to prepare their strategies, reduce potential financial and safety risks, and mitigate their psychological distress. These actions included developing an action plan for the upcoming flooding, implementing actions to get ready in advance, evacuating to ensure safety, cleaning and disinfecting the flooded rooms, re-establishing family businesses, and going back to school to restore family routines as soon as possible after the flooding. In terms of the long-term benefits, participants' families took protective measures to lessen the potential financial loss from future floods such as changing residential location, applying tiles to the walls, or using plastic bowls. All these actions and changes helped the families to solve problems caused by the flooding and facilitated them to becoming stronger in the face of the flooding, including upcoming, existing, and possible future flooding.

Families took actions collectively to fight against the flooding, with all individual family members uniting to cohesively cope with the disaster.

Some participants described the adult couples taking action together to deal with the flooding.

I and my husband dealt with the flooded rooms together. We are a family, therefore we should take actions together (PA).

I and my husband moved possessions and cleaned the flooded rooms together (PF).

In the preparation stage for the upcoming flooding, we took actions together. I was mainly in charge of packing, my husband was responsible for ensuring electricity and gas safety. He was the last one to evacuate, and turned electricity and gas meters off ... we must unite to deal with the upcoming flooding, that was for sure (PE).

Several participants mentioned that, apart from the couples, other family members also took actions as a team.

My son and daughter-in-law all joined us for packing and moving possessions (PE).

My daughter was on flood leave from the school, she helped me with packing and moving (PB).

My daughter was on flood leave from their school. She helped me to look after possessions and monitor water level (PJ).

My children were on flood leave from the school, and joined us to move possessions (PK).

Our family moved the possessions by ourselves. My grandchild helped to move the small items, and I and my husband did the packing together (PG).

4.3.4.3.1 Getting ready

Flooding also destroyed family routines. For instance, children could not go to school, family restaurants had to close, and adults could not go to work. The only activity they could undertake was getting ready for the upcoming floods. Getting ready helped families to mitigate the potential impact of the flooding on their safety and possessions. According to the participants' statements, families conducted many preparation strategies to protect them from the worst consequences and to overcome the possible devastating situations caused by the flooding. Getting ready included two aspects: getting mentally ready (having a plan) and physically ready (packing and moving, and preparing sufficient supplies). Through accessing and judging the information, families estimated the potential risks of the upcoming flooding, considered their possible strategies, and took action accordingly.

4.3.4.3.1.1 Having a plan

The participants acknowledged the importance of preparation, and had relevant plans in mind in advance. They considered the proper time and suitable shelter for packing and moving, where they might evacuate to, the vehicles needed for moving their possessions, and who they might seek assistance from. Getting the mind ready was the initial step in encountering the threats from the upcoming flooding, as indicated by participant F:

We did not have a complicated moving strategy in paper work; instead, we had it in minds (PF).

Participants C, K and H's descriptions demonstrated the families' moving and evacuating strategies they had in mind in encountering the upcoming flooding. Importantly, even if their apartments might not be flooded directly according to the predicted water level information, if their residential area was in danger, they were still mentally prepared.

We should consider the place for evacuating and moving possessions in case the flood reaches our apartment. We might go to my eldest daughter's place because she lives in a higher area … if we decide to move possessions, we will consider the place for storing the possessions, how many people should we have to move

the possessions, what we should prepare for the daily life, etc (PC).

I and my husband discuss the evacuation time and place, and we decided that if water reached the third floor we should go to the highest level of our building (PK).

We decided if the water went up, we would move possessions to the higher floor. We packed some clothes and if the water went up, we just took the clothes with us, and let the furniture alone (PH).

4.3.4.3.1.2 Packing and moving

Relevant actions were taken soon after families made their packing and moving decisions. The participants described different packing and moving strategies based on their own experience. Indeed, many had various practical strategies based on their own situation.

Timely packing and moving was an effective way to protect families from financial loss. Many participants indicated that they urgently commenced their preparation activities soon after they received the warning information.

We started to move possessions soon after the water started to go up … we moved all the possessions otherwise they would be flushed by the flooding water … we needed to find vehicles for moving possessions (PD).

Soon after we received the information, we managed our family to get ready. We started to pack our possessions (PH).

Packing is the first step to get ready … we moved our possessions to the shelter school (PE).

We moved all of our possessions while we experienced flooding in 2010 and 2011. We moved our possessions to the stairwell … (PF).

I had some crops at home, around 500 kilo wheat, I packed them quickly and moved them to the safer place … (PG).

However, participant J indicated that she took earlier action due to her family's particular situation.

We took the doona to our relatives place. … You know, my husband is not at home, only me and my daughter, therefore we should take actions earlier (PJ).

Practical packing and moving strategies were employed by different families as a result of their own judgement and their particular situation. Participant H described her packing strategies which were focused on convenience.

I put the doona, quilts, and sheets together into a big bag, then put the food together in another big bag. In my opinion, we needed to sort the stuffs out when we were packing, then when we sheltered outside, we knew in which bag we could find the items we needed (PH).

Some families packed their possessions and moved them all to safer places.

The bed linen and quilt were moved to the safe place, and the electricity appliances were taken to the higher place. I moved the refrigerator to the corridor, and washing machine as well. The beddings were packed into a big bag and took to neighbour's home (PA).

Some families conducted packing selectively based on the value and size of the possessions, as indicated by participants B, I and K below. This was considered to be a practical option.

I only packed and moved some small and valuable stuffs and left the heavy possessions such as furniture alone (PB).

We just took some small and valuable items, we left those heavy items at home (PI).

We packed some valuable items. Those cheap stuffs we just left them at home (PK).

Some families packed and moved their possessions on a step-by-step basis according to their observations and judgement, which presented another realistic strategy.

Because we had lots of possessions, we moved part of them after we received the information. Then we kept watching the water level, as soon as we found water went up and almost reached our place, we moved all the possessions to the safer place (PF).

We moved some items, and kept watching the water level (PJ).

In addition, families' previous experiences and lessons learnt from other people's stories assisted them to be better prepared in the face of the upcoming flooding. Participant A described her packing and moving experience during the two floods she had experienced in the past, and that her strategy had improved the second time she encountered the flooding.

I stayed at home myself, and I had no idea how to move the possessions. I simply moved the possessions from the lower place to the higher place. Also, I took some quilt to my neighbour's place locating in the upper floor of the building. I moved the possessions within one day … I moved possessions from the lower place to higher place at home in 2010, but I took all the possessions to the safer place in 2011 (PA).

4.3.4.3.1.3 Preparing supplies

The preparation of supplies was an effective way for families to maintain the basics of life and to deal with the difficulties caused by the flooding.

They described the essential necessities their families prepared before the flooding, including: food, drinking water, rice, candles, a re-chargeable torch, a charged mobile phone, a life buoy, and gas cylinders.

We prepared supplies in advance, for example, we prepared food, drinking water, etc. … We prepared rice, water for at least two days. Also, we had vegetables, pickles. … We had torch, chargeable torch. You know, torch was very important

during flooding. … We prepared life buoy before the flooding. If the water went up and we had to evacuate, we should be able to go out safely with the life buoy. … We charged mobile phone in advance. The telephone could not work during flooding, however the mobile phone worked well, no problem (PC).

… In addition, we prepared food, candle, water, gas cylinders. The water we prepared could last for at least 2 days, food could last for around 3-4 days (PE).

… we prepared bottled spring water … we bought some dry food, such as biscuit, bread (PF).

Yeah, the power was off during flooding … however, we prepared candle in advance, therefore we lighted the candles at night during the flooding (PG).

We bought the rice, vegetable oil, bread, biscuit, and cooked the rice. We prepared candle, torch, you know the power would be off and the water supply would not be provided during flooding. We prepared water, and boiled water for drinking. Also, we had pickles as well. Normally, it wouldn't last long, just a few days (PH).

We bought some food such as cakes. They were enough for us during the flooding. … We prepared candle (PI).

The participants also mentioned that their families prepared medications in advance in case they had any medical problems during the flooding.

Soon after we received the information, we prepared some medication, say, antibiotics for curing infection disease such as the commonly occurred gastrointestinal disease after flooding (PE).

We had some Chinese traditional medicine such as Ageratum-liquid which could be helpful if we suffer gastrointestinal disease after flooding (PF).

We bought some medicine, actually, we always keep some medicine at home, such as the one for curing the flu (PI).

Furthermore, families prepared particular medications for the needs of family members' chronic diseases.

We prepared some medications, especially the medication I and my husband need, such as medication for curing cerebral thrombosis and hypertension (PH).

4.3.4.3.2 Evacuating

Timely evacuation was an important way for families to ensure their safety. Families either had their evacuation routes in mind or evacuated to a safer shelter due to the rising water.

When the water reached the wine factory, we decided to evacuate to the high place. We drove our car to the top of the hill. That place was high (PI).

Our family choose Suiyang Mountain as our emergency evacuation place because it is high, people evacuated to there during the devastating flooding in 1981, the most highest water level flooding in our city. Therefore it should be safe for us to stay (PL).

4.3.4.3.3 Getting back to normal

Families were willing to return home and restore their life routines as soon as possible after the flooding; therefore, they made great efforts to minimize the negative impacts of the flooding, including cleaning the wet and dirty apartments in a timely manner, disinfecting and painting the cleaned apartments, changing damaged furniture, checking and repairing electrical appliances, returning home, and going back to school and work. All these activities were conducted to facilitate the families to rebound from the disaster as quickly as they could.

4.3.4.3.3.1 Returning home

Families were eager to return home and settle down shortly after the flooding; therefore, they actively engaged in cleaning and renovating flooded rooms, disinfecting the flooded home to protect them from disease, dealing with wet electrical appliances, and then returning to their apartments.

> *When the water went down, our family members cleaned the watered room by ourselves. After that, I asked the workers from Renovation Company to renovate the rooms for us. … I asked my daughter to buy the instrument for the disinfection, after we cleaned the watered rooms, we disinfected them, then left the door opened to dry the rooms (PB).*
>
> *Soon after the water started to go down, we went back home to clean and disinfect the watered rooms. Then we opened all the doors and windows to let the wind go through the rooms and made them dried. …We returned our home after the rooms dried. We stayed outside for around 1 month (PI).*
>
> *When the water went down, we cleaned the rooms, then dried the rooms by a blow dryer. After that, we moved the possessions back home from neighbour's place. I asked the worker to change the electricity meter, then the electricity supply restored. After that, I checked the electricity lines by the voltage tester (PJ).*

4.3.4.3.3.2 Restoring normal life

Families took action and put much effort into getting back to normal and restoring their routines.

Many participants mentioned their families re-started their family businesses to restore their finances.

> *We were busy in cleaning and renovating the watered rooms; after that, we could run the restaurant business as soon as possible (PD).*
>
> *Our family experienced financial loss. We should work hard, try our best to run our business as soon as possible (PE).*
>
> *I needed to re-run my business. Then I returned home … after I cleaned the watered rooms, I started to run my business (PJ).*
>
> *After we cleaned the watered rooms, we re-run our business, you know, after flooding, every household would go out to buy stuffs; therefore, we run our business soon after cleaning (PF).*

Families also used their savings to deal with the financial issues caused by the flooding.

> *We used our savings to deal with the financial issues ... we had savings, therefore we did not need the financial support from my son after flooding (PF).*
>
> *We experienced financial loss caused by the flooding, and we had to spend money on cleaning and renovating our rooms. We used our savings to deal with this difficulty, which is very helpful (PE).*

Participant B depicted how their family dealt with the problems and started to enjoy life again.

> *After the computer and the rooms were dried, we restored the electricity. I checked the electricity to see if it was leak or not … soon after the air conditioner could work again, we turned it on, we felt very comfortable and enjoyed our life again (PB).*

Other participants described how their families resumed their normal life after the flooding.

> *… Our family members just did whatever we need to do after the water went down. Some of us went back to work, some of us cleaned the rooms (PE).*
>
> *… but only one or two days after the water went down, my daughter went back to school, because her school was not watered. Her teacher made up all the lessons they missed (PJ).*
>
> *Soon after the watered streets were cleaned, we could go outside easily and do exercise like usual (PL).*

4.3.4.3.4 Being prepared for future disasters

Relevant actions were taken, or either temporary or permanent changes were made by families in order to prepare for future flooding. Changing their place of residence permanently was one strategy used to reduce the risk of enduring financial loss from future floods. One participant stated that her family relocated from a high-risk flood zone to a lower-risk area, while others expressed their willingness or intention to relocate to a safer place in the future if a flood was to strike their residence again.

One participant's family changed their residence permanently after experiencing flooding twice in the same apartment which, in the long run, appeared to be the best option to protect her family from repeatedly suffering severe financial loss.

> *We relocated to another place after experienced flooding twice. We do not live at the previous place anymore. We fear of flooding and have to move (PA).*

A few other participants expressed their expectations of moving to a safer place, although they did not take subsequent action.

> *I don't know if there will be flooding again or not. If I experience flooding like the year before I encountered again, I might leave here … I can't stop flooding. If this place is flooded again, I would leave here permanently (PD).*

It is not good to live at the ground floor … if I buy another apartment, I would not choose ground floor anymore, I will choose the second, third, or fourth floor (PG).

If you can choose, you must choose the higher level of the building. You might be scared if you experience flooding, but your property would not be damaged if you live on the higher floor. However, if you choose the lower level, you will be scared, and your property will be damaged, every year (PL).

Several participants outlined the strategies their families used to avoid financial loss and reduce the physical workload from potential flooding in the future.

We had the watered wall painted after flooding, but the mildew came out, then we put tiles on the walls, most of my neighbours preferred putting tiles on the walls, then we won't worry the walls will be damaged by flooding in the future. If the walls with tiles are watered, what we need to do is to clean them, which makes things much easier (PD).

… we changed all the ceramic bowls into plastic bowls, because the ceramic bowls were easy to be broken; however, the plastic bowls could withstand a fall. In addition, we tiled the walls and the platform for storing stuffs between the roof and the top of the walls, you know, the tiles won't be damaged by water. Therefore, I can put some possessions on the platform if the flooding occurs in the future (PE).

Anyway, I will change all the furniture into water resisted furniture next time if I experience flooding again, then I won't worry about it anymore. If I can make it, no matter how frequent the flooding might be, I won't worry about it anymore … this is my future plan (PB).

In addition to taking immediate action, the families were also ready to apply the knowledge they had learnt from their previous flooding experience to prepare for future flooding.

Next time if the community committee informs us to move, we will move our possessions immediately (PG).

If we experience flooding in the future, we need to take food with us while water-resisted possessions can be left at home. Those ideas I have gradually gained after experienced previous flooding. Actually, this is not a sort of formal disaster plan, but anyway, it is the ideas we already have, and we know how to deal with the future flooding. We need to be prepared, just in case, not only for future disaster, but also for other unknown difficult situations (PE).

Yeah, we go out to the bank of the river to observe the water level every year during the flooding season. That is a sort of habit we have now (PM).

4.3.5 Easing minds

'Easing minds' was a term which was frequently used by the participants when mentioning how they reduced their sense of worry and panic. It was identified as a major category because it demonstrated families' capabilities in adjusting, or adapting psychologically, and in building psychological strength in the face of the flooding. Families used several methods of easing their minds before, during, and after the flooding which resulted in reduced levels of fear, worry, and frustration. Avoiding, accepting, going with the flow, having a peaceful mind, being positive, not

fearing, and making meaning of the flooding contributed to the families' psychological adjustment and adaptation. In other words, 'easing minds' represented the psychological capacity that the families' had which helped their adjustment and adaptation to disaster. This section used some of the participants' words as the in vivo codes because the properties of these terms vividly revealed the participants' meanings, which led to a deeper understanding of their actions (Charmaz 2014, p. 134).

4.3.5.1 Avoiding

The practice of avoiding pulled people's attention into the present and pushed the uncertainty of future disaster further away. This was a strategy employed by families to manage and reduce their anxieties about the flooding. Indeed, it seemed to be a negative aspect of their thinking; however, for some families, it proved to be helpful when they felt worried or scared.

> *Don't think too much, otherwise your life will be full of anxiety. I tell myself that flooding won't occur anymore. I ease my mind by this way … I even don't want to think about that, otherwise I will feel more anxious (PL).*

In addition, the participants used the word 'hope' to psychologically deny the possibility of future flooding.

> *We hope there is no flooding anymore (PF).*
>
> *I hope no flooding anymore (PG).*
>
> *I hope no flooding or other disaster occur anymore (PM).*

Furthermore, avoiding thinking about the negative consequences helped the families to reduce their stress and sense of fear during the flooding.

> *I hope the water won't go up to the upper floor of the building. Otherwise, all of us who live in that building, even we stay in the higher place will be scared … we live at the bank of the rivers; we can't keep worrying all the time. If we keep thinking about flooding, we might not eat well. We just have the good wish that no flooding occur anymore and ease our minds (PL).*

4.3.5.2 Accepting

Accepting was considered to be an effective way for families to ease their minds, reduce their anxiety, become psychological stronger in the face of future uncertainty, move on from their past flooding experiences, and to overcome the frustration of the current flooding. As participant G indicated:

> *This is the natural disaster, we have no choice (PG).*

Many of the participants addressed their acceptance of the flooding and other disasters that might occur in the future.

4.3.5.2.1 Accepting future uncertainty

The participants expressed their understanding of, and attitudes towards, natural disaster. From their points of view, natural disasters, including flooding, were unavoidable, and worrying or panic would not prevent the occurrence of flooding, but may worsen people's mental health.

> *Nowadays, natural disaster occurred frequently, If you feel scared every time, you put psychological pressure on your own (PN).*

The participants also discussed how they dealt with the future uncertainty of disaster. In their opinion, people should accept the inevitability of future incidents.

> *We have to accept the possibility of experiencing flooding again. We won't worry too much. We just need to adjust psychologically and accept … this is natural disaster, we have no choice (PL).*

Many participants pointed out that their families not only accepted the possibility of flooding in the future, but would also face it positively and, as a result, took relevant action to prepare for such an eventuality.

> *We are not happy with the flooding, it is undoubtedly true. However, we have no choice; no matter how we worry about the flooding, it still can't be avoided … flooding is unpredictable, it is the natural disaster … in my opinion, we can't avoid difficulties; we must face it (PD).*
>
> *If the unexpected things happen, we can't escape from them. If the disaster occurs in the future, what we can do is to face it, because we can't get rid of it (PM).*
>
> *We don't worry too much about the flooding now, because the flooding is unavoidable. What we need to do is to get ready. We have to do like this. Worrying can't stop flooding (PE).*
>
> *We hope there is no flooding anymore. We felt very tired to move the possessions. But we have no choice if the flooding occurs again. What we need to do is to pack and move possessions in advance to get ready (PF).*

4.3.5.2.2 Accepting what has already occurred

The participants indicated that they accepted their past disaster experience and the consequences, and renewed their lives afterwards. They described the financial losses and other negative consequences their family underwent after the flooding. However, they recognized that all the residents living in the flood zone were affected, so they should accept the fact.

> *When the flooding occurred, nobody could stop it … though my family experienced financial loss, we should accept the fact (PA).*
>
> *This is natural disaster; it influenced not only my family but also others. … This is the natural disaster, we can't blame anybody … we had no choice, our apartment already was flooded, and we had to face the fact (PG).*
>
> *Flooding influenced my family. However, every family experienced the flooding,*

we could not blame anyone … flooding already occurred, not just my family was influenced, but all the residents who lived on the ground floor were flooded. I had to think like this. You know, in some people's business place, many electrical supplies were damaged; actually, all of us experienced the flooding (PI).

The participants also mentioned that they would not be bothered by their past flooding experience because they still needed to move on.

Fear did not help. Anyway, I would not think too much because the flooding already occurred. What we needed to do is to ease our minds (PA).

In my opinion, the flooding already occurred; we had no choice but to accept it. Business still needs to run. Flooding keeps striking us, but our life still needs to move on (PD).

In terms of the natural disaster, like the earthquake occurred in recent years, I accept if it occurs. If I have nothing due to the earthquake, I won't be hurt. I accepted. It happened, and you had to experience (PL).

I did not feel any negative psychological influence on me after the first time I experienced flooding. At least, I did not think too much after that. I just let it go (PN).

4.3.5.2.3 Accepting the inconvenience

The participants indicated their acceptance of the inconvenience resulting from the flooding, especially evacuating from their own home and sheltering with others. It was difficult for family members to live outside of their own dwellings.

We had to stay with my mother-in-law for more than one month during the flooding. We had no choice, we felt like the refugee, because sheltering with others, even with mother-in-law's family, was inconvenient compared with our own home. I preferred to stay at my own home, which was more comfortable. However, this situation was caused by the unavoidable natural disaster, we had no choice (PA).

Life was not convenient when stayed with my aunt … however, we had no choice during the flooding (PI).

4.3.5.2.4 Accepting fate/leaving things to chance

On one hand, the participants emphasized that their fate was destined; however, on the other hand, they maintained hope that fate would favour them.

We did think about if the building would collapse or not … anyway, if it did collapse, we had to accept the fate. We had sort of leave-thing-to-chance thought, we believed that it wouldn't happen ... oh, yes, we had sort of leave-thing-to-chance thought. But we still felt scared, we worried that if the water kept going up, the building would collapse. Yeah, we did feel a little bit scared ... we did not think too much, what we thought at that moment was if the severe consequences did happen, we could not avoid but accepted it. We still had leave-thing-to-chance kind of thought (PC).

That is the fate; you can't do anything but accept. We believe the fate. Actually, fate is destined; you can't change it if you are supposed to die (PG).

If it is collapsed by the water and we died, that is our fate, yeah, we just think like this (PK).

4.3.5.3 Going with the flow

Going with the flow was another way in which the participants' families eased their minds. In the Chinese context, going with the flow was a traditional way of thinking in Chinese communities when confronting difficulties or life's challenges.

My attitude towards flooding is to go with the flow (PM).

I am not worry too much about the flooding, just go with the flow. We should adjust psychologically to reduce the psychological pressure of being flooded, make it flow (PI).

Participant L interpreted the meaning of psychological adjustment as going with the flow.

Adjust psychologically means go with the flow … when we faced the flooding, we did feel worried, we had so many questions such as how to deal with the flooding? What kind of actions should we take, what was the water level? etc. We need to adjust psychologically, ease our minds, and do whatever we need to do (PL).

4.3.5.4 Having a peaceful mind

Having a peaceful mind was another common way for Chinese people to ease their minds when encountering emergencies and difficulties. The participants explained the importance of having a peaceful mind in adverse situations.

You know, happiness is a kind of feeling. If we ease our minds, and have a peaceful mind towards any difficult situation, we will feel better … my business runs smoothly and gets better and better. It might be attributed to the flooding. If we interpreted the unpredictable or unexpected things by an idealist way, we could keep a peaceful mind. You won't immerse into the disasters. We should remember every happy moment … frankly speaking, most of the time in our life was full of unhappiness. This kind of attitude helped me to keep calm and cope with the flooding while others were anxious … in my opinion, we should not be in a rush; we should keep calmness during the flooding. I never made myself frustrated (PB).

Our family has peaceful mind when we face up to the difficulties. Though you feel worried, the difficulties are still there. We have to deal with it with peaceful mind (PE).

I and my husband have peaceful minds towards life and death. Both of us are old people, what we need to do is to look after ourselves, and enjoy the life (PK).

4.3.5.5 Being positive

Having a positive attitude was identified as another important way in which families overcame their sense of panic towards disasters.

In my opinion, we need to face flooding positively ... I shared my optimistic

attitude towards flooding with my daughter … I want my daughter to be positive when face up to the difficulties ... we should face disaster in a positive way (PB).

My family is optimistic (PF).

I will try to solve the problem in a positive way rather than only considering negative aspect (PN).

4.3.5.6 Not fearing

The participants highlighted the confidence they had when encountered the flooding. This confidence was based on their psychological strength, their knowledge and past experiences, and the connection with their neighbours.

Some participants stressed that people need to be psychologically strong when facing flooding.

We should be strong enough to deal with the flooding, especially psychological condition (PB).

I had strong psychological condition. We can't avoid the disaster, we must face it (PD).

In addition, several participants explained why they did not feel fear during the flooding. Confidence in the quality of their residential buildings and the location of their home was an important factor in helping them to feel less anxious.

Yeah, we did not fear when we decided to stay at home during the flooding. We knew the structure of the building, it had good quality even could withstand earthquake. Thus we did not worry about it (PC).

We did not worry about the building. We did not think it would collapse by the water … the foundation of this building was very strong; it would not be influenced by the water. I trust the quality of the building (PF).

We knew that the water level would not reach our home, so we did not worry too much … anyway, both of us thought we should not be scared. Our apartment was in a high place, the water level did not reach there in recent years, except the previous flooding occurred in 1981 (PM).

Connecting with neighbours was another way of overcoming panic, which demonstrated the meaning of social interaction and connection.

We were neighbour for years in this building and my family kept in touch with neighbours during the flooding, we did not fear (PE).

Flooding? We did not fear or worry, all my neighbours stayed at home. If all of them evacuated, we might be scared. But all of them stayed. Yeah, we observed our neighbours' action (PK).

Prior flooding experience also helped families to reduce their anxiety and fear.

Actually, I was frightened during the previous devastating flooding, but this time,

we did not fear (PH).

I was not scared of flooding. Compared with the flooding occurred in 1981, flooding occurred in recent years was small-scale (PM).

We didn't feel scared. Because all of us experienced the severe flooding in 1981 … you know in some situation, if you had the first experience, you would not be panic if you experience the same situation the second time. But if you had never experienced, you would feel scared, because you didn't know the consequences. We already experienced the severe flooding in 1981, and we knew the strategy to deal with flooding (PN).

Trust in government also helped families to mitigate their fear.

We knew we would be rescued if we were in danger. We saw that kind of situation on TV. People who were trapped by the flooding were rescued by others (PK).

You know, for people who were trapped in the building, the community residents' committee would send rescuers to deliver food for them, you would not be starving. The policy of the government is very good. Nowadays, our country is getting better and better, the government will look after the ordinary people like us during this situation. If the disaster occurred, the government would send the patrol officers to deliver food to people who were trapped in the building. So, we don't worry too much … and the communication is very convenient, if you want to evacuate, the rescuers will take you out with the boat and send you back home (PM).

The water level information helped the families to estimate their risk also reduced their sense of panic.

We knew the water level, then we did not fear ... we knew the estimated maximum water level; it would only reach the second floor. We live on the sixth floor, therefore we don't need to worry about that, still 4-level floors to go (PC).

4.3.5.7 Making meaning of the flooding

One participant interpreted the flooding in a humorous and positive way, and mentioned his perspective several times in the interview; therefore, this might be an effective way for his family to interpret their difficulties and reduce their anxiety and anger. However, it should be noted that the financial status of this participants' family was far better than the other families in the study, which may have shaped his interpretation of the influence of flooding.

Flooding is a good thing, the more flooding, the more fortune. My business runs quite well during those two years accompanying with flooding (PB).

4.4 'Acting and Easing' : the process of family disaster resilience

The five major categories outlined above are related to each other and are involved in the dynamic process of family disaster resilience. The overall process of family disaster resilience is represented through the core category 'Acting and Easing' which emerged out of the major categories. This core category is linked to all the major categories and explains the relationship

between the major categories. ‘Acting and Easing’ outlines the dynamic process the families went through in utilising their families’ resilience factors, which helped their families to prepare for, respond to, recover from, and become stronger in response to the flooding.

On one hand, ‘Acting’ demonstrates the active physical actions and behaviours the families performed to deal with the adverse situation caused by the flooding. ‘Acting’ represents the process of families utilizing their social resources and connections and family inner resources through communication to solve the problems caused by the flooding. The link between the four major categories ‘Having social resources and connections’, ‘Having family inner resources’, ‘Communicating’, and ‘Solving problems’ is illustrated by the term ‘Acting’.

For example, ‘having social resources and connections’ helped with ‘solving problems’ through ‘communicating’ which led to ‘Acting’. The community residents’ committees were one of the families’ social resources. When the flooding occurred, the community residents’ committees communicated with the families frequently, and helped them to solve their problems. This has been demonstrated previously in the relevant sections above, and is typified by the words of participant A:

> *We followed suggestions from the warning announcement made by the community residents’ committee and moved our possessions … (PA).*

Relatives were another social resource of the families. When flooding stuck their residential area, communicating with relatives helped them to solve their difficulties.

> *My adult children called us and asked us to evacuate to their place (PK).*
>
> *My husband called his brother-in-law and asked him to go to our apartment to have a look and help me out (PJ).*
>
> *Our extended family is solidarity. Though we have our small family and focus on our own small family in the daily life. But if it our small family encounters any difficulties, especially severe difficulty, if we call our relatives, they will be more than happy to help us out (PN).*

In addition, ‘having family inner resources’ helped with ‘solving problems’ through ‘communicating’, which resulted in ‘Acting’. ‘Family norms’ were one of the family inner resources. Families applied the norms that had previously been established in daily life through communication to deal with the difficulties of the flooding. For instance, the ‘family roles’ of ‘decision-maker’ or ‘collective decision-makers’ helped families to finalise their decisions in the face of the flooding.

> *I and my husband always discuss with each other regarding family issues. We don’t have a fixed decision-maker, instead we try to find a best way to solve the problem based on our discussion. For example, we made the return decision together (PF).*

‘Having previous experiences’ helped with ‘solving problems’ through ‘communicating’ with other family members and to take corresponding action.

> *I used to run a big restaurant in Guangdong. I was in charge of tens of staff. I must know everything, especially how to disinfect the restaurant … this was our life experience and embedded in our life. After flooding, I told my daughter to buy the backpack disinfectant sprayer and disinfected our apartment (PB).*

On the other hand, ‘Easing’ illustrates the process of families’ psychological and mental adjustment and adaptation to the flooding, an event over which they had little control. The actions they employed to reduce their psychological stress is demonstrated by the term ‘Easing’ which is strongly related to the major category of ‘Easing minds’. Therefore, the core category of ‘Acting and Easing’ captures the entire process of family disaster resilience and conveys the meanings found in the five major categories.

In addition, the core category not only presents ‘Acting’ and ‘Easing’ as parallel processes, but also illustrates the interaction between these two processes.

The ‘Acting’ process helped to ease people’s minds, as indicated by participants A, E and L.

> *We already evacuated from the building, therefore I didn’t feel scared as life was the most important thing (PA).*

> *We were neighbouring for years in this building, and our family kept in touch with neighbours during the flooding, we did not fear (PE).*

> *Sometimes, if we think about flooding, we feel a little bit worried. Actually, we do worry if the flooding will occur again in the future … in my opinion, the best way to overcome this kind of anxiety is to get ready after we receive the warning information. We can’t do anything to stop flooding, no way. We need to ease our minds (PL).*

Also, ‘Easing’ helped to activate actions and solve problems. As participant N indicated:

> *Our family had positive attitude towards disaster. Umm, how to say, just dealing with the problem when it comes (PN).*

More importantly, the findings drew these two processes together as an ongoing process which shows the dynamic pathway of family disaster resilience. The ‘Acting and Easing’ process helps families to become stronger. As previously indicated by PE:

> *… we changed all the ceramic bowls into plastic bowls, because the ceramic bowls were easy to be broken; however, the plastic bowls could withstand a fall. In addition, we tiled the walls and the platform for storing stuffs between the roof and the top of the walls, you know, the tiles won’t be damaged by water. Therefore I can put some possessions on the platform if the flooding occurs in the future (PE).*

This was further supported by PN:

If you experienced some adverse situations in the past, you would not be very panic. If you haven't experienced, you must have kind feeling being panic and scared … if you face similar situation, you won't be very panic, at least you know how to react (PN).

4.5 Summary

This chapter has presented the findings arising from the data. In total, five family resilience factors were identified as the major categories in the present study. The core category of 'Acting and Easing' emerged from the data analysis and represents the process of family disaster resilience and also links the important resilience factors and the relationship between them. The next chapter will provide a conceptual analysis of each category as well as the family disaster resilience model.

CHAPTER 5 DISCUSSION

5.1 Introduction

The data presented in Chapter 4 informed the 'Acting and Easing: the process of family disaster resilience' model which was developed in response to Chinese families' flooding experiences in Chongqing, China. This chapter draws on the data and the relevant literature to discuss each major category, and the family disaster resilience model for the Chinese context. First of all, the Chinese socio-cultural context of this study is introduced in order to better understand the interpretation of the proposed model developed from the information provided by Chinese families residing in urban communities in a district in Chongqing, China. After this, each individual major category presented in the previous findings chapter will be discussed as a family disaster resilience factor. In addition, the linkages between the factors will be illustrated. Then the family disaster resilience model, known as the 'Acting and Easing: the process of family disaster resilience' model, is presented to illustrate the interaction between each resilience factor and the core category, and to demonstrate the dynamic process of family disaster resilience. The existing literature and a number of theories will be used to explain and clarify the categories and their relationships. Finally, the specific family disaster resilience factors and their unique interactions, as presented in the family disaster resilience model, will be addressed through a comparison of the similarities and differences of the model to extant family resilience models and relevant family resilience research.

5.2 Chinese socio-cultural context

The socio-cultural environment needs to be taken into account in seeking to understand family resilience. For example, White et al. (2002) suggested that the dynamics of family resilience can be better understood from a cultural perspective. Holroyd (2005) further supported this suggestion by pointing out that family resilience is culturally-specific. Black and Lobo (2008) also indicated that there are common family resilience factors among cultures and ethnic groups; therefore, cultural aspects should be taken into consideration when exploring the resilience of families. Socio-cultural theory (Rogoff, 2003) emphasizes that families' world views, functioning, and coping and adaptation strategies are shaped by culture (Cited in Davey et al. 2012, p. 1261). Family members are interdependent and mutually influence each other; thus, understanding culture is essential in gaining insight into how individuals and families cope with adversity (Davey et al. 2012, p. 1268).

The present research is situated in China, hence the Chinese socio-cultural context has been considered and integrated to conceptualize the family disaster resilience model developed by the present study. Han Chinese account for 92 per cent of the total Chinese population and is the

largest ethnic group among the 56 ethnic groups in China. The Han people live all over China, mainly in the middle and lower reaches of the Yellow River (Huanghe), the Yangtze River (Changjiang), the Pearl River (Zhujiang), and the Songliao Plains (Chinese Culture.org 2015). Based on the demographic data in the present study, all of the participants were of Han ethnicity; therefore, the culture of the Han Chinese is mainly presented in the following section.

5.2.1 Traditional Chinese culture and its impacts on Chinese families

Confucianism, Daoism, and Buddhism are three fundamental thought systems embedded in Chinese traditional culture which influence Chinese people's lives and contribute to the holistic nature of Chinese society (Guang 2013). Confucianism and Daoism originate from ancient China, while Buddhism was introduced from India. Buddhism has become the most popular Chinese religion since it was introduced to China in 400 AD, and has been integrated into the Chinese people's lifestyle. Although Daoism can be traced back to the Han Dynasty, it is not widely accepted (Chinese Culture.org 2015). However, it has played an important part in developing Chinese culture (Tang 2015). In the Han culture, Confucianism is considered to be a philosophy rather than a religion; its concepts and teachings have had a significant impact on the Chinese ruling class and intellectuals for the past two thousand years and still plays an important role in the Chinese community (Chinese Culture.org 2015).

Confucianism is a sophisticated set of ethical and moral rules, which contribute to the development of the norms of social morality in China (Huang & Gove 2012). Confucianism is regarded as the underpinning philosophy in understanding the Chinese family within Chinese culture (Park & Chesla 2007). Confucianism defines family as *"the fundamental unit of society",* including its economic and social functions and is guided by ethical and moral principles (K.-K. Lee (1989), (Cited in Park & Chesla 2007, p. 296).

Chinese family values have been informed by the familism rooted in the Confucian teachings (Chen & Li 2014). Firstly, Confucianism values a structured hierarchy within the family system, and advocates that the role and responsibilities of every individual should be defined clearly (Huang & Gove 2012). This can be seen from Confucius' statement, "let the father be a father, and the son be a son" (Huang & Gove 2012, p. 12). Secondly, Confucianism stresses the difference between men and women, and indicates that this difference is understood as normative in the traditional Chinese hierarchical society. The functional difference between men and women is attributed to their physical differences, women's sacred nature, and women's specific roles in human reproduction, child-bearing, and child-raising in family-centred daily lives. Men and women are responsible in different ways for the family, society, and politics. It is normal and appropriate that males take more responsibility for familial, social, and political issues. The order of society and the happiness between the male and the female will be at risk if equal rights and responsibilities between men and women are demanded. Gender-related roles are rooted in

Confucianism's understanding of relationships within the family (Wang 2011, p. 91). Again, the Confucian philosophy establishes strict rules informing traditional Chinese women's behaviours, among them "San cong si de" specifying *"three forms of obedience and four virtues"* as a guide for the *"model Chinese woman"* (Xia et al. 2013, p. 258). In addition, filial piety (Xiao) is one of the core family virtues highlighted by Confucianism (Huang & Gove 2012), emphasizing that the younger generations should respect the family's senior members and take care of them (Wang 2011, p. 97). Confucianism highlights social and family harmony, mutual obligation, and the harmony of the group rather than the individuals. This might partially contribute to the highly cohesive nature of Chinese families (Xu et al. 2007, p. 158).

Furthermore, Chinese culture values collectivism which is different from Western culture which emphasises individualism (Zheng & Gray 2015). Collectivism is a traditional Chinese value with an emphasis on maintaining interdependence and interpersonal harmony (Ho & Bai 2010). The collectivist culture highlights unity and togetherness within the family (Xu et al. 2007).

5.2.2 The changes in Chinese families during the social transition in China

The unique characteristics of the family are *"shaped by their historical, cultural, social, and economic context"* (Xu & Xia 2014, p. 32). There has recently been a rapid increase in Chinese urbanization, industrialization, and economic development which has resulted in the transformation of Chinese society (Xu & Xia 2014). For example, China has experienced a rapid economic transformation since the early 1990s, and has approximate 10% GDP growth on average annually since this time (Steele & Lynch 2013). Both family incomes and living conditions have improved, however, there are increasing gaps between the rich and the poor, the coastal and the inland, the urban and the rural. Meanwhile, the Chinese family structure, relationships, values, and beliefs have also been influenced by these socio-economic changes (Xu & Xia 2014). Although Confucianism and traditional family values are rooted in Chinese families, the significant socio-economic transformation has challenged these traditions due to the gradual exposure to Western values and cultures in recent years (Qian & Qian 2015). Through critically analyzing the existing literature and the empirical research, Xu and Xia (2014) pointed out that the Chinese family structure, values, and relationships have seen changes in line with the rapid social and economic development over the past three decades.

5.2.2.1 Chinese family structures and sizes

Chinese family structures have become more diverse along with family sizes decreasing. Although traditional Chinese extended families still exist, many other family forms have become more common, such as *"nuclear families, single-parent families, families with double income and no kid (DINKs), single person households, and cohabitant households"* (Xu & Xia 2014, p. 31). The traditional patri-local family (parents and married sons living together) has gradually been replaced by the neo-local family (young couples residing in separate dwellings from their parents).

Consequently, in comparison with past generations, elderly couples are inclined to live separately from their adult children (Xu et al. 2007, p. 158). According to the population census data in China, Xu and Xia (2014, p. 32) indicated that *"the average size of a family household was 4.33 in 1953, 4.43 in 1964, 4.41 in 1982, 3.36 in 1990, 3.44 in 2000, and 3.10 in 2010",* while *"the nuclear family was the dominant family structure"* in 1982, 1990, and 2000. However, they argue that the census data might not reflect the actual living arrangements of families because it mainly relies on residency registration. 'Hukou' is a residency registration tool used by the Chinese government to control population mobility. However, since the economic reforms, residency restrictions have been eased, and individuals can move to another place for a job or to live. As a result, a person may reside elsewhere from the residence recorded in their official registration (Xu & Xia 2014). Results from the 2006 China General Social Survey (CGSS) showed that 63.9% of Chinese families were nuclear in structure, while 34.3% were extended families. This is consistent with the census data which pointed out that the majority of Chinese families are of the nuclear type. However, the mean number of persons in one household was 5.09 according to the 2006 survey, which is different from the population census data (Xu & Xia 2014).

Indeed, the Chinese family structure is flexible and the number of household family members is quite changeable, especially for urban families. Through participation, observation, and interviews among 10 young families in Kunming City, Su and Tian (2014) analysed familial structures, living styles, and the sense of familial identification of the participating families. In contrast to Western countries, they found that Chinese family patterns present a trend of mobility and diversity represented by the idea of 'combination-and-separation', and cannot simply be categorized as nuclear or extended families. Chinese nuclear families are unique because they are tied closely to their extended family members through frequent physical interaction, and emotional and financial exchange (Xu & Xia 2014). Grandparents help their adult working children with childcare, while the adult couples are responsible for taking care of their ageing parents. Family members live either independently or together at different phases of the family life-cycle (Su & Tian 2014; Xu & Xia 2014). Therefore, even though the nuclear family is the dominant family form in contemporary China, the Chinese family structure is changeable and dynamic, and the nuclear family is often re-shaped into an extended family to meet the care needs of the small children and the aged; meanwhile, the extended family might separate into a nuclear family for certain periods of time (Xu & Xia 2014).

According to the demographic data for this study, the participants were from a range of different family types, including couple-only families, couple families with dependent children, single-parent families with dependent children, grandparent families with grandchildren, and old couple and young couple with children household families. The total number of family members in a household ranged from two to five with an average of 3.1, and the nuclear family structure (couple only and couple with dependent children, (Xu & Xia 2014, p. 35)) accounted for 57.2% of total

families. Overall, the characteristics of the participants' families were consistent with the characteristics of contemporary Chinese families, including the diverse family structures and the small number of residing family members.

5.2.2.2 Chinese family relationships and values

Chinese family relationships and values have been influenced by socioeconomic development and have experienced many changes in recent decades (Xu & Xia 2014; Xu et al. 2007). The utility of intergenerational relationships among families has been strengthened, while families have faced more challenges during the social transition (Xu & Xia 2014). Hu and Scott (2014) conducted a covariance (ANCOVA) analysis of data from the 2006 Family Module of the China General Social Survey (CGSS) which was conducted in collaboration with General Social Surveys in Japan, Korea, and Taiwan conducted annually from 2003 to 2008. The findings showed that generally, traditional family and gender values were still maintained and accepted in contemporary China. However, generational, geographical, and gender differences contributed to the different endorsement levels for traditional family values. Filial piety was strongly supported by all of the respondents, whereas patrilineal beliefs and gender roles were less well supported. Women of the 'reform and opening-up generation' presented the lowest support for patrilineal beliefs. Lower support for traditional gender roles were associated with more recent generations, higher education, women's employment, and smaller family size (Hu & Scott 2014). Similarly, Xu and Xia (2014, p. 41) stated that filial piety has not been influenced by urbanization and is still the core Chinese virtue. A survey study conducted in Shanxi and Fujian revealed that the majority of respondents in their twenties of all education levels, indicated that they would be responsible for, and take care of, their families including their parents and siblings (Hansen & Pang 2010).

In terms of collectivism, there are different views on whether it has changed, or is still maintained, in contemporary China and in Chinese families. One perspective is that there has been a rise in individualism in modern China. Hamamura and Xu (2015) explored such changes in Chinese culture through the examination of personal pronoun usage. Data between 1950 and 2008 in the Chinese corpus of the Google Books database was analysed using the Google Ngram Viewer. The findings showed that an increase in individualism, along with the fall in collectivism has been increasingly apparent in Chinese culture in recent decades, which is in line with the transformative socio-economic changes that have occurred in China over this time. Chen (2015) briefly reviewed the extant literature and found that generational issues, education levels, and gender differences have contributed to the transformation from collectivism to individualism. The older generations conformed more to the collectivist culture in comparison to the younger generations who were influenced by the influx of Western culture after the open-door policy. The education experience and the introduction and integration of individualistic cultures into the Chinese education system may have increased the younger generation's acceptance of, and transition from, the collective

to the individualistic culture. Based on a review of the relevant literature, Chen (2015) analysed the collected data through structural equation modelling. The findings confirmed that the more educated participants appreciated Western culture more than the less educated. However, another point of view suggests that traditional collectivist values still dominate in contemporary China.

Despite concerns that the individualism of Western culture might shape traditional Chinese collectivism, Xu and Xia (2014) advocated that the traditional collectivism of Chinese families and their mutual dependence still remain the dominant family values based on a critical analysis of the extant literature. Compared with their Western counterparts, Chinese family members are more likely to depend on each other to deal with challenges throughout their lives. For instance, in Chinese families, children rely on their parents financially and believe it is normal to seek assistance from their parents. Ageing parents expect their adult children to provide physical, emotional, and financial support for them if and when such support is needed. The spouse and the family are the major sources of relief and support (Xu & Xia 2014). Furthermore, Chinese families value collective more than individual interests; namely, mutual obligation and interdependence are a priority in Chinese families rather than individual interests (Xu & Xia 2014). Similarly, Ho and Bai (2010) pointed out that collectivism is still maintained in contemporary Chinese communities. This view is based on a study by Ho and Cheung (2007, pp. 139-52) which showed that Chinese people are inclined to be concerned about the happiness of other people who are important to them, rather than considering their own happiness (Ho & Bai 2010, p. 147). To summarize, the transformation of collectivism into individualism has been influenced by a range of factors, and yet collectivism is still rooted in Chinese families and maintained in contemporary Chinese culture.

In summary, contemporary Chinese family structures are diverse and flexible. Filial piety has been maintained as the core value in Chinese families, whereas gender-related roles and the hierarchical relationships within the family have changed. Collectivism is still embedded in Chinese families. For this study, the contemporary Chinese socio-cultural context outlined above has been integrated into the discussion of each family disaster resilience factor. In addition, the proposed family disaster resilience model has been conceptualized and situated in this context. The following section discusses the major family disaster resilience factors and the proposed ‘Acting and Easing: the process of family disaster resilience’ model through integration and comparison of the existing knowledge base.

5.3 Family disaster resilience factors

Five major categories which emerged from the data were identified as the most important resilience factors that families possess which help them to prepare for, cope with, and rebound

from flooding in Chinese urban communities. The factors that the disaster-resilient families presented included 'having social resources and connections', 'having family inner resources', 'communicating', 'solving problems', and 'easing minds'. Based on the findings from this study, these factors assisted the families to overcome the disruptions caused by the flooding and to maintain the families' social, physical, and psychological well-being (Zakaria & Mustaffa 2014). 'Having social resources and connections' provides assistance and support for the families while 'having family inner resources' shows the intangible resources that families possess which can be applied in disaster situations. 'Communicating' connects families' social resources, thereby helping them to maintain social engagement, avoid social isolation, and achieve social well-being. 'Solving problems' helps families to make good decisions and take protective measures; thereby protecting family possessions from being damaged, ensuring family members' safety, preventing associated diseases, and in turn, maintaining families' physical well-being. 'Easing minds' covers the pre, during, and post-disaster phases and helps families to overcome fear, anxiety, anger, and psychological stress, thus maintaining families' psychological well-being.

5.3.1 Having social resources and connections

'Having social resources and connections' is defined as the resources and connections that families possessed before the disaster, or built up during or after the disaster, which comprises the community residents' committees; family social networks such as neighbours, friends, employers and colleagues, and paid workers; and family networks including relatives and household family members. Assistance from the community residents' committees, neighbours, relatives, and household family members were particularly addressed by many of the participants in the present study, showing the unique Chinese characteristics embedded in the Chinese socio-cultural context.

A **community residents' committee** (the term used in the present study was adopted from Chen, Lu and Yang (2007), other translations are 'residential committee' and 'residents' committee') is a form of neighbourhood organization linking the bureaucracy with the community in China (Chen, Lu & Yang 2007; Mok 1988). It should be noted that the Chinese meaning of community (shequ) is different from the meaning of community in the Western context (Terte, Becker & Stephens 2009). A Chinese community is:

> *a demarcated urban space with clear geographical boundaries as a basic urban administrative unit; the institutions governing the neighbourhoods; an environment where residents live together as neighbours and fellow consumers, mobilizing resources collectively to protect or valorise their entitlements* (Wan 2015, p. 2).

Accordingly, a community residents' committee refers to:

> *A 'Mass organisation founded by residents and has its members democratically elected by the multitude', and its main function was to 'coordinate with street office to implement policies and accomplish relevant work targets'.* (Wan 2015, p.

3).

The Chinese urban 'self-government' system (and its 'self-governing' bodies, the residential or residents' committees), was established in the 1950s (Chen, Lu & Yang 2007). The residents' committee (RC) functioned as a facilitator of government-community communication, played a vital role in social service delivery including social welfare, employment services, and conflict resolution, and maintained public security (Mok 1988). Initially, the main tasks of the residents' committee were to help work units implement party and government policies, monitor the population, and provide some basic social welfare services for the residents at the grassroots level, because the urban residents mainly depended on their work units to meet their demands for everyday life before the post-Mao reforms. Nevertheless, the function of work units in people's daily lives diminished due to the social transformations after the reforms, resulting in many urban residents being employed in private, foreign, or joint-venture enterprises, and not belonging to a work unit (Chen, Lu & Yang 2007). In 1990, the Organic Law on Organization or Residents Committees of Cities was implemented which stipulated that *"RCs were responsible for administering local socioeconomic and political affairs in urban neighbourhoods"* in China (Chen, Lu & Yang 2007, p. 507). In 2000, the name of the RC was changed to the Community Residents' Committee (CRC) by a decree issued by the Ministry of Civil Affairs. The CRC is considered as *"the administrative and political core of the current urban self-government system"* (Chen, Lu & Yang 2007, p. 506), and is *"expected to be the foundation of a new social welfare system"* (Chen, Lu & Yang 2007, p. 508). For instance, the CRCs take responsibility for expanding welfare services and strengthening community security. They are also expected to become a more autonomous system of self-government in the urban areas, and residents are expected to engage with the management of their own local and everyday affairs (Chen, Lu & Yang 2007). Due to the unique role in connecting urban government and the public, the communities and their self-governing organization, the 'Community Residents' Committee' are at the frontline of disaster relief (Chu 2015). A series of measures have been developed to promote the capabilities of the community in disaster relief, and an urban community disaster relief system has been established in China (Chu 2015). The structure of urban disaster relief at the community level shifts *"government-administered bureaucracy"* into *"community-based governance",* in which the role of the community residents' committee in disaster relief is emphasized (Chu 2015, p. 192). According to Article 19 of the Organic Law of the Urban Residents Committees of the PRC:

> *State organs, public organizations, units of the armed forces, enterprises and institutions shall not join the organizations of the residents committees in their localities, but they shall support the work of these residents committees (Chu 2015, p. 193).*

In addition, the newly-established community-based disaster management (CBDM) system in China has become an important component of the national strategy for disaster reduction and has shown its value in reducing casualties and property damage (Zhang, Yi & Zhao 2013).

Activities aiming to prevent and reduce the negative impacts of disaster at the community level have been conducted in China recently. For example, disaster-related knowledge has been disseminated by the community residents' committees via booklets and post slogans; assessment of community disaster-resistance capacity, community disaster risk, and disaster social vulnerability have been undertaken; and disaster prevention and reduction drills at the community level have been carried out by designated government departments. Meanwhile, a series of laws and regulations designed to strengthen community-based disaster reduction have been promulgated and implemented by the Chinese government in recent years (Zhang, Yi & Zhao 2013). As a result, CRCs have gradually become pivotal organisations playing key roles in disaster relief and risk reduction at the community level in China. The findings from the present study have identified the vital importance of CRCs as social resources for families when confronting disaster. The findings have also shown the smooth functioning of the CBDM system and the important role of CRCs in disaster management and the urban disaster relief system in China. Consistent with the goals and tasks of CRCs, the findings have shown that CRCs are a strong link between the government and the residents. The strong ties and close relationships established between the community residents' committees and ordinary families in normal (non-disaster) situations facilitates the cooperation and collaboration between the CRCs and families when disaster strikes.

Neighbours were a major source of support for families during the flooding disaster. The importance of mutual support between neighbours and families was highlighted by the participants in the present study. This might be attributed to traditional Chinese neighbourhood relationships with an emphasis on mutual help (Xu, Perkins & Chow 2010). In Chinese culture, assistance from neighbours is considered to be more important than assistance from relatives under some circumstances, which can be seen in an old Chinese saying: 'A far-off relative is not as helpful as a nearby neighbour' (Ge 2002). Many of the participants indicated that they had lived in their current residence for a long time; therefore, they knew their neighbours and got along well with them. The bonding and close relationship with their neighbours contributed to families' well-being during the flooding. In accordance with the findings, Guoliang and Siqin (2010) compared American and Chinese family values from the perspectives of individualism and collectivism in a discussion paper. They pointed out that Chinese people normally had fixed residences compared to their American counterparts who moved from place to place for a variety of reasons. Chinese residents maintained close relationships with their neighbours, knew each other very well, and supported each other. Guoliang and Siqin (2010) equated this phenomenon with the notion of Chinese collectivism. The findings in the present study also showed that when the flooding struck, neighbours collaborated and fought against the flooding together, with the collective coping activities further supporting the collective Chinese culture. It should be noted that the types of neighbourhoods and the relationships among neighbours might vary in

contemporary urban China. Middle- and upper-class citizens might live in gated commercial residential housing whereas the 'underclasses' might live in the older neighbourhood compounds (Wan 2015).

Deng (2015) examined the association between gated communities and residential segregation in urban China through a retrospective questionnaire survey study conducted in three gated communities in China. The findings showed that homeowners' contact with other people, and participation in local public affairs, reduced after they relocated to a gated community, suggesting the existence of residential segregation in urban China (Deng 2015). This study was conducted in communities with a long history in a district of Chongqing. Therefore, the neighbourhood relationships might be different from those in the gated communities, as the close neighbourhood ties might contribute to the extensive mutual assistance when families confronted the flooding. Further investigation needs to be considered to explore the roles of neighbours for families who live in gated communities in disaster situations in China.

Consistent with the findings of this study, neighbours have been identified as an important 'resource' in fostering disaster resilience at the local level (Norris et al. 2008). Their important roles have been recognized and valued in disaster situations. In a review paper looking at social capital and community resilience, Aldrich and Meyer (2015) noted that neighbours are the actual first responders in devastating disaster situations. They pointed out that neighbours provided first aid and saved the lives of people who lived nearby during two earthquakes occurring in Japan. Cheshire (2015) explored the impact of pre-existing neighbour interactions and relationships on the nature and extent of support from neighbours when disaster occurs. In total, 27 residents in south-east Queensland, Australia were interviewed 18 months after the 2011 floods. The findings showed that closer neighbour relationships fostered frequent and more reliable forms of help, and that people whose neighbourhood relationships were relatively poor or absent also received assistance because of the obligation of being neighbours. The findings suggested that neighbours were an important resource in disaster preparedness and in the recovery phase, regardless of prior history and interactions due to the moral duties and expectations of being a neighbour. Furthermore, Cheshire (2015) pointed out that despite encouraging neighbours to get to know each other being integrated into disaster resilience strategies, the best way to nurture neighbouring relationships is to enhance mutual respect and tolerance, rather than simply implementing disaster policy. Interestingly, according to the present study, assistance from neighbours was attributed to the emotional connections between them, which can be seen in participant C's words*: "Fire and floods are merciless, but human being is fully of sympathy."* Neighbourhood cohesion might be the main reason Chinese families provide assistance for neighbours. However, from Cheshire (2015) perspective, support provided by neighbours in a disaster situation was attributed to their expected roles and obligations. This presents a different set of neighbourhood values in Eastern and Western settings.

Nevertheless, other research illustrates that neighbours might be a negative factor in family resilience under some circumstances. Caldwell and Boyd (2009) examined the effects of drought on rural families residing in southern New South Wales, Australia and identified the coping resources used by these families through interviewing 11 members of five farming families who experienced drought. The findings revealed that community relationships were negatively affected after the drought due to accumulated individual demands. Farmers only shared information if they thought it would not disadvantage themselves, which potentially destroyed social cohesion, suggesting that neighbours might be poor, or at least dysfunctional, support resources (Caldwell & Boyd 2009). Islam and Walkerden (2014, p. 288) examined the roles of bonding and bridging relationships in disaster recovery through case studies of two coastal villages in Bangladesh affected by Cyclone Sidr. The data were collected through household surveys, focus groups, meetings with NGOs, and key local and national informants. The results showed that neighbours and friends provided mutual support in the initial recovery stage; however, support from neighbours and friends diminished, or even disappeared, in relation to long-term recovery due to poverty, the impact of the disaster, and competition for, and conflicts around, access to external support. The solidarity of the local community diminished accordingly (Islam & Walkerden 2014). These contradictory conclusions may be associated with different socio-cultural contexts and different types of disasters.

Relatives are considered as important and reliable resources for families in confronting flooding. The important role of the extended family has been recognized and identified in various disaster situations (Aldrich & Meyer 2015; Drabek & Boggs 1968; Ge 2002; Greeff & Lawrence 2012; Warner et al. 2015). Chinese families have been considered as cooperative kin groups for a long time. Families care for the welfare of all family members and bond tightly through common goals and interests (Xu et al. 2007, p. 159). As indicated in the socio-cultural context section of this chapter, Chinese families function as extended families in the face of adversity, regardless of the actual living arrangements or structures (Xu & Xia 2014, p. 49). The findings from the present study show that physical, emotional, and financial support, such as labour, essential life necessities, shelter, and money from relatives were important resources for families in the face of the flooding. Families who have experienced disaster tended to seek assistance from their relatives. Adult children, siblings, and in-laws were major sources of instrumental and emotional support for families in the present study. These findings are consistent with the characteristics of Chinese families described by Xu and Xia (2014, p. 49), who suggested that the *"Chinese family structure is 'extended' in nature and the extended family is a network of mutual obligations and benefits"*.

The findings also illustrate the embeddedness of the collectivist Chinese culture within Chinese families which results in strong family relationships and support (Xu et al. 2007). In a review paper related to the strengths and resilience of Chinese families, Xu et al. (2007, p. 154) indicated that

the extended family represents a critical Chinese support network, and plays important social, economic, and emotional roles. Extended families provide mutual support when families encounter difficulties and crisis in China. For most ordinary Chinese people, assistance from their extended family members was a taken-for-granted part of the traditional culture, which can be seen in participant A's statement that "*relatives must care for us, otherwise they should not be called relatives."* The findings illustrated Chinese people's strong sense, and expectations, of extended family in disaster situations. Similarly, recent research has also revealed that close ties with extended family helped survivors in the aftermath of disaster in other collective culture settings, such as in India, Sri Lanka, and Bangladesh (Amarasinghe 2011; Chadda & Deb 2013; Islam & Walkerden 2014). Augustine (2014) conducted a survey study that investigated the impact of trauma exposure on adult survivors of the 2004 Indian Ocean tsunami. The findings showed that, in India, nuclear and extended family households maintained their relationships and close ties with their relatives, and that this close network provided emotional and financial support for them which helped them to overcome these disruptive situations. Ekanayake et al. (2013) investigated the coping strategies employed by survivors of the 2004 Boxing Day tsunami in Sri Lanka through in-depth interviews with 38 survivors, researcher observations, and official secondary sources. The findings showed that the importance of cohesive communities and assistance from extended families were highlighted by the participants. The participants with a family member who had died, or who was missing, emphasized the profound support of extended family, especially when they took on the roles of the lost family member. *"The sense of community solidarity and the strong extended family structure in traditional Sri Lankan society"* were believed to be the underpinning reasons for this, according to many of the participants (Ekanayake et al. 2013, p. 71). Islam and Walkerden (2014) investigated how bonding and bridging relationships helped households to recover from disaster through case studies in two coastal villages in Bangladesh which had been affected by Cyclone Sidr. The findings revealed that in-laws' households provided various forms of support for affected households, such as bringing food supplies, and offering shelter and building materials, which might be attributed to the strong kinship network in Bangladesh which tends to offer support to relatives in crisis situations (Islam & Walkerden 2014).

Slightly different from the results of the present study, the expectation of receiving support from extended family members in disaster situations might be lower in Western countries. The findings from Caldwell and Boyd (2009) study showed that although participants in Australia indicated that having relatives living in their area was an added resource when they confronted drought, they mainly emphasised the support from their partners and children. Meyer (2013) reported in his PhD thesis based on two case studies in Florida, USA, that individuals assumed that family members, especially their immediate family members such as parents, children, and siblings, would support each other in the face of disaster. This phenomenon might be a result of the

different roles that extended family members play in the household in Eastern and Western cultures. A cross-cultural comparative study should be considered to compare the differences in the expectations of support from extended family, the major extended family members who might provide support, and which factors might influence support from extended family in disaster situations in a range of different settings.

Support from **household family members** living in the same dwelling is another important resource in family networks. The mutual support of couples, including the provision of practical and emotional support, plays an important role in facilitating the entire family's capabilities in dealing with flooding. The participants in the present study particularly stressed the emotional support from their partners which provided them with a strong sense of 'coping together as a family unit' and reduced their anxiety and fear when confronting the floods. Similarly, the findings from Islam and Walkerden (2014) study showed that family members provided pivotal support in the aftermath of Cyclone Sidr. All household members gained emotional support from other members, and the emotional support helped them to cope with disaster-induced stress. Furthermore, the literature relating to individual disaster resilience reveals that family support is an important resilience factor, which further supports the findings of the present study. Terte, Becker and Stephens (2009) advocated that family support is pivotal for building psychological resilience in a discussion paper regarding the application of an integrated model for understanding resilience in adverse situations. They pointed out that other members of the family are trusted to provide direct support for them. In a disaster situation, family members are inclined to interact, and to collect and/or build resources together, which helps them to survive and adapt in the wake of disaster (Terte, Becker & Stephens 2009).

Hegney et al. (2007) identified individual resilience factors through 10 in-depth interviews and a focus group with residents who lived in a rural town who had experienced 'black' frosts, hail-storms, and bushfires over the previous two years in Queensland, Australia. The findings showed that many of the participants indicated the importance of family ties in building resilience. Caldwell and Boyd (2009) reported that participants valued support from their partners and children because they did not feel that they had to deal with the drought alone. Their study also suggested that a strong marital relationship contributed to the health of all family members under adverse circumstances. Forbes, Jones and Reupert (2012) explored young rural adults' experiences of both formal and informal social support networks in the aftermath of bushfire in Eastern Victoria, Australia. Ten bushfire-impacted young adults (18-27 years) participated in the in-depth interviews. The results showed that young adults emphasised that their family was most helpful for them immediately after the fires. However, most of these studies focused on family support for individuals within a family, with little of the research drawing attention to how household family members interact with each other as a unit and improve the entire families' resilience in disaster situations. The findings in the present study showed that although the children played a minor

role in family activities during the flooding, such as helping with packing and moving, they were mainly protected by the adult family members. Therefore, further investigation needs to be conducted to explore how household family members support and engage with each other, the potential roles of different family members in disaster situations, and which factors might influence support from family members in different settings.

Based on the findings of this study, **friends, employers and colleagues, and paid workers** provided certain forms of assistance for families when it was needed; however, they were not considered to be important properties of the category 'having social resources and connections'. Only one participant mentioned that her family received practical help from her friends, while other participants did not specify any assistance from friends. This is quite different from the extant evidence which shows that friends are important for offering help in disaster situations. Forbes, Jones and Reupert (2012) study indicated that support from friends after the fires was meaningful for the participants, as they received psychosocial and informational support. Further research should be conducted to examine the importance of assistance for families from friends in disaster situations in different settings.

Furthermore, only one participant mentioned that her family had received assistance from their employers and colleagues. This may be attributed to the different social backgrounds of the participants in this study because many were self-employed. This phenomenon is consistent with the social transformation of contemporary China in that the functions of the work unit have been replaced by the community residents' committees. Despite the work unit performing certain roles in helping families deal with disaster, it may not be a crucial social resource for ordinary families in China. Previous studies have shown that people's ethnicity, gender, employment status, and education status all contribute to access to social resources. Individuals who are males, employed, and highly-educated had increased access to social resources (Häuberer 2010, p. 133). Therefore, further research needs to be considered to explore the importance of support from people in the workplace.

Some of the participants indicated that their families had help from temporary paid workers; however, they did not specify the importance of this kind of support. Conversely, other participants mentioned that the price charged by the self-employed workers, who mainly offered labouring assistance for moving possessions, might increase due to the shortage of these kinds of workers in disaster situations; therefore, they preferred to deal with the disruptive situation by themselves, rather than seeking help from the workers. Therefore, paid workers were not considered to be important social resources for families in the present study, which might be associated with the financial status of these families, as the majority were low-income families.

Some disaster-related studies have emphasised the role of medical professionals, psychology

professionals, social workers, and volunteers in disaster situations (Hossain 2011). However, the participants in this study did not mention that they had received support from professionals or social workers. This phenomenon might be attributed to the severity of the disasters in the different research studies, as the flooding in the present study might be less severe than other major devastating disasters such as earthquakes and tsunamis.

Indeed, social support has been identified as an essential element in current family resilience theories (Distelberg, Martin & Borieux 2014). Social support contributes to adaptation (Gorman, Fitzgerald & Blow 2010), compensates for losses (Wickrama & Kaspar 2007), and promotes coping and resilience (Kayser, Wind & Shankar 2008). Aldrich (2012) further confirmed that social resources are the fundamental element of resilience based on the findings of a mixed-methods study. The findings from this study expanded the extant understanding of social support in family resilience concept and research. The present study provides an insight into the important social resources and connections of Chinese families which serve to provide extensive assistance for families in disaster situations in China.

5.3.2 Having family inner resources

"Having family inner resources" are defined as resources within families, which are intangible but embedded in the family unit, encompassing family norms, family self-reliance, and family values and beliefs, along with previous experiences and knowledge. Family inner resources include not only the resources of the entire family unit, but also the resources of each individual family member. These resources facilitated the coping and recovery strategies of the families when they encountered the flooding.

5.3.2.1 Family norms

Family norms are composed of family roles and family unity in the present study. Pre-existing family roles such as gender-related roles, care-giving roles, and decision-making roles helped the families to react better under disaster situations, and to work more efficiently and effectively. These findings are supported by previous research indicating that designated tasks and the roles of family members helped them to be resilient while they rebuilt their homes which had been lost in a fire (Greeff & Lawrence 2012).

The different gender-related roles presented as a useful factor in guiding families' actions towards the flooding. Designated gender-related tasks helped the families to take action more efficiently and systematically, especially in the packing and moving stage. These roles can be classified as follows: women did the light work, men the heavy work; and women were in charge of sorting and packing, men were in charge of moving and checking security. These findings are in accordance with the tenets of Confucianism, that "husbands should behave like husbands, wives should behave like wives" (Rhee 2008, p. 3), and of traditional gender-related roles in Chinese families.

As indicated in the above section on the Chinese socio-cultural context, the younger generation, the increased numbers of higher education students, and women's employment were associated with the reduction in traditional gender roles. Many of the participants in the present study are from the older generations and have low levels of education; thus, it is understandable that the traditional gender-related roles were still retained in their families and applied when their families faced the flooding.

Liu and Mishna (2014) employed a grounded theory approach to examine how females coped with a major earthquake in Taiwan in 1999. In-depth interviews were conducted with 16 female survivors of the earthquake. The findings illustrated the female gender norms in the family which were also embedded in Taiwanese culture, and which served as coping resources which helped them to successfully cope with the difficulties after the earthquake. These norms included: children's demands as the first priority; men worked outside and women worked inside; and the female supported the family when the husband could not. Their study further confirmed that gender-related roles embedded in Chinese traditional culture were helpful for families facing disaster situations. On the other hand, it should be noted that the findings from the present study also illustrate that some of the female participants had to cope with the flooding on their own because their partners were not physically at home during the flooding, or were not physically well enough to play an active role. In such situations, the female had to take responsibility for both roles of a couple. They either sought help from relatives in compensating for the husband's role, or managed the difficulties by themselves. This phenomenon illustrated the shaping of gender-related roles in the specific situation when the disaster struck, and also illustrated the flexibility of families' gender-related roles. Furthermore, in a single-parent family, the male organized all the packing and moving activities with the assistance of their daughter(s). Therefore, when considering the gender-related roles within a family, different family structures and family status should be taken into account.

Care-giving roles were another helpful factor within the family unit which promoted the well-being of the entire family during the flooding. The participants indicated the care-giving roles they played for their ageing parents, sick family members, and children in their families, and emphasised that these care-giving roles influenced their families' decision-making and action-taking. Their elderly parents, children, and sick family member's safety and demands were considered and then integrated into the families' coping strategies in dealing with the flooding. These findings illustrate the importance of caring roles in families in helping vulnerable family members in disaster situations. On the other hand, senior participants who lived separately from their adult children highlighted that their family received extensive emotional, practical, and financial support from their adult children during and after the floods. A disabled participant stressed that her husband was her 'protector' during the flooding. These findings further confirm that vulnerable family members gained a strong sense of security during the flooding because of the caring of other

family members.

As described in the above section on the Chinese socio-cultural context, filial piety remains a core virtue informed by Confucianism in contemporary China. Different from Western countries, care for the aged is not institutionalized in China; therefore, most elderly people live with their adult children rather than in a nursing home (Xia et al. 2013). Many aged people depend on support from their adult children and families in addition to some degree of assistance from government social security, along with employer sponsored pensions, especially the aged living in rural areas (Xu et al 2007, p. 154). As well, no matter where families live (either in an urban or a rural area), they provide physical care for the aged in the famiy. In rural areas, the adult children and relatives also provide most of the living expenses for the elderly. Mutual obligation and interdependence are valued over individual interests by the Chinese family (Xu & Xia 2014, p. 42). Furthermore, the 'combination-and-separation' mode of the contemporary Chinese family structure allows young couples to take care of their ageing parents who live independently (Xu & Xia 2014, p. 36). Therefore, the majority of Chinese adult children still take care of their frail elderly parents at home (Xia et al. 2013). Apart from the underpinning traditional Chinese value of 'filial piety', which encourages the younger generations to take care of the elderly within the family, Chinese laws have been promulgated to support and protect the elderly. In 1996, the Law on Protection of the Rights and Interests of the Elderly was enacted with an emphasis on the responsibilities of adult children in taking care of their ageing parents (Xia et al. 2013). In 2012, an amendment to this law was issued, further highlighting the adult children's obligation to care for their ageing parents. Visiting parents regularly and providing emotional support for the aged were specified in this updated law (Xu & Xia 2014, p. 40). Based on the participants' accounts from the present study, the care-giving roles were spontaneous and voluntary within the family, and none of the participants indicated that the laws had influenced their actions. This phenomenon might be attributed to the traditional values still embedded in most Chinese families, with family members not considering their care-giving roles for the aged to be enforced by the law. Having said this, elderly couples who do not have adult children, whose adult children live far away from them, or those who do not take responsibility for looking after them, should be considered. Future investigation needs to be conducted to explore if care-giving roles from other family social resources could help these types of families to deal with disasters in China.

Again, traditionally, Chinese families care for their family members if they have chronic illnesses, and the government also has regulations for families functioning as caregivers for the disabled and the chronically-ill family member (Xia et al. 2013). In the present study, the participants mentioned their partner's physical illness, and how their responsibilities of being carers helped their family to deal with the flooding. Families with disabled or sick members encountered more difficulties than other families in the disaster situation; therefore, more research needs to be conducted to investigate their specific resilience factors.

In terms of care-giving roles for children, as indicated in the section on the Chinese socio-cultural context, grandparents often live with their adult child's family and help to look after their grandchildren (Xu & Xia 2014). Furthermore, in some families, the grandparents live with their grandchildren and take care of them because the children's parents work in another city due to the increase in migration to the big cities in contemporary China. Therefore, not only parents, but also grandparents are the main care-givers for children in China; this is different from Western countries in which the nuclear family is the typical family structure, in which parents are responsible for nurturing their children. The findings from the present study showed that children were protected by either their parents or grandparents in different families when the flooding occurred. It was a major priority to ensure that the children were in a safe place and suffered less stress as a result of the flooding. In this study, in one family consisting of grandparents and children, the children stayed with their neighbours while the grandparents sheltered in the stairwell and observed the rising water. In another single-parent family, the father tried to pass on his positive attitudes towards the flooding to his daughter to reduce her anxiety. In a family with only the mother living at home, the topic of preparing for the flooding was avoided with the daughter, because the mother wanted her daughter to concentrate on her studies. These findings are consistent with traditional Chinese culture in which the children are dependent on the family (Xu & Xia 2014). However, children are also an important part of the family, and can play an important role in disaster preparation, coping, and recovery actions. Further investigations should be considered to explore children's experiences in disaster situations and their roles in helping their families in the face of disaster in China.

Interestingly, based on the findings of the present study, the decision-maker in the family can be either the husband or the wife and, in many families, couples discussed and made decisions together during the flooding. These findings were different from the traditional Chinese family relationship proposed by Confucianism where the male is the leader within a family and has the power to make decisions, whereas the woman should obey her father before getting married, and follow her husband in the marriage (Xia et al. 2013). Indeed, the findings are consistent with the changing family relationships in contemporary Chinese families in which family members are inclined to discuss issues and make decisions together (Hu 2004). These findings also illustrate that women's status within the family has changed in China which has also been supported by previous research. The results from the Second Investigation on Chinese Women's Social Status (2001) showed that women's decision-making power in the home increased, with 67.4% of the participants reporting shared decision-making or the wife's sole decision-making in career choices. In terms of family financial investments, 60.7% of wives were participated in decision-making (Xu et al. 2007). Nevertheless, the findings from the present study show that, in some families, traditional patriarchal beliefs still exist and that the husband or the father is the decision-maker (Gailliard 2016; Li 2008). The various decision-making roles in different families may well

represent the transition of Chinese culture, or it could also be explained by different family characteristics and preferences. In addition, children were not involved in family decision-making during the floods based on the findings of the present study. This is consistent with previous research indicating that, in Chinese culture, children are seldom involved in the decision-making processes of the family, even in relation to their education (Huang & Gove 2012).

Family unity, which includes family cohesion/solidarity and family harmony, influences the ways in which families make decisions and take action during the flooding. These findings are supported by the core aspects of the traditional Chinese collectivist culture and Confucianism.

Collective decision-making and action-taking facilitated family preparations for, responses to, and recovery from, the flooding. As described in the Chinese socio-cultural context section, Chinese families' functions and behaviours are influenced by the collective culture. The findings from the present study illustrate that collectivism is still embedded in Chinese families and helps them to deal with disaster in a collective way. Almost all the participants frequently used the word 'we' when describing their family's activities, which represents the collectivist underpinnings of Chinese family life. Greeff and Lawrence (2012) examined the resilience of families who lost their homes after a fire in South Africa through a mixed-methods approach with 38 families. A thematic analysis of the qualitative data showed that 47.4% of the participants indicated that 'working together as a family' (e.g. organising family members and designating tasks to rebuild their homes) helped their family in the aftermath of the fire, suggesting that family members took action together which helped them to be resilient in the face of disaster, further supporting the notion that family cooperation is helpful when families are confronted with disaster (Okada, Fang & Kilgour 2013).

Family harmony assisted families to eliminate potential conflict and to accommodate each other's ideas through negotiation and compromise. Families employed various strategies to achieve and maintain family harmony during the flooding. Obedience, discussion, and having a single leader were some of the means families utilized to avoid quarrelling and conflict and to reach agreement in the face of the flooding. Achieving an agreement without quarrel was pursued by families when faced with a disaster situation according to this study. Indeed, family harmony is considered to be crucial for the maintenance of Chinese social stability (Xia et al. 2013). Harmony in family relationships is also strongly emphasised in Confucianism (Chang & Holt, 1991). Parental authority, conformity, and the roles and responsibilities of each individual are considered in order to achieve harmony within the family unit (Lu & Shih, 1997; Miller & Yang, 1997). From the Confucian perspective, the husband and wife should not argue or fight with each other; instead, they should support and care for each other. Avoiding conflict helps the family to retain a sense of harmony. The importance of harmony within the family is represented by a famous old Chinese saying: 'A peaceful family will prosper (Jia he wan shi xing)'. Another Chinese phrase 'he mu xiang chu' also indicates that family members should

maintain peace and harmony when interacting with each other (Epstein et al. 2012). Differing from Western culture in which romance plays an important role in family relationships, harmony is considered to be very important in Chinese family relationships (Rothbaum et al. 2002, p. 342). When conflict occurs, negotiation and compromise are effective ways to achieve a solution in Chinese families (Rothbaum et al. 2002). The preferences of the individuals within the family are less important than family harmony in most Eastern countries (Lin, Pang & Chen 2012).

5.3.2.2 Family self-reliance

Self-reliance is the capacity to 'withstand', rather than depend on external help, and this ability is considered to be an imperative resilience factor (Aldunce et al. 2015). Many of the participants reported that their family preferred to manage difficulties caused by the flooding on their own rather than seeking external assistance; meanwhile, they highlighted the importance of family self-reliance, especially in the long-term. The self-reliance of the family helped them to be physically and psychologically strong and confident in their families' capabilities in dealing with the disaster. These results demonstrated the advantages of self-reliance in a disaster situation, and are supported by previous studies which show that self-reliance is a central component of disaster resilience, and that the enhancement of self-reliance is an important strategy to mitigate the negative consequences of disaster (Aldunce et al. 2015; Fung & Loke 2010; O'Keefe & Westgate 1977). For example, in Japan, measures are taken to promote 'Kyojo' (neighbourhood or community self-reliance) and 'Jijo' (individual or household self-reliance), and to reduce 'Kojo' (government assistance) (Okada, Fang & Kilgour 2013, p. 47). French and Dutch authorities have also emphasized the significance of citizens' responsibility in disaster risk reduction and management. The Dutch government strongly encourages the public to be self-reliant in disaster situations by advising citizens to be aware of potential disasters, establishing protective measures when encountering a disaster, and providing mutual assistance before external help arrives (Corniaa, Dresselb & Pfeil 2014).

However, although self-reliance is emphasised as an important strategy for the building of disaster resilience, there is a dearth of literature exploring and identifying self-reliance factors. Only a small number of studies have been conducted on self-reliance under disaster conditions at the community and individual levels (Jang & Wang 2009). The present study suggests the importance of self-reliance at the family level in disaster situations, and provides insight into the characteristics of Chinese families' self-reliance in the face of disaster. 'Relying on our family' is a frequent phrase used by almost all the participants in this study, illustrating that self-reliance in disaster situations might be an accepted principle in Chinese families. The findings show that families' collective decision-making and action-taking, savings, mutual emotional support, and their determination to be self-reliant, ensured and promoted their self-reliance. Meanwhile, the

close ties and relationships with their extended family members also contributes to family self-reliance; as Moloney (2011) pointed out, connections to neighbours and a large extended family could promote a strong feeling of independence. Nevertheless, the factors that influence self-reliance are still vague. Jang and Wang (2009) reported that self-reliance was a major protective factor for individual survivors of the 1999 earthquake in Taiwan. Individual self-reliance positively influenced people's behaviours in disaster situations, and job security and good health were also essential for self-reliance. Corniaa, Dresselb and Pfeil (2014) suggested that people's faith in a predestined fate could inhibit them from taking adaptive actions and being self-reliant. In the present study, although some of the participants accepted the unavoidable nature of the disaster, their families still took action to protect themselves from the disruptive consequences of the flooding. Therefore, further investigation needs to be considered to explore family self-reliance in the face of disaster.

Apart from the strong willingness to be self-reliant families, the participants talked about their attitudes towards seeking help from others and the government. On one hand, participants referred to self-reliance as 'not wanting to bother others' and 'not wanting to rely on others'. Even under some circumstances, when their employer or neighbours offered help for the family, they did not take up the offer for this reason. The underpinning meaning of these statements might be interpreted as a consideration of how to 'return the favour'. This phenomenon might reflect a passive help-seeking preference influenced by Confucianism in which reciprocity is emphasised when one asks for help from others (Wen & Hanley 2015). On the other hand, establishing boundaries between self-reliance and help-seeking from the government illustrated the families' attitudes towards self-reliance and government assistance. The participants indicated that the external resources and support from the government should be allocated to more vulnerable people who needed extra assistance in disaster situations, and that their family's self-reliance could reduce the burden for the government after a devastating disaster. Similarly, previous research has demonstrated that people were of the view that they could not simply wait for the government to provide support and services, and that instead, they should rely on their own strength to overcome the difficulties (Greenberg, Dyen & Elliott 2013; Jang & Wang 2009). However, the government's role in disaster management is still valued according to the victims (Jang & Wang 2009), which is in line with the findings of this study, that although the participants were willing to be independent, they were inclined to seek help from the government if the difficulties were beyond their control. A previous study argued that government aid may result in community dependence and a reduction in residents' initiatives to overcome difficulties on their own (Aldunce et al. 2015). External assistance is prone to diminishing the spirit of self-reliance in people, especially in the aftermath of a devastating disaster (Archer & Boonyabancha 2011). Excessive trust in the authorities and a strong reliance on government intervention in a disaster lessens the public's sense of independence and their self-reliance, and prevents them from taking

their own protective measures (Corniaa, Dresselb & Pfeil 2014). Chinese citizens have had a strong reliance on government since ancient times (Yun 2011); however, the people in this study showed great self-reliance in the face of disaster based on the findings from the present study. Therefore, further research is needed to explore the role of government assistance for families, and its influence on family self-reliance.

5.3.2.3 Family values and beliefs

Walsh (2007) suggested that families' collective responses to disruptive situations are shaped by the shared values and beliefs of the family members (cited in MacDermid Wadsworth 2010, p. 550). Walsh (2016) proposed that family belief systems are at the heart of all family functioning and are vital elements of family resilience. In the present study, family values and beliefs were shaped by the Chinese socio-cultural environment. For example, 'being benevolent' helped families receive support during the flooding. Participant G's family valued sharing with other people without expecting anything in return in daily life, and got along well with their neighbours. When flooding struck their residential area and they had to evacuate from their flooded apartment, their neighbours provided food and shelter for their family. The participants also mentioned their willingness to help others because they sympathized with those who had suffered the flooding and believed that helping others would bring joy for themselves. These findings are supported by previous research which showed that providing support to others is a strength in family resilience (Lietz 2007). Furthermore, 'being grateful' helped families to interpret the difficulties and the negative consequences they encountered in a positive way and to appreciate the assistance they received. Expressing gratitude is another way in which families showed their respect for people who provided support for them. This is consistent with previous research which showed that participants often addressed their gratitude and thankfulness for being alive and for the help they gained (Messias & Lacy 2007). The concept of 'life being the most important' helped families to make decisions and take action rationally when facing an emergency. This attitude also provided comfort when they experienced financial losses caused by the flooding.

Family beliefs influenced their views about crises and how the adverse situations could be dealt with (Walsh 2016). Culture and society may contribute to different family beliefs (West et al. 2012). Attitudes towards disaster influenced family members' psychological status and, in turn, affected their behaviour in a disaster situation. The family's ability to *"make sense of their experience"* was related to adaptation (Gorman, Fitzgerald & Blow 2010, p. 11). Families' activities could be understood by their own unique framing of the "definition of the situation" (Drabek & Boggs 1968, p. 445). Shek (2004, pp. 65-6) claimed that Chinese cultural beliefs about adversity demonstrated two different aspects. The first aspect, encompassing positive beliefs about adversity, highlights the value of adversity and people's capacity to overcome adversity, which is based on the Confucian principle of people's inner strengths and virtues, illustrated by the saying 'ren ding

sheng tian' *("man is the master of his own fate")*. The second aspect, encompassing negative beliefs about adversity, as shaped by Buddhism and Taoism, emphasises people's inability to change adversity, and the negative consequences of adversity, which is represented in the saying 'hao chou ming sheng cheng' *("whether a life is good or bad depends on fate").* Shek (2005) indicated that Chinese cultural beliefs about adversity are the foundation upon which Chinese people understand adverse situations and develop coping strategies accordingly.

Huang, Wong and Tan (2014) examined the association between Chinese cultural beliefs toward adversity, income recovery, and psychological status among the 2008 Wenchuan earthquake survivors in China. A survey study was conducted through face-to-face interviews using a questionnaire, in total, 304 completed questionnaires were collected. The findings showed the relationship between life satisfaction and positive Chinese cultural beliefs. They suggested that due to the endorsement of positive Chinese cultural beliefs toward adversity, survivors of the Wenchuan earthquake in China were more likely to accept the adverse situation and to believe that they could overcome adversities in their lives; therefore, they had higher life satisfaction than people who adopted negative Chinese cultural beliefs. They also advised that optimism and positive Chinese cultural beliefs toward adversity were similar, while pessimism and fatalism and negative Chinese cultural beliefs toward adversity shared similarities. Furthermore, Corniaa, Dresselb and Pfeil (2014) argued that participants who believed that disaster was unavoidable were less resilient because they thought they were unable to deal with the disaster. Based on the findings from this study, families believed that flooding was an unavoidable natural disaster, and this belief resulted in less blaming and more action. This is slightly different from the Chinese cultural belief towards adversity. On one hand, it seemed to be in line with the negative Chinese cultural belief because the families believed that they could not do anything to avoid the flooding. On the other hand, the families took action to cope with the flooding and to mitigate their potential financial losses. Therefore, further research might need to explore Chinese cultural beliefs and their impacts on people's behaviours in disaster situations.

In contrast to most of the research findings in Western settings, and in some other settings, religious beliefs might not be a resilience factor for Chinese families in disaster situations based on the present study. Only one participant mentioned her family's belief in Buddhism, whereas other participants did not talk about any particular religious beliefs, and clarified that their family did not have religious beliefs. These findings might be attributed to the Chinese socio-cultural environment in which the majority of Chinese people are not involved in any religion (*Dimensions of Culture* 2006). Cao et al. (2013) conducted a cross-sectional study to examine perceived family functioning and depression in 190 bereaved parents who experienced the 2008 Sichuan earthquake. A multi-stage stratified sampling method was employed in their study, with the participants coming from two villages in two of ten hardest-hit cities in the 2008 earthquake. The findings showed that the majority of the participants did not have any religious beliefs (76.3%),

and that religious beliefs was not a predictor for individuals becoming depressed, which further supported the notion that religious belief might not be important for survivors and families in China when confronted with disaster. Nevertheless, as indicated in the Chinese socio-cultural section, apart from the majority being of Han ethnicity, there are 55 other ethnic groups in China. Religion still influences local people's lifestyles in some of the minority-dominated areas of China. Wei, Su and Liu (2013) conducted a questionnaire-based study to investigate the public response to an earthquake in the Tibetan Autonomous Prefecture, which was dramatically affected by the *Ms* 7.1 earthquake in 2010. In total, 300 middle-school teachers were recruited for the study through a combination of cluster and random sampling strategies. In all, 274 questionnaires were completed and used for the data analysis. The results showed that 65.0% of the respondents were of Tibetan ethnicity, while 25.9% were of Han ethnicity. Meanwhile, 82.5% of the respondents reported having religion beliefs, while only 11.9% indicated no religious belief. Furthermore, the regression analysis showed that family income, experience, and religion were the most significant factors influencing the responses. This study suggested that religious belief might play an important role in improving individual's disaster responses. This contrasts with the in-depth interviews in the present study which were conducted in the urban communities of a mega-city in China, with all the participants being of Han ethnicity; therefore, people's perceptions of religious belief might be different from the minority population living in the areas dominated by religious belief. Having said this, further study is needed to investigate the role of religious belief in disaster situations in other parts of China, particularly involving minority populations.

Conversely, extant family resilience models and much of the literature illustrates spirituality and family religious beliefs as being important family resilience factors (Greeff & Joubert 2007; Hackbarth et al. 2012; Walsh 2016). Spirituality can be an important coping resource for families facing a crisis, being associated with less psychological stress (Greeff & Lawrence 2012) and positive change (Augustine 2014, p. 502). There is a positive relationship between spirituality and family resilience (Hackbarth et al. 2012). Greeff and Loubser (2008, p. 288) found that spirituality facilitated Xhosa-speaking families in South Africa's adaptation after a crisis, which included "*Gifts from God; Guidance; God's Works; God's Plan; Prayer; and Faith"*. It is common for individuals to seek guidance and support through their spiritual beliefs or religion (Carr 2004, cited in Hackbarth et al. 2012). Spiritual and religious beliefs provide *"a sense of shared values between family members"* (Martin, Distelberg & Elahad 2015, p. 172) and help people to make meaning of their adverse situations. Ekanayake et al. (2013, pp. 71-2) pointed out that their study participants recognized *"the importance and relevance of their faith and religion",* and relied on them to explain their losses caused by a tsunami. According to the findings, Buddhists regarded the tsunami as *"an example of Buddha's preaching on tentativeness in life and nature"*, while the Catholic and Muslim participants thought that God protected them and helped them to escape from the disaster. Their study, along with others, was conducted in Western countries with disaster survivors and

show that strong religious faith and beliefs are associated with lower levels of distress (Ekanayake et al. 2013, p. 73). The church was referred to as a source of emotional support by participants (Greeff & Lawrence 2012), while religious programs such as memorial services were organized by most of the Buddhist temples, and Catholic churches helped the tsunami survivors to overcome their panic and sadness (Ekanayake et al. 2013, p. 72).

Interestingly, although most of the literature has shown the positive impact of religion and spirituality for the enhancement of resilience, results from a small number of studies demonstrated that their roles in resilience were ambiguous. For instance, Greeff and Lawrence (2012) noted that there was no significant correlation between family adaptation and family capability in actively seeking spiritual assistance; however, a few participants mentioned that they had sought assistance from the church during the crisis and that this was helpful for them. Therefore, Greeff cautiously suggested that deeper investigation needs to be conducted to clarify the role of religion in disaster resilience. Another study by Greeff and Thiel (2012) showed that spirituality and religious beliefs were important internal coping resources; however, they were not a quality of resilience in adapting to prostate cancer. There are very few studies exploring the role of religious or spiritual beliefs in disaster situations in China, while the majority of resilience-related studies focusing on examining religious beliefs or spirituality have been conducted in other settings. Therefore, future research needs to consider the roles of religion and spirituality in disaster situations in different cultures.

5.3.2.4 Having prior experience

The experiences gained through life and various disaster events allowed families to build confidence in dealing with the flooding, gaining relevant knowledge, and lessening their fear and anxiety in the face of the flooding. The flooding events helped families to build on their existing experience, so that they had more knowledge about how to handle future crises. These findings are supported by previous research which shows that having prior experience contributes to better preparation and responses to disaster, and promotes people's actions and adaptation behaviours in various disasters (Becker et al. 2012; Koerth et al. 2013; Wei, Su & Liu 2013).

Firstly, prior experience influences people's preparedness (Becker et al. 2012). The best way to help families to be better prepared is through the lessons learnt from their previous experiences. Mara et al. (1999) indicated that the severe ice storm experience of 1998 in Canada prompted people to take proactive measures during the following winter, which reduced their vulnerability.

Secondly, previous experience promotes better responses to disaster. Through a questionnaire-based survey and interviews with 274 respondents in Yushu Tibetan Autonomous Prefecture in China in 2011 (around 1 year after *Ms* 7.1 earthquake occurred in Yushu County), Wei, Su and Liu (2013) assessed the public response to the earthquake. They found that people who had

previously encountered unexpected emergency situations, such as fires, floods, and storms, had more measured responses in the face of the earthquake than those without prior experience. Their findings further confirm the important role that individual experience plays in response to natural hazards. Furthermore, this is consistent with the findings of the present study in which the participants indicated that a lack of previous flooding experience made them have feelings of panic and helpless. Based on a case study conducted in Queensland, Australia, Aldunce et al. (2015) pointed out that some individuals without disaster experience do not know how to respond when disaster occurs. They suggested that exposure to recurrent disasters facilitates people to be better prepared and to become more adaptable.

More importantly, prior experience helps people to conduct adaptive measures toward disaster. Bohensky and Leitch (2014) conducted a systematic newspaper analysis over a one-year period to explore media framings of the flooding which occurred in Brisbane, Australia, in January 2011. The findings showed that individuals or communities with previous disaster experience were considered to be more resilient. Sharing stories and hearing others' experiences were highlighted as important ways to learn and adapt. Koerth et al. (2013) employed a questionnaire survey to explore the elements that motivated coastal households to adapt proactively to sea-level rise and associated flood events. Data were collected at the North Sea coast in Denmark and Germany. In total, 257 household questionnaires were collected. The findings illustrated that personal experience had a positive effect on the implementation of adaptation measures. Kayser, Wind and Shankar (2008) examined coping among survivors of the 2004 tsunami in Tami Nadu, India. They interviewed 10 emergency responders who provided relief work following the tsunami by asking them *"how the survivors coped with the disaster, and how they coped with providing relief to victims"* (Kayser, Wind & Shankar 2008, p. 91). Eight interviews were selected for interpretive analysis due to the quality of the interviews. The results showed that 'finding benefits from the disaster experience' was revealed as one of five common ways of coping, and many survivors transformed their devastating experiences into positive change in their own lives and those of their families (Kayser, Wind & Shankar 2008).

On the contrary, there has been a paucity of research showing that prior disaster experience has negatively influenced human agency. Jang and Wang (2009)'s study illustrated that recent natural disaster experience had a negative impact on earthquake survivors' disaster resilience. This might be attributed to the severity and impact of different disasters, or the variety of human being's personalities and other characteristics. Harville et al. (2011, p. 294) found that being frequently exposed to disaster was associated with poorer mental health. In a review paper, Lindell and Perry (2000) analysed data from 23 studies related to household seismic adjustments and different variables. They pointed out that there was some research which identified past earthquake experience as a predictor of seismic adjustment, while other studies did not. Therefore, they suggested that the positive role of prior experience in seismic adjustments should be

carefully conceptualized and more consistently measured. Although virtually all of the participants in the present study indicated that previous flooding experience had helped their families to deal with flooding to some degree, further investigation still needs to be considered to examine the impact of prior disaster experience on families' preparation, response, and recovery strategies, and family members' mental health, in various disasters.

5.3.2.5 Having knowledge

Virtually all the participants mentioned that having relevant knowledge and applying it to the disaster situation helped their families with their decision-making and action-taking processes. This knowledge ranged from disaster-related information and risk assessment methods to coping and preparation strategies. Consistent with these findings, Ajibade et al. (2015) suggested that flood-related knowledge is an important factor which helps the adoption of behaviours and reduces damage.

The findings from the present study show that there are three ways for families to gain knowledge, through experiential learning, social learning, and learning from the media. Much of these families' knowledge is from their lived experiences and from other people's stories. Experiential learning is the *"process of creating knowledge through the transformation of experience"* (Armitage, Marschke & Plummer 2008, p. 88), namely, learning-by-doing. Learning from previous experience was shown to be an important way for families to gain knowledge. In accordance with the findings, Walsh (2006) indicated that families gain knowledge from their previous successful or failed experiences, which promotes their confidence and their competence. The lessons the families learnt from their past experiences helped them to deal with the new challenges they encountered, and will also help them with more complex situations in the future.

Social learning presented as a useful way for families to accumulate knowledge in the present study. Social learning is defined as *"learning as a process of iterative reflection that occurs when we share our experiences, ideas and environments with others"* (Keen et al., 2005, cited in Aldunce et al. 2015, p. 9). Sharing others' experiences facilitates the process of learning and adaptation (Whittle et al. 2010, cited in Bohensky & Leitch 2014). Family members shared their experiences within a family and with their relatives and neighbours, which proved to be an effective way to gain first-hand knowledge.

Learning from the mass media, such as through television programmes was another way for families to acquire knowledge. However, undertaking education programmes to acquire knowledge, as emphasised in other research (Aldunce et al. 2015; Ronan & Johnston 2001), was not mentioned by the participants in the present study; only one participant indicated that she had gained knowledge through an education session in her workplace. The findings from the present study show that families mainly relied on their own prior experiences and the sharing of other

people's experiences to build on their disaster-related knowledge base, whereas other ways of gaining knowledge were limited. Therefore, further investigation needs to be considered to explore appropriate disaster knowledge-related education programmes, as well as effective ways of delivering this knowledge to the public.

5.3.3 Communicating

Communicating is not simply a static family entity; rather, it is an ongoing and engaging process across all phases of the disaster. Communicating functions as an important activator and connector between family resources and family problem-solving processes, and also contributes to 'easing minds'. The findings of the present study show that communicating was involved in the receiving, sending, and sharing of information, knowledge, feelings, and opinions, and operating in concert with families' internal and external resources during the flooding. Frequent communication with these resources helped these families to access warning information, share ideas and information, make decisions, connect to the families' resources, and receive interdependent emotional support while they confronted the flooding. Communication has been identified as an important family resilience factor in extant family resilience models and in the literature (Black & Lobo 2008, p. 38; McCubbin & McCubbin 1988; Oh & Chang 2014). However, most of the family resilience literature focuses on communication among family members. For instance, communication is one of the three key processes proposed in Walsh's family resilience model. Communication can help to clarify disruptive situations, encourage emotional sharing and support, and promote collaborative problem-solving and proactive planning within a family (Walsh 2016).

In the present study, communication mainly occurred at three levels, at the community residents' committee level, the neighbourhood level, and at the family level. Communicating is a key process connecting all the family resilience factors in disaster situations based on the present study, illustrating the crucial role that communication plays when disaster strikes.

5.3.3.1 'Communicating' activates and maintains connection to families' resources

Pre-existing family resources were activated through the communication process and were utilized by the families accordingly. Communicating with families' social resources also helped them to seek and receive assistance, maintain connection with the community, and provide assistance to others during the flooding. Communication was an active process in which the families engaged with their social resources and connections. Communication also helped the family members to exchange and share ideas, and to use family inner resources, such as previous experience and knowledge. Prior research demonstrates that access to social networks provides opportunities for families to transfer tangible or intangible resources, and helps them to overcome challenges (Distelberg, Martin & Borieux 2014, p. 244).

The importance of capacities in accessing and using available resources in disaster situations was indicated by Wisner, Gaillard and Kelman (2011, p. 28), who defined capacities as *"the resources and assets that people possess to resist, cope with and recover from disaster shocks they experience … the ability to either use or access needed resources, and thus goes beyond the mere availability of these resources".* This perspective is supported by Abramson et al. (2015), who proposed a conceptual framework entitled 'The resilience activation framework', which was developed from 12 distinct studies. This model explains how access to social resources can enhance positive adaptation and reduce psychopathology among individuals and communities exposed to the acute collective stressors of a technological disaster (the 2010 Deepwater Horizon Oil Spill). According to the framework, access to, and engagement with social resources can activate resilience attributes. Using social supports, such as family cohesion and warmth, strong social networks, and connection and bonding with others who cope well in the aftermath of disaster, could promote the resilience process, enhance problem-solving, and develop positive emotions. Having and making best use of advanced social resources and social support can facilitate people being better able to withstand the negative effects of a disruptive situation such as a disaster (Abramson et al. 2015). This framework further confirms that the activation of social resources is the key process in disaster resilience. However, the 'resilience activation framework' only indicates the resilience attributes at the individual and community levels, and does not clarify which factors might trigger the activation, or promote the mobilization, of social resources, whereas the present study not only identifies communication as an important resilience factor for families, which enables them to access social capital and mobilize embedded resources for their actions (Häuberer 2010, p. 125), but also illustrates that communication prompts the utilization of families' resources in disaster situations. A lack of communication might cause delays, or underuse, of family resources. In order to understand the experiences and responses of those affected by the 2004 Manawatu-Wanganui floods in New Zealand, Smith et al. (2011) conducted a questionnaire survey and face-to-face interviews with farm households and individuals who were directly involved in the management of the recovery programme in the aftermath of the floods. The findings showed that communication problems, such as a lack of radio transmitters in rural areas, and failed mobile telephone services, left people isolated and stranded in their homes. A lack of information about the ongoing rescue and recovery efforts resulted in less action being taken by farming households because they were ill-prepared. Interpersonal communication was disrupted by failed infrastructure which cut off supplies and services to some households. This research further supports the notion that a lack of communication might cause isolation from social resources and result in negative consequences during a disaster.

Furthermore, communication helped families to maintain their interactions and connections with their resources when confronted with flooding. A sense of being socially bonded with family members, friends, neighbours, and the local community can help families to reduce the sense of

isolation and making them feel supported during and after the disaster. Walsh (2006) pointed out that maintaining engagement with the social world while undergoing adversity was critical for a resilient family. Families sought assistance from their neighbours, friends, extended family, and community services when the difficulties were beyond their capabilities. The interaction between families and their social contacts was significant because family functions were inclined to be disrupted if they were isolated and lacked social support in a crisis situation (Walsh 2006). Kayser, Wind and Shankar (2008) proposed that community connectedness is a major foundation in dealing with devastating events. Smith et al. (2011) recognized the importance of links to pre-existing networks. They proposed that people with stronger pre-existing ties with the community could access help and had positive views on the assistance provided. Indeed, interaction with families' resources helps the functioning of the family, and support from kin, social networks, and the community plays an important role in these interactions (Greeff, Vansteenwegen & Gillard 2012).

5.3.3.2 'Communicating' promotes 'problem-solving'

The present study shows that communicating plays an important role in promoting the problem-solving process during all phases of a disaster. Communicating enabled families to gain access to warning information, which helped them to make decisions and to solve subsequent problems. The gaining of relevant information assists families in coping and adapting more effectively (Walsh 2006). The advantages of having information has been addressed in previous disaster-related research which indicated that by gaining information about the disaster, the impacts could be somewhat mitigated. In a review paper regarding the relationships between source credibility, risk communication, and well-being, Zakaria and Mustaffa (2014) pointed out that if people living in flood-prone areas could gain effective warning information in advance, the negative consequences of flooding could be reduced. Furthermore, information is crucial for ensuring rational and sensible choices, and is essential for building disaster resilience (Aldunce et al. 2015). Information accessibility and its usefulness is also considered to promote individual capacity and community resilience (Tappenden 2014). The pivotal role of information in disaster situations further supports the idea that communicating is an important family resilience factor because it is the major channel through which to gain information.

Virtually all the participants in the present study indicated that their families received flood information in advance through various means of communication. On the one hand, families were information receivers who accessed information passively, and gained warning information in a range of different ways and from different sources, including official channels such as the community residents' committees, television, their employer, and also through informal channels such as neighbours and relatives. Among these, the community residents' committees were identified as the most important sources of delivering warning information to families before the

water levels rose. These findings are similar to previous studies which indicated that police, the Department of Defence, the flood forecasting agencies, local authorities, and the media were official sources for the dissemination of flood warnings (Parker & Handmer 1998) . In contrast to the present study in which the participants highlighted seeking information from their neighbours, Rivera (2012) reported that participants' families, friends, and co-workers were the primary sources of information about a hurricane. However, Smith et al. (2011, p. 547) pointed out that the 'most accessible' method of communication for many households was the information accessed through their neighbours, further supporting the findings from the present study that neighbours are an important source of access to water level information.

Congruent with past research (EXCIFF team 2007; Zhu, Xie & Gan 2011), this study illustrates that information was delivered to families through various means, such as face-to-face conversations, loud speaker announcements, television, telephone calls, mobile phone messages, and the Internet. According to this study, face-to-face conversations between representatives of the official authorities and families were important and effective ways for families to acquire relevant warning information. Again, loud-speaker announcements from the representatives of the official authorities in the flood area was stressed by many of the study participants in suggesting that they relied on these announcements to access updated information. This type of communication helped them to maintain a sense of external connection when they were stranded in their homes with a power failure during the flooding. This finding suggests that loud-speakers play an important role in information dissemination before and during floods in Chinese urban communities. In fact, loud-speaker announcements are a simple way for the local official authorities to deliver warning information for residents living in disaster-prone areas, which is particularly useful for vulnerable populations who are not able to access television, radio, telephones, or the Internet. This finding is supported by Zhu, Xie and Gan (2011) who pointed out that word-of-mouth information positively affected people's risk perception in China. They advised that word-of-mouth information was personal, vivid, and detailed; therefore, it was easy to attract people's attention which positively influenced their behaviours. In contrast, Cretikos et al. (2008) illustrated that radio was the most useful information source for households who underwent a storm in Australia. Rundblad, Knapton and Hunter (2010) also indicated that local radio was the primary information source for households after flooding in the United Kingdom. Other disaster research also supported the idea that radio broadcasts were one of the most important information sources (Johnston 2014; Messias & Lacy 2007). However, radio was not identified as an importance source for Chinese families for gaining information, and this difference might be associated with different forms of disaster management systems in different countries. Chinese families might possess higher expectations of the source of government announcements. Another possible reason might be that the study setting is in urban communities, while the situation in rural communities in China might be different.

On the other hand, families actively sought information, despite the fact that they had already gained information through official and informal channels. This might be attributed to their uncertainty about the current situation, or it may be a protective strategy for their family before they make a final decision regarding follow-up actions (Rundblad, Knapton & Hunter 2010). Alaszewski (2005) also proposed that when it came to the crunch, individuals would seek relevant risk information actively rather than waiting for the information passively. Past flooding experience also motivated people to actively seek information on the risk of future disaster (Fothergill & Peek 2004).

Furthermore, 'communicating' helped families to make appropriate decisions and take effective action. Communicating is a dynamic process in which meanings are developed and clarified via verbal and non-verbal communicating. Communicating is a meaning-making process through which families interpret meanings in other people's words, responses, and actions, in the adverse situation they are undergoing. This is consistent with the definition of communication in the resilience literature, which stated that *"communication is the creation of common meanings and understandings, and the provision of opportunities for members to articulate needs, views, and attitudes"* (Norris et al. 2008, p. 140). According to the participants' descriptions, they asked their neighbours for ideas about evacuation (no intention to leave), and subsequently observed their neighbours' actions (stayed at home), and then decided to stay at home rather than evacuate. The possible explanation for this might be that families created a meaning around the idea of the 'low-risk of the current situation' through verbal and non-verbal communication with their neighbours, thus confirming their judgement of the warning information which, in turn, helped with their final decision. Patterson (2002b) advised that good communication helped families to solve conflicts and problems that arose within the family. Families are less likely to argue and more likely to resolve difficulties if they engage in shared decision-making and negotiation (Mackay 2003).

5.3.3.3 'Communicating' helps with 'easing minds'

Firstly, 'communicating' helps families to gain relevant information, and this sense of being informed reduces their fear of flooding. In the participants' accounts, they emphasised that knowing the peak water level would not reach their residential places made them feel relieved and so they did not scare or worry too much. Gaining information could assist families to reduce their sense of anxiety (Walsh 2006).

Secondly, 'communicating' enabled family members to share their ideas about the flooding situation and to discuss coping strategies with neighbours and family members, thereby lessening their psychological stress in a collective way. For instance, when some family members shared their previous flooding experiences, they were conveying the idea of 'no fear at all, nothing is worse than the past'. This optimistic attitude inspired other family members who had not

experienced the previous devastating floods, and so it helped them to learn how to cope with flooding, and therefore led to a more confident family in the face of the flooding. Furthermore, family members shared their attitudes toward and understandings of disaster, reached agreement on the nature of the disaster they experienced, and then moved on over time rather than feeling worried or anxious. Previous research supports these findings that making meaning of the adverse situation and emotionally sharing these meanings contributes to the entire family's well-being. Nygaard et al. (2011) indicated that the interpretations of the disaster situation helped family members to eventually reach a consensus. Family members emotionally sharing and connecting with each other helped them to find hope, and a positive outlook helped them to cope with their traumatic loss (Gao et al. 2013, p. 125). Overall, communication *"contributes positively to family functioning when there is mutual understanding among family members"*(Gorman, Fitzgerald & Blow 2010, p. 9).

Finally, 'communicating' helps family members to convey their emotional support and demonstrate caring for each other which, in turn, facilitates individual family members bonding closely together and reducing the stress caused by the flooding. Previous research has shown that when a natural disaster occurs, almost all family members are exposed to the same adverse situation, and they cope with the disaster in the same dwelling. Therefore, interactions among family members may influence each other's behaviours and reactions toward disaster (Nygaard et al. 2011). Furthermore, there is a significant positive relationship between family adaption and the quality of communication within the family (Greeff & Lawrence 2012). According to statements from participants in this study, communicating with other family members (either individuals living in the same dwelling, or extended family members living in another place) before, during, and after the flooding, helped their families to build their confidence in fighting against the flooding, to feel supported and cared for, and to relieve their anxiety and fear. Communicating within a family enables every individual family member to link with the family unit in a collective way and to make a contribution to the entire family. Through internal family conversations, household family members shared their beliefs, values, experience, and knowledge, and applied these to making good decisions and taking proper action. Indeed, emotional support is crucial for each individual family member, and is the difference between a family as a unit and a set of separate individuals, because a sense of being in a collective group facilitates people to fight against disaster more confidently than dealing with the difficulties as an individual. Understanding is also promoted during the sharing process. Based on this study, parents communicated with their adolescent daughter(s) or children to share their positive attitudes, and to provide them with emotional support. This might promote youth and children's psychological well-being, and thus, could have an important influence on the entire family's resilience.

5.3.4 Solving problems

When disaster strikes, it can result in various problems ranging from safety and property damage to various life difficulties; therefore, families' problem-solving capacities have been identified as an important resilience factor according to the research findings. Problem-solving is a dynamic process consisting of three major steps: judging information, making decisions, and taking action. These steps are not a simple linear relationship; instead, they overlap and each affects the other. Through appropriate judgement of information, decision-making, and action-taking, families get ready for the impending disaster, rebound to normality shortly after, become stronger, and are better prepared for future disasters. Pre-existing family resources are activated and mobilized for facilitating the problem-solving process through communication. For example, the information sources in the families' pre-existing resources deliver warning information to families through various means of communication, in turn helping them to cope with the flooding. Furthermore, the problem-solving process promotes communication and the interaction of family resources, and creates opportunities to build new resources. Again, problem-solving helps families with 'easing minds'. The process of problem-solving, the factors that contribute to effective problem-solving, and the interaction of 'problem-solving' with other family resilience factors identified in the present study, will be discussed in the following sections.

5.3.4.1 Process of problem-solving

5.3.4.1.1 Judging information

Judging information is the initial stage of problem-solving. Accessing various information sources and making proper judgments of the received information is the basis upon which good decisions are made, especially in the preparation stage. Making a rational judgement of the information turned out to be an important capability of families in helping them to react appropriately. Families received a range of information from different means through communication. However, the quantity of information might be overwhelming and may cause confusion and uncertainty. Timely, appropriate, and useful information has a positive impact on families' protective actions, whereas vague and unreliable information may result in negative impacts, such as over-cautious actions or underestimation of the severity of the consequences of a disaster. In reality, the judgement of an overwhelming amount of information is a complex matter. Thus, the ability to judge information is identified as an important property of problem-solving. Trusting, monitoring, and reflecting facilitates good judgement of extensive information. The trustworthiness of the warning information also helps families to make up their minds and to respond in a timely and appropriate way. The main reasons for the building and achieving of trust might be attributed to official authority, expertise, and information accuracy.

First of all, credible information sources ensure trust in the received information (Zakaria & Mustaffa 2014), and official authority may contribute to the establishment of source credibility.

The research has shown that people's attitude towards information is shaped by the information sources. Information from reliable sources is more likely to be trusted (Steelman & McCaffrey 2013). In contrast to Alaszewski (2005), who pointed out that credible sources for individuals were their acquaintances, the present study found that families particularly trusted information from the community residents' committees and provided various reasons to explain this trustworthiness. Indeed, the motivation, honesty, and integrity of the information being delivered was considered to help with the judgement of trustworthiness (Eiser et al. 2012). The participants believed that the community residents' committee would not deliver inappropriate information and cause unnecessary public panic because they were the representatives of the authorities.

These findings are supported by other studies that the acceptance of information is influenced by the reliability of the information disseminator, and officials or authority representatives were regarded as credible messengers ensuring the public's trust in the disseminated information (Burnside, Miller & Rivera 2007). Hence, common people's faith and trust in officials might play an important role in helping families to distinguish the information they receive. Corniaa, Dresselb and Pfeil (2014) also pointed out that the population take warning messages seriously due to their trust in public authorities. In the 'five part resilience model', Terte, Becker and Stephens (2009, p. 24) indicated that trust in social institutions, such as health providers and local authorities may help individuals to more likely interact with these institutions and, in turn, to achieve positive outcomes, while a lack of trust might have the opposite effect when encountering adverse events. Conversely, Corniaa, Dresselb and Pfeil (2014) indicated that people tend to rely on the information provided by their informal networks, such as neighbours, rather than through official channels during crisis situations because of their mistrust of the authorities. Their study involved 26 in-depth interviews with senior professionals who were in charge of disaster management or crisis communication, 31 biographical interviews with natural disaster victims in seven European countries: Germany, Austria, Italy, Hungary, France, Sweden, and the Netherlands, and 5 focus groups in each of the examined countries except for the Netherlands. The different attitude towards the official sources of information might be attributed to different social environments and the relationship between the public and the government. Another possible reason explaining the trust in the information from the community residents' committee might be that people are prone to be more trusting of the information from sources they know and have a rapport with (Alaszewski 2005). The findings from the present study show that the trust between ordinary families and the community residents' committees was established through interactions of daily life and this pre-existing trust promoted trust in the warning information provided by the community residents' committees.

Furthermore, the expert basis of information may increase its trustworthiness. The participants indicated that the information from the weather forecast program on television, or from the community residents' committee, was science-based and confirmed by scientific research;

therefore, they should trust the science. Epistemic authority is considered to be the underpinning reason for this phenomenon. In recent years, a disaster monitoring, early warning, and forecasting system has been established in China and has played an important role in disaster management (The government of China 2012). In terms of the flood warning and forecasting system, Ma, Tan and Zhang (2010) reported that there are 7,584 gauging stations providing flood information nationwide in China. As well, 3,171 gauging stations provide flood information to the central government via telephone, transmitter-receivers, telegraph, and satellite transmission stations. The double transmitting systems of most of the stations guarantee the reliability of the flood information. In addition, 1,134 hydrological stations provide flood forecasting information (Ma, Tan & Zhang 2010, pp. 18-9). In China, flood warning information is initially developed by the Flood Control and Drought Control Headquarters, and is then disseminated to the community residents' committees at the community level through relevant government departments, after which it is delivered to the public (Chongqing water resources bureau n.d.; Shuibei street office of Shaowu city 2016).

'Chongshang quanwei' (respect for authority), as indicated by Xu and Bing (2012), is one of the Chinese cultural traditions that has existed since ancient Chinese times, and is employed to explain trust in official authority and expertise. Chinese people believe that people who have a more advanced social status, or are knowledgeable, experienced, or older, are more likely to disclose the truth. This phenomenon is associated with the Chinese social tradition of respecting authority, and illustrates the traditional Chinese hierarchical social system (Xu & Bing 2012). 'Respect for authority' has been maintained as a common social norm in contemporary China which can be seen from ordinary people's views of the Chinese government, people of high social status, the knowledgeable and the experienced (Xu & Bing 2012).

Another attribute that assists families to judge information is the accuracy and appropriateness of the received message. Individuals are able to distinguish, compare, and assess the information clearly because of the availability of various information sources (Alaszewski 2005). In the present study, the families compared the information announced by the community resident's committees with the exact water level during the flooding, and confirmed the accuracy of the information at the scene through their own eyes. As a result, the credibility of the obtained information was enhanced, and hence, influenced their next judgement in a positive way. This result coincided with previous research which indicated that information credibility played an important role in recipients' assessment of received information (Zhu, Xie & Gan 2011).

Apart from trust in the information, real-time monitoring of water levels and the gathering of updated information facilitated the families' judgement of the information. As an old Chinese saying recommends: "what you hear may be false, but what you see is true". This might guide the public's behaviour during flooding in China. The most common way for families to remain updated

about the current situation is to seek information actively and independently. Observing water levels frequently during flooding is a useful way for families to stay informed of the updated information. Drabek and Boggs (1968) reported that most families took action to confirm the information they received, with one mode of confirmation being to go directly to the river to evaluate the severity of the hazard. This is consistent with the findings from this study that monitoring might be an important factor affecting families' information judgement processes.

Reflecting on the successful or unsuccessful assessment of information from previous flooding experiences is another strategy that helped the families to judge the information regarding the upcoming, or future, disaster situation. Reflection is a process of self-learning from families' own experiences, or other people's experiences in the past. Previous research has found that adults' responses to the information were affected by their prior experience and knowledge; consequently, effective self-learning through reflection is a useful way to facilitate the judgement of information (Steelman & McCaffrey 2013). One participant chose to trust in rumours and took action accordingly; however, it turned out to be a mistake and she wasted time and physical energy. Thus, she was aware that information from unknown sources was unreliable, and she decided to change her attitude towards information from unreliable sources and to take action more rationally in the future. Other research has shown that people were more likely to trust negative disaster information due to being psychologically over-cautious and trying to protect themselves and their families from potential danger and damage. This may have contributed to the spread of, and trust in, the rumours (Zhu, Xie & Gan 2011). However, through the active reflection process, families' attitudes and responses to information became more sensible over time.

5.3.4.1.2 Making decisions

In fact, obtaining information may not always lead to immediate action (Steelman & McCaffrey 2013); instead, decision-making is a crucial step in motivating relevant action. Making decisions under conditions of uncertainty is considered to be an important property of the problem-solving process, according to this study. Good decisions play an important role in helping families to act effectively in the face of disaster. Poor decisions and inadequate subsequent actions resulted in unexpected financial loss and health issues, as indicated by the participants. In a study aiming to explore the construct validity of the Decision-Specific Reinvestment Scale (DSRS), Laborde, Dosseville and Kinrade (2014) described two decision-making modes. If the decision-making is based on direct affective reactions in confronting options, it is called intuitive decision-making such as when making a decision depends on feelings; if decisions are made in a rational evaluative manner, it is considered to be deliberate decision-making. The decision-making of families was generally based on deliberate decision-making rather than intuitive decision-making, because their decision-making process involved assessing the potential risks and rationalizing the final decision. The decision-making capabilities of families consist of four dimensions,

evaluating risk, assessing costs and benefits, social influence, and discussion with family members.

The first step in making decisions was to justify the potential risks of the impending flooding, and this proper risk evaluation helped with the follow-up decision-making accordingly. Families evaluated risks according to the threat of flooding to their personal safety, health, and property. These findings are supported in other studies indicating that people's perceptions of risk play a vital role in their subsequent behaviours during natural disasters (Ajibade et al. 2015; Burnside, Miller & Rivera 2007; Zakaria & Mustaffa 2014). There are several factors influencing families' assessments of the potential risks of impending disaster. Firstly, family members' previous experiences assisted with risk evaluation. Their previous disaster experiences and knowledge facilitated their capabilities in judging the potential risks (Messias & Lacy 2007). Both positive and negative experiences contributed to risk identification. Health concerns are considered to be another important aspect of risk evaluation, especially in the decision to return home after the floods. The participants indicated that returning to the wet apartment immediately might result in contracting disease; therefore, they stayed in temporary shelters until they felt comfortable about returning home. Previous research also illustrated that health concerns were a crucial factor in families' evacuation and return decisions when Hurricane Katrina struck New Orleans (Messias & Lacy 2007). Again, the perceived degree of potential damage was regarded as one criterion of the risk evaluation. Personal safety is another priority when making evacuation decisions, so ensuring the safety of every individual within the family outweighed any financial losses. This coincided with the family value of 'life being most important'. Potential financial loss was another important factor to consider when evaluating the risks, especially in relation to packing and moving decisions.

Evaluating the potential costs and benefits of corresponding actions is another way to help families to make decisions if the situation is ambiguous. The participants mentioned that their decisions were flexible and optional under some circumstances; hence, they took both the advantages and the disadvantages of particular decisions into consideration. For instance, when it comes to the possibility of their apartment being flooded, families might make different decisions due to their judgement of the pros and cons of the packing and moving actions. They considered the serious consequences of making a wrong decision and the benefits of making a right one. 'Leaving-things-to-chance' may have resulted in weaker intentions to take protective action, which may be explained by protection motivation theory (Dang et al. 2014).

Social influence is another factor that helps families to make decisions. The suggestions and behaviours of neighbours heavily influenced families' decision-making processes, while community residents' committees, police, and patrol officer's recommendations also played certain roles in family decision-making. These findings illustrated that family decision-making was

associated with the social context. Meanings conveyed through the words and actions of social connections were interpreted by the family as symbols of the severity of the upcoming flood, which they then compared to their own judgements and decisions. Families particularly valued their neighbours' choices because they were all exposed to similar risks; therefore, neighbours' behaviours were considered to be reliable signs upon which to judge the current situation and confirm their own decisions. From a socio-cultural perspective, risk is not only an objective dimension but also a social construct. Prior knowledge and discourses that are strictly bound to the socio-cultural context contribute to the measurement, identification, and management of risk (Lupton 1999, p. 30). Risk perception is influenced by groups *"sharing common cultural values, moral principles, and world-views"* (Corniaa, Dresselb & Pfeil 2014, p. 289). Social influence may have positive or negative impacts on individual behaviours. However, based on this study, social influence played a positive role in helping families to make decisions in stressful situations and it also helped to reduce their anxiety.

'Shangliang' (the closest English translation is discussion) is another important method that families used to help with their decision-making, as this phrase appeared frequently in the participants' accounts in this study. Virtually all of the participants indicated that they discussed issues with other family members, especially with their partner, before they took action. This form of collective decision-making was a common method that families used to make their final decisions, according to the findings of the present study. This can be explained by 'family rules' which emphasise cooperation within the family when confronting adverse situations, and which are deeply embedded in Chinese collectivist culture.

5.3.4.1.3 Taking action

Taking protective measures is the behavioural outcome of solving problems. Families' actions in the flooding situation included getting ready, evacuating, cleaning, returning, getting back to normal, and preparing for the future. These actions resulted in families lowering their potential financial losses, ensuring safety, reconstructing their flooded homes, restoring family routines, and becoming stronger in the future. This finding is supported by previous research indicating that problem-focused coping was one way of building resilience (Reissman et al. 2006). Aldunce et al. (2015) demonstrated that preparedness/ response was another disaster resilience factor. More importantly, the majority of participants indicated that their families took action together, including the children, and that this collective coping strategy is rooted in Chinese collectivist culture.

Disaster preparedness is defined as a set of *"self-protective behaviours or precautionary behaviours"* (Mishra & Suar 2012). The purpose of disaster readiness at the family level is to protect family property and to ensure the personal safety of family members. Disaster type, past disaster experiences, and knowledge of the individuals within the family, and their psychological characteristics all contributed to different disaster preparedness behaviours (Mishra & Suar 2012).

The findings from this study further confirmed the importance of previous disaster experience and existing knowledge in the disaster preparation phase. Getting ready included a range of actions, such as planning, packing and moving, and preparing supplies (life necessities, medications). Planning helped families to be prepared with alternative options, and to be flexible towards the upcoming flooding. Packing and moving could reduce potential financial losses. Preparing life necessities, such as food, drinking water, candles, a chargeable torch, and necessary medications helped families to overcome the problems caused by flooding, such as power failure, poor transportation, and being trapped.

Evacuation helped families to stay safe during the flooding. The literature shows that if households perceive a severe threat to their safety, trust the warning messages, and have temporary shelter in mind, they are more likely to evacuate from their home. On the contrary, people lacking experience might underestimate the relevant risks, while people who had positive experiences in overcoming past disasters and who experienced the false warning information may choose to stay at home (Adeola 2009; Baker 1991). In the present study, families made their evacuation decisions and took evacuation action based on their trust of the warning information, their constant monitoring of water levels, and the availability of shelter.

Returning to the flooded apartments helped families to rekindle their sense of ‘home’. Families made great effort to return home which showed their need to re-establish normality and a safe home environment. The findings from the present study showed that families cleaned and disinfected their flooded homes together shortly after the flooding in order to reconstruct their lives. These findings are supported by previous studies showing that families worked together as a unit to rebuild their homes through arranging and assigning tasks to individual family members, and that these collective actions facilitated greater family resilience after they had lost their homes in a fire (Greeff & Lawrence 2012). The meanings inherent in returning to the home, and the renovation activities, has been explained by Gorman-Murray, McKinnon and Dominey-Howes (2014, p. 242), who indicated that returning to their own living space does not simply mean going back to the physical location, but to a safe environment they can call ‘home’. Going back to their apartment is a sense of returning ‘home’ and to normality and security. In the disaster recovery process, the ‘house’ is both material and symbolic; it is a safe place that secures and underpins family members’ sense of self-identity. On the other hand, Gorman-Murray, McKinnon and Dominey-Howes (2014, p. 246) pointed out that disaster not only destroys or damages the physical structure of individual residences, but also ruins their sense of belonging and attachment to the home, which has both material and emotional consequences. This might be the motivation for families rebuilding their homes as soon as possible in the present study. Returning home encompasses another meaning for families, that of getting back to a sense of normality. The findings showed that families tried to restore normality quickly after the flooding through adults going back to work, children returning to school, and the re-opening of family businesses. Orner

et al. (2006) indicated that, in the wake of a natural disaster, survivors needed to shift from a state of normlessness to normality and to reinstate their family routines (cited in Kayser, Wind & Shankar 2008, p. 91). This has been supported by Kayser, Wind and Shankar (2008, p. 95) who pointed out that normalization was the most appropriate response for tsunami survivors in Thailand. Through attempting to establish order out of chaos, returning to normality lowered the stress levels (Kayser, Wind & Shankar 2008, p. 91).

Taking action also helped families to become stronger. Families took action to become physically stronger for future disasters and to have a peaceful mind towards future uncertainty. This has been suggested by previous studies that people living in disaster-prone areas must be physically and psychologically prepared (Zakaria & Mustaffa 2014). Preparedness is especially important for better responses and to recover quickly (Aldunce et al. 2015). Families are one of the basic units of the community; therefore, they should understand the importance of disaster preparedness in order to protect their family members. Each family should have a preparation plan to reduce the potential damage of disaster (Fung & Loke 2010). Preparing for the future is embedded in Confucianism which advocates the importance of preparing for future adversity (Eiser et al. 2012). Importantly, disaster experiences might improve people's awareness of being ready for future disasters, and may change negative situations into long-term positive outcomes (Archer & Boonyabancha 2011).

5.3.4.2 Interaction with other family resilience factors

5.3.4.2.1 'Having family social resources and connections' helps with 'solving problems'

The main Chinese family's social resources and connections identified in the present study assisted them to solve the difficulties caused by the flooding. Having community residents' committees kept these families informed about warning information and also offered practical assistance such as labour and shelter. Neighbours provided families with instrumental assistance, such as moving heavy items, supplying food, providing information and knowledge, and making appropriate decisions. Having relatives helped families with the moving of their possessions, finding shelter to store possessions, evacuating and having somewhere to stay, cleaning flooded rooms, and receiving financial support. Finally, having residing family members helped families to make decisions and take action more efficiently.

5.3.4.2.2 'Having family inner resources' helps with 'solving problems'

'Having family inner resources' also helped families to solve the problems caused by the flooding. Having certain family roles, such as that of decision-maker, gender-related roles, and care-giving roles helped families to make decisions and take action more efficiently and effectively, as did family unity. The self-reliance of the families helped them to deal with their difficulties independently. Family values and beliefs helped them to make relevant decisions more rationally. Having previous life and flooding experiences and knowledge improved families' capabilities in

judging the potential risks of flooding, making appropriate decisions, and taking effective action. Previous flooding experiences helped families to pack and move their possessions more strategically, while having knowledge about the timing of the cleaning of the flooded apartment made the cleaning activities easier. Finally, having knowledge of infection control strategies helped families to take appropriate action to maintain their physical health.

5.3.4.2.3 'Solving problems' promoted 'communicating'

The problem-solving process prompted greater communication and more interaction with the families' resources. The findings showed that, when families judged the information they received and made decisions to pack and move their possessions, or to evacuate, they exchanged ideas and shared coping strategies with their neighbours and discussed the situation with family members to establish solutions. These problem-solving processes facilitated greater communication with the families' resources and connections and created more opportunities for communication.

5.3.4.2.4 'Solving problems' develops family resources

The problem-solving process enhanced the interactions between the various family resources and also expanded these resources. The findings showed that when the water rose, families provided assistance to nearby people whose homes were flooded; or, when families were stranded in their residential buildings, their neighbours, even those who they had not been familiar with previously, offered them assistance. This mutual assistance helped families to strengthen their relationships with their neighbours or to establish new connections with other people facing the same adverse situations, thus potentially expanding their social resources. The increased social cohesion during the problem-solving process allowed more interaction and communication for families with their pre-existing and newly-established connections (Greene, Paranjothy & Palmer 2015), thereby developing more resources. Furthermore, families hired temporary workers to help them renovate their flooded rooms, or consulted the rescuers or police officers while they observed the water levels. These activities all potentially improved the families' social resources which could then be used in response to future disasters.

5.3.4.2.5 'Solving problems' helps with 'easing minds'

Flood disasters threatened family members' safety, and their physical and mental health (Greene, Paranjothy & Palmer 2015). Evidence from the present study showed that 'solving problems' assisted families to reduce their anxiety and to remain positive in the face of flooding. For instance, after families made a decision to relocate to a safer place permanently, they felt relieved because they would not be bothered by the flooding anymore; after families took action to prepare for future potential flood disasters, they felt less worried about the property damage and financial losses; after families took action to prepare (packing and moving their belongings to a safer place), they were positive about the impending flooding because they knew their property was secure and that

their family would not experience significant financial losses; after families evacuated to temporary shelter, they felt no fear because they felt safe. All these actions taken by the family while solving the problems caused by the flooding helped them to positively adjust their psychological status.

5.3.5 Easing minds

Post-traumatic stress disorder, anxiety, and distress are considered to be common stress reactions to natural disasters (Braun-Lewensohn 2014a). Flooding disasters can result in psychological harm and other mental disorders (Greene, Paranjothy & Palmer 2015). 'Easing minds' represents an effective capability which helps Chinese families to reduce their fear, anxiety, and anger, and to remain calm and positive in the face of flooding; therefore, 'easing minds' emerged as a major family resilient factor. Families employed various ways to overcome their psychological and mental disruptions in immediate response to the flooding, or they recovered in the aftermath of the flooding and achieved different levels of 'easing minds' subsequently. The strategies that families used to help them with 'easing minds' included the slightly negative 'avoiding', the more neutral 'accepting', and 'having peaceful mind/making it flow', and the more positive 'not fearing' and 'being positive'. It should be noted that 'easing minds' illustrated how families dealt with psychological and mental stress during the flood disaster. External mental health assistance, such as support from psychological professionals and social workers, was not mentioned in the data for this study. One possible reason for this might be attributed to the severity of the flooding the participants experienced being less than a major earthquake or other unpredictable emergency situation; thus, the degree of impact on family members' mental and psychological health might be less than in other devastating natural disasters. Therefore, families mainly relied on themselves to overcome psychological and mental disruptions caused by flooding.

5.3.5.1 Strategies for 'easing minds'

Avoiding was one strategy that families employed to help them with 'easing minds'. Although avoidance appears to be a negative way to face disaster, it turned out to be a useful strategy for some families to reduce their anxiety in the long-term. The participants expressed their concerns related to future uncertainty; however, they were aware that they needed to remain calm and move on, rather than constantly being bothered by their unexpected future. Avoiding negativity was one way of feeling less stressed (Caldwell & Boyd 2009). This might be a way to live with persistent ambiguity and the possibility of future disaster. In contrast to this finding, the previous literature showed that avoidance-oriented coping strategies may result in ineffective long-term adaptation outcomes (Zheng & Gray 2015). Denial may result in resistance to change, which has the potential to cause long term negative impacts on the family (Caldwell & Boyd 2009). Further studies need to be conducted to explore the short-term and long-term impacts of avoidance on

families' mental health.

Acceptance was another strategy families used to get over the disaster. Acceptance of current circumstances and of unavoidable future disasters was helpful for families to reduce their anxiety, fear, and anger, so that they could face future uncertainty more peacefully. Consistent with the present study, the extant literature shows that acceptance is an effective coping strategy which helps individuals to maintain their mental health after a disaster. Bei et al. (2013) investigated the effects of floods on the older adults' physical and mental health in Australia and explored risk and protective factors through a longitudinal prospective design. In total, 274 older adults (aged ≥60) completed questionnaires pre- and post- flooding. Measures of anxiety, depression, self-reported health, and life satisfaction were included in both of the surveys. In addition, the flooding experience, symptoms of post-traumatic stress disorder (PTSD), stoicism, and psychological coping with the floods were included in the post-flood questionnaire. The findings showed that 71.4% of the participants employed acceptance as a coping strategy, which was also the most commonly-adopted coping method. Acceptance was associated with lower levels of deterioration in mental health after floods. Greeff's study illustrated that the acceptance of the disruptive situation helped the participants to move on after a fire (Greeff & Lawrence 2012) . These results support the findings from the present study that acceptance helps families to maintain a peaceful mind towards what happened to them and towards the future uncertainty they might encounter. As indicated by the extant literature, human beings are part of nature, so they should accept the occurrence of disasters and learn how to adapt to potential changes, and understand that uncertainty is part of nature (Aldunce et al. 2015; Corniaa, Dresselb & Pfeil 2014).

Corniaa, Dresselb and Pfeil (2014) pointed out that acceptance is embedded in fatalism, by which people are inclined to believe that adversities are predetermined and caused by external forces, such as fate, God, or nature. Individuals may have different attitudes towards, and understandings of, disaster; for example, they might consider disaster as a simple natural phenomenon, an unlucky event, or as punishment from God. Different perspectives may result in different reactions and responses in the face of disaster. In the present study, many of the families thought that the floods were a natural disaster which would not just 'go away', so what they needed to do was to face it and overcome the difficulties. This point of view helped the families to take action to deal with the flooding in an active way. This is different from the fatalistic belief that, due to the unavoidable characteristics of disaster, nothing can be done to deal with it, in which fatalism is associated with the lack of confidence of individuals to fight against an adverse situation (Corniaa, Dresselb & Pfeil 2014). However, under certain circumstances, for example, if families make a decision to stay at home while the water rises and surrounds their place of residence, they reassure themselves by saying "that is fate" and "leave-things-to-chance kind of thought." These justifications may partially support fatalistic beliefs. Overall, acceptance illustrates families' attitudes towards disaster and the impacts of disaster, and presents as an effective way of

assisting families to maintain their mental health and to reduce psychological stress.

'Going with the flow' and 'having a peaceful mind' are other attitudes that helped families to ease their minds in the face of the flooding. When the participants mentioned that they should adjust psychologically, they used phrases such as "go with the flow" and "have a peaceful mind"; these thoughts reduced their stress and anxiety towards the flooding. Indeed, the concepts of 'going with the flow' and 'having a peaceful mind' are embedded in Taoist belief (also known as Daoism), a Chinese traditional religion in which Laozi suggested that people should follow the law of nature. In Taoism, 'go with the flow' means to follow arrangements from the outside world, and to avoid intervening or changing the situation you are currently facing, thereby achieving a quiet and peaceful mind (Peng 2006). From the Taoist perspective, 'nature' means 'the law of nature'. For example, the movement from daytime to night-time, or sunny weather being accompanied by rain, are phenomena according to the law of nature which cannot be controlled by humans. Thus, humans should follow and accept the law of nature, and thereby achieve happiness (Ping 2014). Similarly, participants in the present study employed the attitudes of 'going with the flow' and 'having a peaceful mind' as strategies to ease their minds when facing disaster. Yip (2004) indicated that the tradition of Taoism has had a significant impact on Chinese people's mental health. The Chinese mind has been influenced by the writings of Lao Tzu and Chuang Tzu for over a thousand years and is still affected by these cultural roots. Through the analysis of Chinese concepts of mental health in a discussion paper, Yip (2005, pp. 394-5) pointed out that, from the traditional Taoist perspective:

> *Mental health is an ultimate peace of mind and absolute happiness in relating to the universe. Taoism encourages the individual to transcend himself/herself in the universe and the law of nature (dynamic revertism), so to achieve the ultimate peace of mind. The real peace of mind of a person depends on how one really understands and practices dynamic revertism within the law of nature.*

Therefore, according to Taoism, a wise person follows the infinite point of view of nature and lets everything happen naturally. People should let everything happen naturally, and doing nothing to change the law of nature is the best way to achieve high levels of mental health. Accounts from some of the participants in the present study are consistent with Taoist thought as 'going with the flow' and 'having a peaceful mind' were measures they employed to adjust psychologically, in order to reduce anxiety and frustration towards the flooding. Actually, 'going with the flow' has been integrated into a psychological therapy known as "Morita Therapy", and is suggested by Wang (2008) to be applied to help Chinese people who experienced the devastating earthquake of 2008. The strategies the families employed to maintain their mental health in the disaster situation were in accordance with traditional Taoism, although they did not specify that their family had any religious beliefs. This might be attributed to the notion that the principles that are rooted in Taoism were recognized and accepted by lay Chinese people as cultural beliefs rather than as a religion.

‘Being positive’ emerged as a very important factor which helped families to deal with the flooding. Maintaining optimism is part of the building of resilience (Reissman et al. 2006). Being positive in this study included cultivating an optimistic attitude towards the adverse situation, not fearing, making positive meaning out of the disaster, and maintaining one’s sense of humour. These findings are supported by family adaptation models and previous research which has emphasized the importance of positive appraisal as a coping strategy (Reissman et al. 2006). Making meaning of an adverse situation was a way in which families found comfort and solace (Gowan, Kirk & Sloan 2014; Walsh 2006).

Participants in the present study also mentioned that they shared positive attitudes towards the flooding with their families. Positive attitudes from the parents could influence their children’s attitudes and help the entire family to remain positive towards the adverse situation. Parental modelling of emotional dysregulation may play a meaningful role in helping the children to overcome anxiety and stress (Proctor et al. 2007). Previous studies have suggested that the possibility of children developing PTSD after a disaster was associated with their parent’s post-disaster mental status (Li et al. 2010; Proctor et al. 2007). In general, the research supports the existence of these parental roles, suggesting that parental stress has a significant impact on how disaster is responded to by their children. (Pfefferbaum et al. 2014, p. 90). Role-modelling by parents in coping effectively might transmit their individual resilience to the next generation (Yu et al. 2014). MacDermid Wadsworth (2010, p. 550) indicated that children’s resilience is chiefly influenced by their parents, as they may model coping behaviours and provide social support to the young people after a disaster (Banks & Weems 2014, p. 342). Terranova et al. (2015, p. 536) pointed out that parents play an important role in helping their children to adjust their emotions through assisting them to understand the emotional experience or distract them from the stress. Parental functioning is important for children’s adjustment in the wake of disaster.

5.3.5.2 Interaction with other family resilience factors

5.3.5.2.1 ‘Having family social resources and connections’ contributes to ‘easing minds’

Emotional support from the community residents’ committee, neighbours, relatives, and household family members helped families to reduce their anxiety and fear. Sharing coping strategies with neighbours and collectively dealing with the flooding with other household family members also helped to ease feelings of anxiety and panic. Practical support from the family’s social resources also contributed to reducing the anxiety associated with worrying about financial loss and finding shelter. Previous research has suggested that social support, family resources, and social cohesion could help to maintain and increase individuals’ mental health levels after a disaster, supporting the notion that ‘having social resources and connections’ has a positive impact on family members’ mental health in disaster situations. For instance, He, Xu and Wu (2013) examined the immediate effects of coping strategies on the relationship between social

support and post-traumatic growth (PTG), which is defined as *"the subjective experience of a positive psychological change reported by individuals as result of a struggle with trauma"* (He, Xu & Wu 2013, p. 1). A survey study, using the Social Support Rating Scale and the Coping Scale, was conducted with 2,080 adult survivors from 19 of the counties hit most severely by the 2008 Wenchuan earthquake in China. The findings revealed that when the survivors received more social support, they were more likely to report PTG, which illustrates the fact that social support plays a pivotal role in balancing and protecting mental health after a disaster. Apart from adults, the role of social support in improving post-disaster mental health has been found in adolescents who have experienced disasters.

Paul et al. (2015) examined the relationship between PTSD, depressive symptoms, and social support with 2,000 adolescents who had experienced tornadoes in 2011 in the USA. The findings showed that higher levels of post-disaster social support could act as a buffer against symptoms of PTSD and depression. Augustine (2014, pp. 491,503) examined the positive effects of trauma exposure among 301 adult survivors of the 2004 Indian Ocean tsunami. Post-traumatic growth and demographic, individual, family, and social capital variables were assessed in the study. A hierarchical regression analysis revealed that religion, employment, family type, family flexibility, and family communication were significant predictors of post-traumatic growth. Families with fewer personal, familial, and social resources were negatively influenced by the disaster, and found it difficult to mobilise these resources, which resulted in greater distress. Nevertheless, resourceful families with effective communication skills, mutual emotional support, and who exchanged and shared ideas had enhanced PTG, resulting in positive adjustment. Greene, Paranjothy and Palmer (2015, p. 1792) examined the role of social cohesion as a component of vulnerability and resilience to the psychological distress of flooding through a survey which collected data from 2,238 individuals living in flood-affected areas of England in 2007. Bayesian structural equation modelling was employed to assess factors relating to the latent variables of resilience (years in area, family nearby, and social cohesion) and vulnerability (disruption of essential services, flood risk, and previous flood experience). The findings illustrated that flooding was strongly associated with poor mental health, and that social cohesion was strongly associated with reductions in psychological distress. Social cohesion influenced the *"psychological processing of the individual by providing meaningful contact and increasing the sense of purpose and connection with other residents, contributing to more favourable mental health outcomes"* (Greene, Paranjothy & Palmer 2015, p. 1794).

5.3.5.2.2 'Having family inner resources' helps with 'easing minds'

'Having family inner resources' promotes a family's mental health. Firstly, the findings from the present research showed that family self-reliance helped families with 'easing minds' due to their confidence in dealing with the flooding independently. Secondly, 'family values' helped families with 'easing minds' while they were dealing with the flooding. For instance, 'life being the most

important' helped families to accept the financial loss caused by the disaster and to appreciate what they still possessed. Being grateful and appreciating the assistance of others helped families to face the disaster positively. Based on a qualitative study through individual, open-ended interviews with 93 Latino survivors and evacuees from Hurricane Katrina, Messias and Lacy (2007) pointed out that the participants expressed their appreciation of being alive and for the support of their family. Although the participants suffered greatly, they demonstrated resilience. Caldwell and Boyd (2009) also stated that self-reassurance and participants' personal values assisted them to confront the financial losses caused by drought. Families may use their beliefs or values to explain their adversity and overcome a disruptive situation, further supporting the findings from this study, that families' values assisted them to maintain their mental health in the face of disaster. Furthermore, having previous experience helped families to build their confidence in dealing with the flooding and to decrease their feelings of being scared and anxious. More importantly, prior flooding experience helped families who lived in the flood zone to become somewhat accustomed to floods and to adapt psychologically. This phenomenon represents post-traumatic growth (PTG) because the prior flooding experiences helped these families to transform their negative experiences into positive growth and change. Finally, having knowledge, especially of the quality of their housing, helped the families to be confident and not to feel fearful when they were stranded in their residential buildings surrounding by water.

5.3.5.2.3 'Easing minds' promotes 'communicating'

'Easing minds' leads to greater integration and engagement with families' resources which triggers more communication. For instance, family members shared their previous flooding experiences to help other family members reduce their fear of the upcoming floods. During this process, other concerns may be raised, thus prompting more communication, such as how to deal with the flooding, and the difference between previous floods and the impending one.

5.3.5.2.4 'Easing minds' promotes 'problem-solving'

'Easing minds' helps people to maintain mental health which, in turn, promotes problem-solving behaviours in disaster situations. The participants in this study indicated that they needed to adjust psychologically, ease their minds, and then do whatever they needed to do in facing the flooding. This finding shows that 'eased minds' might help families to focus on taking action rather than being anxious or worried. 'Acceptance' of the occurrence of disaster and the possibility of future disaster helped families respond to the disaster immediately to minimize the negative consequences, and to make active changes to adapt to future potential disasters. The acceptance of problems and their positive restructuring may result in favourable coping strategies under crisis circumstances.

5.4 'Acting and Easing': the process of family disaster resilience

The process of family disaster resilience is presented through the core category of 'Acting and Easing', which was created out of the major categories that emerged from the data, including 'having social resources and connections', 'having family inner resources', 'communicating', 'solving problems', and 'easing minds'. The relationships between the core category and each major category are illustrated in the family disaster resilience model below (see Figure 5-1). This model demonstrates the factors that helped Chinese families to prepare for, respond to, recover from, and become stronger in the face of disaster. Furthermore, this model explains how these factors interact with each other, and helped families deal with disaster, and how their disaster experiences fostered these resilience factors and built their resilience to disaster.

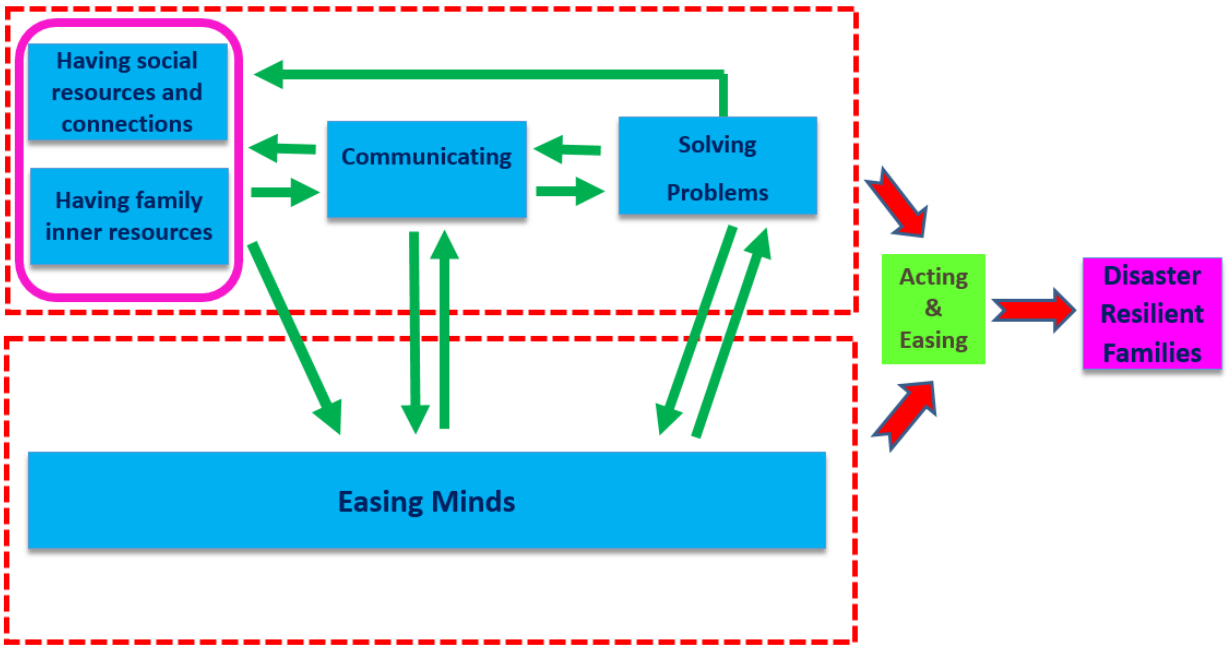


Figure 5-1: Acting and Easing: The process of family disaster resilience

Upper box: The Process of Acting

Lower box: The Process of Easing

The categories depicted in the diagram are shown as a dynamic process which moves from left to right, and as a parallel process involving the top and bottom boxes. The upper box starts with the left-hand section containing 'having social resources and connections' and 'having family inner resources'. The middle of the upper box displays how these resources have been activated and mobilised through the category of 'communicating'. The right-hand section depicts the output, which are the actions taken by the families, in the category 'solving problems'. Activating families' existing social resources as well as their invisible resources through 'communicating' and then

‘solving problems’ presents the acting process. On the other hand, the bottom box represents the major category of ‘easing minds’ which is composed of properties such as ‘avoiding’, ‘accepting’, ‘going with the flow/having a peaceful mind’, and ‘being positive’, all of which work together towards the actions of ‘easing’. The process of ‘Acting and Easing’ represents the process of family resilience in disaster situations.

The family disaster resilience model also shows the relationships between the major categories and the core category. ‘Having social resources and connections’ and ‘having family inner resources’ are two fundamental and critical strengths that families possess and rely on to undertake ‘solving problems’ and ‘easing minds’ when they are faced with disaster. ‘Communicating’ activates the families’ resources, serves the interactions with different resources, and enables the maximal utilization of existing resources. ‘Communicating’ functions as the connector and mediator between families’ resources and the problem-solving process. The action of ‘solving problems’ not only influences communication and the interaction of families’ pre-existing social and inner resources, but also creates opportunities to establish and develop new resources. Furthermore, ‘having social resources and connections’, ‘having family inner resources’, ‘communicating’, and ‘solving problems’ form the dynamic process of ‘acting’, and all these categories contribute to different measures of ‘easing minds’. On the other hand, through different strategies described in the properties of ‘avoiding’, ‘accepting’, ‘going with the flow/having a peaceful mind’, and ‘being positive’, ‘easing minds’ functions as the internal driver of families’ mental and psychological adaptation to disaster, influences ‘communicating’ and ‘solving problems’, and eventually leads to the process of ‘easing’. Finally, the process of ‘acting’ and the process of ‘easing’ carry equal weight and contribute to disaster resilient families.

Moreover, this family disaster resilience model illustrates a potential and rational process of fostering disaster resilient families. According to the model, ‘acting’ stands for families’ physical actions, behaviours, and social engagement in the face of disaster, while ‘easing’ represents families’ psychological and mental adjustment and adaptation to disaster. On one hand, ‘acting’ helps families to build their physical capabilities and confidence in dealing with disaster, while on the other hand, ‘easing’ helps families overcome mental and psychological stress. The output of ‘Acting and Easing’, namely, actions taken by families, especially preparatory actions for future disasters, along with the gradually formed peaceful mind towards future uncertainty, presents a continuously changing process that leads to improvements in family disaster resilience. In addition, due to the frequent occurrence of disaster and its short- and long-term impacts, families gain more knowledge by drawing on their experiences, establishing social connections, and promoting social resources accordingly, and thus, gradually become psychologically stronger. All these positive changes contribute to the fostering of family resilience factors, and helps families to become more resilient in the face of future disaster. Therefore, family disaster resilience is a dynamic process rather than a static concept.

To summarize, this family disaster resilience model contributes to the gaining of deeper insights into Chinese family resilience in the disaster context through understanding how families prepare for, respond to, and recover from disruptions caused by disaster, and how families activate, mobilise, and foster their resilience. Different from extant family resilience models and relevant family resilience research, this model presents specific Chinese family characteristics in the Chinese socio-cultural context and a number of unique disaster-related family resilience factors. The following section discusses these specific factors and interprets the unique interactions of the family resilience factors presented in this model from the disaster research perspective in the Chinese socio-cultural setting.

5.4.1 Specific family resilience factors presented in the model

This family resilience model is grounded in real disaster situations and draws on Chinese families' disaster experiences in Chinese urban communities. Therefore, even though some of the major categories somewhat overlap with the family resilience factors identified in current family resilience models and research, the gerund-style categories present the specific action-dominated dynamic family resilience process in disaster situations. Again, the categories and properties identified and defined in the Chinese socio-cultural context illustrate contemporary Chinese families' traits in the face of disaster. The similarities and differences between the family resilience factors identified by the present study and those proposed in previous family resilience research in the disaster context and in adverse situations, family resilience concept-associated literature reviews, and in existing family resilience models, are presented in Table 5-1 below.

Table 5-1 Major categories and associated properties of the present study

Categories	Properties
Having social resources and connections [A,B,C,D]	• Chinese grass-roots community organizations • Family social resources [A,B,C,D], neighbours [A,D] • Family resources [A,B,C,D], relatives [A,B,C,D], household family members [A,B,C,D]

Having family inner resources [A,B,C,D]	• Family norms
	  ▪ Family roles [B]
	  ▪ Family unity [A,B,C,D]
	• Family self-reliance [A,B,C,D]
	• Family values and beliefs [A,B,C,D]
	• Having prior experience [A,B,D]
	• Having knowledge [A]

Communicating [A,B,C,D]	• Activating and connecting families' resources • Accessing information [A,B,C] • Sharing [A,B,C,D]

Solving problems [A,B,C,D]	• Judging information: trusting, monitoring, reflecting
	• Making decisions [D]
	  ▪ Justifying potential risks
	  ▪ Evaluating potential costs and benefits
	  ▪ Social influence
	  ▪ 'Shangliang' [D] (the closest English translation is discussion)
	• Taking action [A,B,C,D]

Easing minds	• Avoiding [A,B,C] • Accepting [B,D] • Going with the flow/having a peaceful mind • Being positive [A,B,C,D]

A: also identified by family resilience research in the disaster context (see Chapter 2, Table 2-6)
B: also identified by family resilience research in adverse situations (see Chapter 2, Table 2-5)
C: also identified by the family resilience concept-associated literature (see Chapter 2, Table 2-3)
D: also identified by current family resilience models (see Chapter 2, Table 2-4)

Overall, to some degree, the main family resilience factors identified in the present study have been proposed in previous family resilience models and the relevant research, despite the different adversities that the families experienced. These common resilience factors include family social resources, family's inner resources, communication and problem-solving. However, it should be noted that the wording of, and emphasis on, each category, as well as the associated properties defined in each major category, are interpreted differently to those in the existing literature due to the specific disaster situation and the Chinese socio-cultural context. In addition, one major category, 'easing minds', comes from the participants themselves and is particularly situated in the Chinese socio-cultural context. The category, 'easing minds', has not

been identified in the rest of the literature.

In terms of social resources (also indicated as social capital in some of the literature), although these have been identified as pivotal resilience factors in the existing family resilience research, and are crucial elements in some family resilience models, the roles of the different social resources remain unclear. The properties of the social resources and the ways in which people mobilize them vary due to different socio-cultural contexts. The most important social resources proposed in the present model include the community residents' committees, neighbours, relatives, and household family members, which partially coincides with the findings of other relevant studies. However, they illustrate the typical social resources that contemporary Chinese families possess and are likely to seek help from.

The community residents' committee is a Chinese urban community service that operates very differently from services in western and other eastern countries. It is a residential community level organization which plays an important role in Chinese community-based disaster management. The specific role of the community residents' committees in the Chinese grassroots management system and disaster management system are identified and confirmed in the present study, which is in line with the transition of Chinese social support services shifting from traditional work unit support for ordinary families to community-based social services for residents living in residential communities. In addition, traditional neighborhood values and ties are still maintained in contemporary China, although some segregation does exist in the gated communities of the major cities. Again, no matter what the actual living arrangement is, Chinese extended family members are still the main social resources that the family relies on in adverse situations. For instance, in the present study, the majority of aged parents live apart from their adult children; however, their adult children were the main sources of shelter and emotional support. Instrumental support from in-laws was also prevalent. Physical, emotional, and financial support from extended family plays a crucial role in helping disaster-struck families.

With regards to family inner resources, family norms and values are in accordance with contemporary Chinese family values. Filial piety remains a core virtue and is valued by Chinese families which can be seen in family members' caring roles. Family hierarchies have faded to some extent, which can be seen in joint decision-making and female-dominated decision-making within families. Traditional gender-related roles are still retained in some families, especially in the designated tasks while preparing for the disaster, whereas changes were also seen which demonstrated that women's roles in the family were not predominantly to be obeyed. Not only is the man in the family the main bread-winner and responsible for coping with disaster, but now the joint roles of women in the family present as being important as well. Children's roles during the flooding were not emphasised by their parents and/or grandparents, and this is consistent with the Chinese traditional culture that emphasises that children are protected and instructed, rather

than involved in dealing with family difficulties. Family unity is embedded in Chinese collective culture and 'harmony' is advocated for within Confucianism. In addition, although family values and beliefs are identified as a property of family inner resources, they are different from the belief systems proposed by extant family resilience models which are mainly derived from the Western perspective, or from family resilience-associated research in other settings. For example, religious or spiritual beliefs have been reported to be positively associated with family resilience in several empirical studies, and have been identified as pivotal family resilience factors in extant family resilience models. However, religious beliefs are not considered as important factors influencing Chinese families' disaster resilience in the present study, as only one participant mentioned her family's Buddhist beliefs. This difference might be attributed to the roles of religion or spirituality played in Western and Chinese settings. Religion is relatively important in some Western countries; however, it is not obvious in contemporary China. In addition, 'self-reliance' is interpreted differently in the disaster context and in the Chinese socio-cultural context. On one hand, Chinese families have a strong internal locus of control through their family, and this is similar to the extant literature. On the other hand, due to unexpected situations that may eventuate as a result of a disaster, families have an external locus of control; that is, they believe that the government will provide support for them to help them deal with adverse situations. This has not been previously pointed out in the extant literature. Furthermore, 'having previous experience' and 'having knowledge' have been identified as two important properties of resilience, because the data from the present study has shown that knowledge gained from family members' previous life and flooding experiences has helped them to deal with flooding more effectively and to build their confidence. These two factors have also been identified as important family resilience factors in other disaster research, showing their significance in promoting family disaster resilience.

'Communicating' is defined and acts differently in the present family disaster resilience model in comparison with "communication" identified in other research or proposed in the extant family resilience models. 'Communicating' is composed of internal and external communication, both of which help families to deal with disaster. 'Communicating' plays a vital role in connecting existing family resources, problem-solving actions, and in easing minds. The present study expands the focus of communication within families to engaging with families' social resources through external communication. 'Communicating' highlights both internal and external communication, and values the critical role of external communication in accessing and exchanging information and sharing coping strategies, and internal communication in providing mutual emotional support in disaster situations. In particular, 'activating and connecting family resources' is identified as an important property of 'communicating' in the proposed model, showing the specific role of communication in mobilizing pre-existing resources. However, the existing research findings and models pay more attention to the internal communication of families. For instance, Isserman et al. (2014, p. 258) indicated that Walsh's *"family communication patterns encompass the*

exchange of information within the family". The difference here might be due to different disruptions caused by other adverse situations which might only influence the family itself, such as families with a sick family member, or families undergoing a difficult situation such as a divorce, whereas disaster has collective impacts on all family members, their neighbours, and entire communities.

Again, 'solving problems' is interpreted differently in the present family disaster resilience model compared to other studies and in the extant family resilience models. 'Solving problems' in the present study highlights the importance of 'judging information' and 'making decisions', and explains how these influence subsequent action-taking. This is different from other models or research findings which have mainly emphasised coping strategies and the taking of action. This difference might be attributed to the specific disaster situation, especially flooding, in which information plays an important role in decision-making and action-taking. In addition, collectivism is part of the underpinning Chinese culture that influences Chinese families' problem-solving behaviours. Collective coping, particularly families' collective decision-making and action-taking processes, illustrate the collectivist tradition. In the disaster situation, all adult family members of the household were engaged with preparing, responding, and recovering activities, with their designated tasks and existing roles in their families contributing to corresponding cooperative actions. Family members avoided quarrels and arguments while making important decisions, and they maintained family harmony through discussion, negotiation, and compromise during the disaster. In addition, household families bonded with their extended family members, neighbours, and the residential community residents' committees to fight against disaster as a collective unit. All of these activities can be explained and understood in the context of the Chinese collectivist social environment.

'Easing minds' originated from an in vivo code stemming from the participants' own words in the present study, demonstrating strong Chinese characteristics. 'Easing minds' includes various strategies ranging from positive, neutral, and even negative activities; however, as long as the strategies could help families to alleviate their psychological and mental stress, they were defined as resilience factors in this study. Being positive is another factor that has been confirmed by other studies and models. Avoidance has also been identified as a resilience factor in family resilience studies in disaster situations; however, the meaning of avoidance is to avoid negative social influences (Caldwell & Boyd 2009) and potential risks (Kirschenbaum 2006), which is different from the present study. 'Going with the flow' and 'having a peaceful mind' are embedded in the Chinese Daoist philosophy. Family values and cultural beliefs helped them with 'easing minds', whereas religious beliefs and spirituality did not play a critical role in helping Chinese families in disaster situations compared to families in other settings with strong religious beliefs.

Moreover, some of the family resilience factors emphasised in the extant family resilience models

and in research in other settings have been integrated into this model. For instance, although the present model does not particularly indicate that 'family financial status' is a resilience factor, the use of savings and the re-opening of family businesses were strategies that the families in the present study employed in getting their lives back to normal. In addition, the housing conditions helped families to gain confidence when they were stranded in their residential buildings, but these are not specified in the present model. Similarly, 'family member's relationships' are presented within the family roles, rather than as a separate resilience factor.

It needs to be clarified that some of the family resilience factors that are present in the extant family resilience literature are not considered to be important family resilience factors for Chinese families in the disaster context according to the data from the present study. For instance, based on existing knowledge, resilient families are more likely to maintain certain organizational patterns than others, including spending time together, and partaking in family traditions and celebrations (MacDermid Wadsworth 2010, p. 550). However, these factors did not emerge as resilience factors in this study. Indeed, family time and family recreation were not mentioned at all by the participants. This might be attributed to the specific disaster situation in which families' main concerns are different from those in other adverse situations.

To summarize, the major categories and associated properties of this family disaster resilience model illustrate unique Chinese families' characteristics, and fit the specific Chinese socio-cultural context. As indicated in Chapter Two, the family resilience factors that have been identified in the disaster context and in other adverse situations come primarily from research conducted in other settings, with only three papers reporting on rural families' resilience factors to drought in the Chinese context. In addition, most of the resilience factors identified in existing family resilience models have been created, interpreted, and understood from the Western perspective and influenced by Western culture. Even though Lee's Family Resilience Model integrated the resilience factors developed from interviews with Korean families, the unique Korean socio-cultural context was not specified in analysing the data. The present model is a pioneering study exploring and interpreting family resilience factors in flooding situations in Chinese urban communities.

5.4.2 Unique interpretation of family disaster resilience presented in this model

Apart from the specific categories and properties identified in the present study, the relationships among the major categories and the dynamic process depicted in the present family disaster resilience model differ from other family resilience models (detailed information about other family resilience models has been presented in Chapter 2, see Table 2-4).

Overall, MuCubbin's Resiliency Model of Family Stress, Adjustment and Adaptation presents

eight key factors including: ‘stressors’, ‘piled-up demands’, ‘family type’, ‘family meaning and schema’, ‘situation appraisal’, ‘family resources’, ‘social support’, and ‘families’ subsequent coping skills’. The outcome of the interaction of these factors is either positive, known as ‘bonadaptation’, or negative, known as ‘maladaptation’ (Rungreangkulkij & Gilliss 2000). Similarly, Patterson’s Family Adjustment and Adaptation Response model highlights the balance between stressor-resulted demands and families’ coping capabilities (Patterson 2002b, p. 236). Walsh’s family resilience model illustrates the interaction of three domains of family functioning: ‘belief systems’, ‘organizational processes’, and ‘communication processes’ (Walsh 2016, p. 19). Lee’s ‘family coping with stress’ model comprises three factors, ‘stressors’, ‘family resilience’, and ‘family functioning’, in which family resilience is presented as a static set of traits covering ‘intrinsic family characteristics’, ‘family member orientation’, ‘externally directed’, and ‘responsive-to stress’. Lietz’s ‘the process of family resilience model’ identifies 10 family strengths and illustrates how they help families’ actions through five different stages. However, Lietz’s model does not present the relationships among these strengths, but rather depicts the relevant strengths within the different stages. Henry, Morris and Harrist (2015) Family Resilience Model (FRM) includes five key concepts: ‘family risk’, ‘family protection’, ‘family vulnerability’, ‘family adaptation’, and ‘family situational meanings’, and these major concepts are integrated within the ‘family adaptive systems’ and ‘ecosystem’. The FRM is designed for multi-level, multi-system, and multi-disciplinary research and application.

On the whole, as indicated in Chapter Two, and depicted in the above section, existing family resilience models have either been derived from research findings in general adverse circumstances or have drawn upon the theoretical and empirical literature. Therefore, the focus of, and interaction between, the key concepts in each model is different. The proposed family disaster resilience model in this study depicts key family resilience factors in both the disaster and the Chinese socio-cultural context, and explains how the interactions between these factors help families deal with, and promote their resilience to, disaster. Indeed, disaster is a socially disruptive situation resulting in not only environmental damage, but also social change; therefore, family disaster resilience is strongly influenced by the social surroundings and is embedded in relevant cultures. This model provides a deeper understanding of family resilience from an interpretive perspective, especially taking into consideration the specific disaster situation and the embedded Chinese culture within Chinese families. In addition, this model places emphasis on the pivotal roles of ‘communicating’ in connecting to other family resilience factors, and uses the ‘Acting and Easing’ process to illustrate how families apply their resilience factors in dealing with disaster and how they foster family resilience. This unique interpretation of family resilience is different from the processes of family resilience presented in the extant family resilience models. Moreover, this model provides a dynamic process for understanding short- and long-term family resilience through the disaster preparation, response, and recovery phases, with a focus on the interaction

of the resilience factors, rather than on the outcomes of coping.

5.5 Summary

Overall, this chapter has discussed the conceptual categories and associated properties of resilience in relation to the ‘Acting and Easing: the process of family disaster resilience’ model through a critical comparison of the existing evidence. The proposed family disaster resilience model extends the knowledge of current family resilience models, provides a new perspective to understand family resilience in disaster situations which cause collective impacts on families, and in the particular socio-cultural Chinese context. The following chapter will summarize the implication of this newly developed family disaster resilience model.

CHAPTER 6 CONCLUSION AND IMPLICATIONS

6.1 Introduction

Chapter Five presented a discussion of the family disaster resilience factors and the proposed family disaster resilience model, known as the 'Acting and Easing: the process of family disaster resilience' model, which is specifically situated in the Chinese socio-cultural context. This chapter starts with a demonstration of the achievement of the study's objectives, after which the study conclusions are presented by synthesizing the major elements of the previous chapters. Next, the limitations of the study will be acknowledged. The implications of the findings for the evolution of the concept of family resilience will be explored, as will the direction of future family disaster resilience research. A number of guiding suggestions for disaster management and health professional practice will then be elucidated, and a brief summary of this study will be outlined to conclude the chapter and the thesis.

6.2 Achievement of the study's objectives

Overall, the study objectives have been achieved. The specific objectives of the study are to: (1) Understand and identify significant factors of family disaster resilience in China; and (2) Develop a family disaster resilience model for the Chinese context. The findings have identified five major factors which assist families to prepare for, cope with, and recover from disaster, and also to become stronger in response. These findings have achieved the study objectives of understanding and identifying the significant factors of family resilience to disaster. More importantly, the study findings have proposed a model entitled 'Acting and Easing: the process of family disaster resilience', which explains the interactions between these factors and the dynamic process of family resilience in disaster situations in the Chinese socio-cultural context. This allows for the achievement of the second objective of this study.

6.3 Study conclusions

Family resilience has been studied in a range of adverse situations; however, family resilience to disaster still remains unclear. This study has explored and identified important family resilience factors in a particular disaster situation by using a grounded theory approach through interviews with families that have experienced flooding in an urban district in Chongqing City in the south-west of China. The findings from the present study have presented the critical roles of the following family resilience factors: 'having social resources and connections', 'having family inner resources', 'communicating', 'solving problems', and 'easing minds', that contribute to the disaster resilience of families in China. The study has also identified the disaster-specific properties of these family resilience factors, including 'having knowledge', 'judging information', and 'making decisions', which haven't been emphasized in family resilience research in other disciplines and

other general adverse conditions. In addition, the study findings have highlighted the importance of families' external forms of communication with their social resources, and their internal communication within their family. The proposed model presents the unique role of communication in activating and connecting families' resources in disaster situations. Identification of these important family resilience factors and their specific properties in particular disaster situations could provide evidence to develop relevant approaches to foster these factors and, in turn, to promote family resilience in the face of disaster.

Furthermore, the study of Chinese family strengths has been quite limited in the literature, and Chinese family resilience in disaster situations is a poorly understood phenomenon. This study has identified specific Chinese families' resilience factors, and their associated properties, that have been shaped by the Chinese socio-cultural context and which fit contemporary Chinese family structures and values. These Chinese structures and values differ from those of Western families and families in other eastern settings, thus advancing the conceptualization of Chinese family resilience to disaster. This study has identified that community residents' committees, neighbours, and extended family members are the major social resources from which families receive and seek help in urban China. Chinese community residents' committees' essential roles in providing warning information and services for residential families in disaster situations have been identified. This phenomenon is consistent with the contemporary Chinese disaster management system and the current stage of social transition that has seen a shifting of social services from ordinary people's work units to community residents' committees in China. Neighbours are another major source providing support for families under the circumstances of disaster, which presents the traditional Chinese neighbourhood that valuing the mutual help of neighbours.

Extended family members are still important support resources when families encounter disaster in modern China, despite the gradually changing family structure and living arrangements. Traditional Chinese family values such as filial piety, the caring roles of family members, and family harmony contribute to families' decision-making and action-taking behaviours. These findings are in line with the extant research which shows that these traditional Chinese family values are still maintained in contemporary China (Xia et al. 2013; Xu & Xia 2014). The Chinese collectivist culture is still rooted in Chinese families and their social relationships (Xu & Xia 2014), which can be illustrated by families' collective decision-making and action-taking processes and the collective nature of coping with their neighbours in disaster situations. In addition, the strategies employed for 'easing minds' presented typical Chinese characteristics when Chinese people feel anxiety and stress. Among the strategies used for 'easing minds', acceptance of what has already occurred in the past, what is happening in the present, and future uncertainty are important ways for Chinese families who live in the flooding zones to move on. 'Going with the flow' and 'having a peaceful mind' are two other strategies commonly employed by Chinese

families toward disasters which are embedded in Taoist thought (Peng 2006). Understanding and identification of these socio-culturally specific factors can inform culturally-appropriate practice.

The present study is, to the best of my knowledge, the first initiative to develop a family disaster resilience model grounded in field data collected in China. The 'Acting and Easing: the process of family disaster resilience' model provides a new perspective for understanding family resilience in a specific adverse situation (a disaster with its associated stressors and adversities, (Norris et al. 2008)) and the specific Chinese socio-cultural environment. Different from previous disaster resilience research focusing on the recovery stages of disaster, this study has explored family resilience factors before, during, and after a disaster and explained the dynamic process of building family resilience. The focus of this family disaster resilience model is consistent with the contemporary tendency of disaster resilience research to shift the emphasis from discovering resilience in the disaster recovery phase to an emphasis on the building of resilience before the event for better preparation, response, and recovery. In addition, this model further confirms that family disaster resilience is an ongoing and changing process which can be improved and strengthened (Abramson et al. 2015), rather than simply being a set of static family-based characteristics.

In summary, this study adds new knowledge to the limited literature on family disaster resilience in China. Indeed, a better understanding of this phenomenon will provide evidence to develop relevant initiatives to foster families' resilience factors and improve the utilization of these factors when confronting disasters. Therefore, this research provides evidence for resilience-oriented approaches to the fostering of family disaster resilience in China.

6.4 Limitations

There are two limitations of this study which need to be addressed. Firstly, this family disaster resilience model should be considered in the specific socio-cultural and situational context with some caution. This study is based on interviews with participants from one geographical location with flooding experiences in the south-west of China. It is feasible that participants' experiences would be different in other geographical and socioeconomic locations. In addition, this model is based on participants' flooding experiences, which may differ from other types of disasters, such as earthquakes, terrorism, or communicable disease emergencies, due to the severity of the damage and the threat to human lives. Because disaster is a complex concept and consists of various types, it is possible and understandable that the results from other disaster situations might be different. Therefore, this study requires refinement with other populations in other geographical locations with different disaster experiences.

Secondly, only one adult representative from each family was interviewed in the present study which might not cover all family members' opinions. In addition, this family disaster resilience

model is developed on the basis of the perspectives of one family member within each family unit. Although the majority of the interview questions developed by the researcher are related to family experiences and perceptions, it might be more reasonable to recruit other family members to join the interview, such as children, in order to gain different perspectives. Though it is not unusual that only one family member representative has been interviewed or surveyed in previous family resilience research (Greeff & Lawrence 2012; Xin et al. 2013), improvement to this approach in future studies could include better representation and multiple family representatives.

Having said this, the purpose of developing this family disaster resilience model is not in order to generalize, but to identify family disaster resilience factors and to understand the relationships and interactions between these factors in the Chinese socio-cultural context. The findings from the present study have originated from the interpretive domain which are not meant to be used for generalizations to the broader environment (Bryant & Charmaz 2007). Instead, the present study provides an interpretive model to facilitate the better understanding of family resilience in the disaster context in China. However, this first step of identifying and understanding family disaster resilience in the Chinese socio-cultural context has the potential to be extended to other disaster types and settings. Family resilience factors presented during the flooding might have something in common with family resilience factors showing in other disaster sub types such as earthquakes and landslides. Nevertheless, the presentation of family resilience factors might be influenced by different disaster stage/temporal factors (early versus later stage of a disaster), target study participants etc, therefore further investigation are needed. In addition, findings from this study may be generalizable across other cultures and arguably especially across some other Asian cultures; however this requires additional research and any generalisation drawing directly upon the findings of the current study could be seriously flawed.

6.5 Implications

Disasters have a negative influence on family well-being and functioning, destroy family property, and raise families' stress levels (Augustine 2014; Lowe, Rhodes & Scoglio 2012; McDermott & Cobham 2012). Families can suffer tremendous disruption, trauma, and losses, and even severe psychological distress, in the wake of major disasters (Hackbarth et al. 2012). Family resilience research in the disaster context is important for providing evidence to develop approaches that assist families to deal with disruptive disaster situations. The findings from this study have significant implications for the evolution of the family resilience concept, the direction of future family resilience research, and the recommendations for practice of disaster management and population health.

6.5.1 Evolution of the family resilience concept

The present research helps to advance the existing family resilience knowledge-base through

illustrating the characteristics of the unique resilience factors of Chinese families in confronting disaster. The 'Acting and Easing: the process of family disaster resilience' model not only identifies the crucial factors which help families prepare for, cope with, and recover from disaster, and to become stronger in a disaster situation, but also explains the relationship between these factors and the dynamic process of family resilience to disaster. Four major resilience factors that emerged from this study have been indicated in other family resilience models, including 'having social resources and connections', 'having family inner resources', 'communicating', and 'solving problems'. However, in this study, the properties of each of these factors have been shaped by the specific disaster situation and the Chinese socio-cultural context. Furthermore, this study adds a unique category known as 'easing minds' as one of the critical factors which helps Chinese families to reduce the mental and psychological stress caused by disaster. This strategy is somewhat different from the extant family resilience models and relevant studies in which religion and spirituality play relatively more important roles in family resilience. More importantly, this model proposes that 'communicating' functions as the core element connecting family resources and problem-solving, while 'easing minds' acts as the inner driver across all phases of a disaster, thus presenting a new perspective for understanding family resilience in a disaster situation. The focus and specific interpretation of the interaction of major family resilience factors proposed by this family disaster resilience model have not been presented and indicated in the extant family resilience concept studies and in other proposed family resilience models. Therefore, the findings of this study contribute to the evolution of the family resilience concept. The new knowledge produced by this study is expected to provide research evidence for theorists to conceptualize family resilience in a more comprehensive way through considering the situational and socio-cultural context of family resilience, which in turn, promotes the understanding of this complex concept.

6.5.2 Recommendations for future research

There is only limited research connecting family resilience and disaster globally, and there is little family resilience research that has been conducted on disaster situations in the Chinese socio-cultural context. The present study is a pioneering work in understanding Chinese family resilience in disaster situations in China; therefore, there are important implications for future family resilience research in the disaster context.

Firstly, it would be worthwhile to conduct more research focusing on families' disaster experiences and exploring the resilience factors at the family level which help the entire family to deal with disaster situations due to the rapid increase in disasters worldwide and the tremendous adverse impacts they have on families. The present research employed a qualitative paradigm to identify and understand the family resilience factors, and to provide deeper insight into the process of family resilience in both the disaster context and in the Chinese socio-cultural setting. The family

resilience factors and their associated properties identified in the present study, and the proposed family disaster resilience model developed through the grounded theory approach, could be further explored, examined, and refined in other disaster situations such as earthquakes, hurricanes, and other locations in China or in other settings globally. For instance, it is valuable to further investigate the roles of the community residents' committees, neighbours, extended family members, family self-reliance, family religious beliefs, and families' previous disaster experiences and information judging in promoting family disaster resilience. Comparative studies could be considered in the future to examine the differences in family disaster resilience across various socio-cultural settings. For instance, the comparison of family resilience in a collectivist culture and an individualist culture in disaster situations deserves more investigation in order to understand culturally-specific family disaster resilience.

Furthermore, the family disaster resilience model proposed by this study might be the initial step in developing a relevant instrument for measuring or assessing family resilience to disaster from an empirical perspective. Further studies need to be considered to explore and expound upon the key categories and properties of family disaster resilience based on the present family disaster resilience model, thereby developing and validating a culturally-appropriate instrument for measuring family disaster resilience. On the other hand, this family disaster resilience model might provide a culturally-informed framework for understanding family resilience to disaster from a qualitative perspective and to inform future family disaster resilience-related qualitative research.

Finally, the family disaster resilience model provides evidence for the development of resilience-oriented intervention approaches. Further studies should be considered to explore the potential application of this proposed model and to examine its impacts on strengthening family resilience in disaster situations. For instance, 'having knowledge' has been identified as an important property of one of the family resilience factors; however, ways in which to help families gain and accumulate knowledge, what kind of knowledge is essential for assisting families to deal with disaster situations, and how knowledge influences families' behaviours in different Chinese communities and segments of society still remains unclear and needs further investigation. 'communicating' has been identified as an important family resilience factor; therefore, further investigation is warranted, especially in how to help various families achieve effective internal and external communication in a disaster situation, and what means of communication could be applied in different disaster situations in various communities located in different geographical locations. 'Acceptance', 'going with the flow', and 'having a peaceful mind' have been identified as important properties of 'easing minds'. Therefore, how to apply these strategies and the effects of the application of these strategies on Chinese families' mental health after they experience various disasters are further areas for investigation.

6.5.3 Recommendations for practice

The understanding of family disaster resilience uncovered in this study offers a starting point for the development of potential interventions that may benefit families threatened by disaster. The family resilience factors identified in the present study and the proposed 'Acting and Easing: the process of family disaster resilience' model provide a framework to inform practical application in different areas.

With regards to disaster management practice, this study provides initial evidence and a potential framework to inform the development of disaster management policies, strategies, and programs related to helping families to better prepare for, respond to, and recover from disaster in China, and potentially, in the global context. The current findings point to five important factors that could be addressed by intervention efforts, including: (1) social resources, such as community residents' committees, neighbours, relatives, and household family members; (2) family inner resources, including family norms, family self-reliance, family values and beliefs, and families' lived experiences and disaster-related knowledge; (3) communicating, including external communication such as accessing accurate warning information, staying informed of the updated information, and maintaining connections with community residents' committees and neighbours; and internal communication, particularly emotional exchange and sharing with family members; (4) problem-solving, especially the judging of information, and collective decision-making and action-taking based on designated tasks; and (5) easing minds towards existing and future disaster. These factors which have been identified in this study may become the focus of an intervention for promoting family disaster resilience in China.

For instance, relevant strategies could be developed to improve families' social connections and to strengthen their social resources. Although community residents' committees have been identified as important resources for families in disaster situations, there is still more work to be done to maximise their functions based on the findings of this study. Despite the literature showing that community-based disaster management and urban community disaster relief systems have been established in China, the role of disaster-related education provision by the community residents' committees has not been presented in the findings of the present study. Therefore, the development of a disaster-related education programme or activities for families, and the improvement of implementation at the community level is suggested for policy-makers in considering strategies for community disaster risk reduction. More community residents' committee-based education programmes should be established and implemented to help families to build disaster-related knowledge covering preparation, response, and recovery strategies. In considering the important roles of 'having previous experience' and 'having knowledge' in family disaster resilience, it is necessary to organize disaster-related drills or exercises for families who do not have previous experience but who live in a disaster zone in order to gain lived experiences

of how to deal with disaster and to promote their understanding of disaster situations and the knowledge they need in order to cope effectively. For example, it might be a feasible approach for community residents' committees to organize some informal events or meetings to engage new residents with families who have previously been exposed to disaster to share their stories. This approach might be useful to help inexperienced families to learn from others lived experiences, and to have a positive impact on their future behaviour when they encounter unexpected disaster situations. In addition, the means of delivering knowledge to ordinary families could be expanded, not only including the community residents' committees, but also other channels such as the mass media, and training from the work unit or schools. Furthermore, promoting the effectiveness of disaster warning information delivery, and the improvement of information accuracy, should be taken into consideration.

In terms of healthcare workers' practice in helping families to cope with disaster, especially nurses who might provide direct support for families with family members suffering physical injuries and undergoing psychological trauma, or helping families in the community to maintain physical and mental health, this family disaster resilience model provides a potential framework for assisting health professionals to understand the family disaster resilience factors and developing family specfic resilience-based approaches to support families in the aftermath of disasters. Identifying resilience factors inherent in families and integrating these factors into family resilience-based interventions could be helpful in improving the physical and mental health of all family members. The family disaster resilience model proposed by the present study could provide evidence for helping health professionals to identify the resilience factors that exist in a family unit, and then encouraging these families to shift their negative perspectives to a positive mindset, and to focus on their strengths rather than on their vulnerability to disaster. For instance, if neighbours are asked by disaster-impacted families to provide assistance for them, and they cope with the disaster collectively, more communication with their neighbours should be encouraged to help families to go through the adaptation process. If families talk about their previous disaster experiences and compare them to their current disaster experience, it might be an appropriate time to help them transform their current negative experiences into positive growth. If families have the cultural belief that 'having a peaceful mind' and 'going with the flow' are the best ways to face the damage caused by disaster, it might be valuable to confirm and express an understanding of their beliefs. Furthermore, based on the important family disaster resilience factors identified in the present study, relevant interventions could be developed by health professionals to foster family disaster resilience. For instance, the provision of such health education should involve knowledge about disaster-related diseases and prevention strategies, and knowledge about disaster-related mental health problems and coping strategies. Encouraging family engagement in making decisions and taking action in a collective way may be another useful approach to be taken into account.

In addition, this model would be potentially helpful for informing other countries with multicultural populations to develop a culturally-sensitive family intervention for Chinese families in the face of disaster. For example, after a disaster occurs, instead of sending religious support, helping Chinese families to communicate with their extended family members might help them to gain more emotional support and assist them with overcoming the stressful situations caused by disaster. This study also suggests that it is imperative for health providers in other settings worldwide who are likely to provide support for Chinese families after disaster to consider and better understand Chinese cultural beliefs about disaster, misfortune, and mental and physical health, in the design of culturally-appropriate health-related interventions.

6.6 Summary

Overall, this grounded theory research provides deeper insights into family resilience in the disaster context in China, therefore, contributing to providing evidence-based strategies to improve families' resilience to disaster, to reduce the severe negative impacts on families caused by disaster, and to improve the scope of community disaster resilience in China. Importantly, the family disaster resilience model developed by this study could potentially provide evidence for developing initiatives for the improvement of family resilience to disaster and benefit families suffering disasters globally.

APPENDICES

Appendix 1 Literature characteristics

	Author Year & Title	Design	Sample	Data collection	Relevant findings(summary)
1	Hilvano et al. (2016, pp. 1640007-1-25) Household disaster resiliency on Typhoon Haiyan (Yolanda): the case of Manicani Island, Guiuan, Eastern Samar, Philippines	Survey study	114 households experienced Typhoon Haiyan aka Yolanda three months ago, residing in Manicani Island, Guiuan, Eastern Samar, Philippines. Stratified sampling and systematic sampling technique were used.	Primary and secondary data were used for this study. The primary data were collected through a household survey. Secondary data were requested from the respective barangay chairmen. Other relevant information was obtained from periodicals, publications and government office.	Results showed that household's house condition before the typhoon, their knowledge of the typhoon, the educational attainment of house-hold head, the condition of the house after the typhoon, length of time before house reconstruction, person in-charge in reconstruction, livestock ownership after the typhoon were associated with the household resilience to Typhoon. (Hilvano et al. 2016, pp. 1640007-1)
2	Madhuri, Tewari and Bhowmick (2015, pp. 1287-311) Ingenuity of skating on marshy land by tying a pot to the belly: Living with flood is a way of life	Quantitative survey research	472 households residing in the district of Bhagalpur, Bihar, India participated in the study. Multistage random sampling technique was employed.	Data were collected from the seven blocks of the Bhagalpur district during September and December in 2011. Risk perception (RSPR); Flood preparedness (FLPP); Place attachment (PLAT) and Livelihood resilience (LVRS) scales were used as the measures to collect data.	Results revealed the role of risk perception and flood preparedness as a partial mediator between the place attachment and livelihood resilience. The households did not perceive flood as a 'threat', as they had learnt to 'live' with it as 'a way of life' because of their attachment to the place, experience of frequent exposure to flooding, and knowledge of local resources. Households' indigenous knowledge and innovative skills were very crucial in overcoming flood impacts. In addition, the flood experience and indigenous knowledge of households helped them to adapt and develop livelihood resilience. (Madhuri, Tewari & Bhowmick 2015, pp. 1287,305,306)

3	Islam and Walkerden (2015, pp. 1707-27) How do links between households and NGOs promote disaster resilience and recovery?: a case study of linking social networks on the Bangladeshi coast	Case study	The study was conducted in Cyclone Sidr 2007 affected two coastal villages of Bangladesh between February and July 2013. Household heads were randomly selected based on the total number of households in the two villages.	Data were collected through household surveys, 8 focus groups with the villagers, 37 key informant (local leaders, including NGO workers, local government officials, and village head men) interviews, workshops with journalists, local government staff, and NGO officials to discuss relevant issues.	NGOs provided strong support for households through immediate relief (food, water,medicine, household stuff), shelter (building materials, new houses), and livelihood assistance (micro-credit, cropping seeds, livestock, fishing boats, and nets). Households' links with NGOs was an important support for disaster resilience and recovery in Bangladesh. (Islam & Walkerden 2015, p. 1707)
4	Henly-Shepard et al. (2015, pp. 343-63) Quantifying household social resilience: a place-based approach in a rapidly transforming community	A community-based case study. Conceptual framework of community-based household disaster risk, which was adapted from Bollin and Hidajat's (2006) conceptual framework to identify disaster risk, was employed as the conceptual framework guiding this study	This study was conducted at Hanalei, Hawai'i, USA. 37 long-term residents and 20 visitors completed the survey from August to October 2010. 13 key informant community leaders joined an informal post-flood interview in March 2012.	Household surveys, key informant interviews and traditional talk-story sessions were employed to gain baseline information on demographic and socio-ecological transformations, perceptions of risk and preparedness, and coping and adaptive capacity.	(1) Material preparedness, access to resources, social networks and financial assets helped households cope with disasters. (2) Knowledge, expertise and relevant skills helped household adapt to disasters. (Henly-Shepard et al. 2015, p. 354)

5	Arouri, Cuong and Ben Youssef (2015, pp. 59-77) Natural disasters, household welfare, and resilience: evidence from Rural Vietnam	Survey	This study was based on Vietnam Household Living Standard Surveys (VHLSS) in 2004, 2006, 2008, and 2010. The 2004, 2006, 2008,and 2010 VHLSSs covered 6,938, 6,882, 6,837, and 6,750 rural households respectively.	The surveys included household and commune data. Data on households included basic demography, employment and labor force participation, education, health, income, expenditure, housing, fixed assets and durable goods, and participation of households in poverty alleviation programs. Commune data included demography and general situation of communes, general economic conditions, non-farm employment, agriculture production, local infrastructure and transportation, education, health, and social affairs. The commune data contained information on natural disasters happening in communes in previous years.	(1) Kinh households and households with smaller size and a higher proportion of working-age members were more resilient to disasters than ethnic minority households and households with a large number of members, especially members not of working age. (2) Households with high education were more resilient to floods and droughts than those with low education. (3) Micro-credit, internal remittances, and social allowances could help households mitigate the adverse effect of natural disasters. (4) Households in communes with higher mean expenditure and more equal expenditure distribution were more resilient to natural disasters. (Arouri, Cuong & Ben Youssef 2015, p. 72)
6	Akhter et al. (2015, pp. 313-23) Issues with families and children in a disaster context: A qualitative perspective from rural Bangladesh	A qualitative approach involving phenomenological and in-depth interviews and focus group discussions (FGD).	Two coastal districts (Bhola, Shatkhira) and a northern district, Kurigram in Bangladesh were selected on the basis of severity of an environmental disaster. Four adults were selected for the phenomenological and in-depth interviews. A total of 24 participants were included in the focus groups. The selection criteria for	In-depth interviews were conducted to investigate participants' personal perspectives and experiences. Focus group discussions were used to generate broad views of the issues from a group of participants, and to verify and compare the data collected through individual interviews.	Families' adaptation and coping mechanism in disaster included:(1) coping and adjusting to a new reality; (2) cooperation and togetherness; (3) training and preparedness; (4) outside help (Akhter et al. 2015, p. 320)

			participants for the interviews and focus groups were parents and teachers of children aged 0–8 years who had experience of natural disaster.		
7	Razafindrabe et al. (2014, pp. 177-98) Analyzing flood risk and related impacts to urban communities in central Vietnam	Case study. The overall theoretical framework was based on the Risk Management Framework (AS/NZS 2001)	This study was conducted in Danang City, Central Vietnam. Stratified random sampling was chosen based on topography (coastal and inland) and also on economic status. Households were randomly selected based on features related to the stratification criteria mentioned above. A total of 144 households were surveyed.	Data were collected through interviews, questionnaire surveys, focus group discussions, stakeholder analysis, direct observation, a literature review, and secondary data collection relating to all of this content.	Households with more sources of income and more savings recovered faster than others after a flooding event. (Razafindrabe et al. 2014, p. 177)
8	Islam and Walkerden (2014, pp. 281-91) How bonding and bridging networks contribute to disaster resilience and recovery on the Bangladeshi coast	Case study	This study was conducted in two coastal villages of Bangladesh affected by Cyclone Sidr during February and July 2013. 159 household heads, 5 policy makers (senior government employees), 14 disaster practitioners (national and international NGO employees) were interviewed. 8 focus group discussions (FGDs) with villagers were conducted. Thirty-seven Key Informant	Data were collected through household surveys, focus groups, meetings with NGOs and local and national key informants.	The study revealed that immediately after a disaster, cyclone-affected households depended greatly on bonding (family members, relatives) and bridging (neighbours and friends) networks to cope with the crisis. (1) Family members provided crucial support during recovery from cyclone Sidr. All household members received emotional support from other members, which helped them cope with disaster-induced stress; changes in food consumption such as change eating patterns and reduce food intake helped households in recovery; family members provided labour at home and sold labour in the markets through short-term migration to support family income. (2) Relatives also provided various support for households. The most common support from relatives was emotional care, in-laws spending

			Interviews (KIIs); meetings with local journalists, local government officials, and a day-long NGO workshop were conducted to gain the perspectives of local leaders.		time with and talking with affected household members to help them reduce fear and anxiety, and encourage them in their recovery efforts; In-laws also provided food, shelter, building materials, cash, labour, and clothing for the affected households. (3) 60% of households exchanged mutual support with neighbours and friends. The main forms of mutual support were search and rescure, sharing of food, and cooperative works. Neighoures and friends also provided emotional and spiritual support for households. (Islam & Walkerden 2014, pp. 285-7)
9	Botey and Kulig (2014, pp. 1471-83) Family functioning following wildfires: recovering from the 2011 Slave Lake Fires	A qualitative research approach	Families were recruited using snowball sampling and opportunitistic sampling. 27 parents (18 mothers and 9 fathers) and 26 children (16 daughters and 10 sons) representing 19 families in a rural community in Alberta, Canada participated in the study.	Data were collected by 19 semi-structured interviews with family units (family interviews) and 17 interviews with a child within these families (child interviews).	Six major themes related to family recovery were identified: different life goals and priorities; new routines; changes in attitudes; changes in interactions within the family unit and with the community; new values and perceptions (Botey & Kulig 2014, p. 1471)
10	Nguyen and James (2013, p. 13) Measuring household resilience to floods: a case study in the Vietnamese Mekong River Delta	A case study employed both qualitative and quantitative research approaches	Rural households in the Mekong River Delta(MRD) have experienced the impacts of annual flood events for years. The stratified sampling approach was employed to divide the total population of the delta into sub-populations of “three communes”, based on the existing	Qualitative data were collected by in-depth interviews with key informants, focus group discussions (FGDs), and field observations. Four FGDs and 10 in-depth interviews were conducted in each commune, each covering a range of social classes and gender. Information from the qualitative research was used for designing the	Three properties of households’ resilience to floods were: (1) households' confidence in securing food, income, health, and evacuation during floods and recovery after floods; (2) households' confidence in securing their homes not being affected by a large flood event such as the 2000 flood; (3) households' interests in learning and practicing new flood-based farming practices that are fully adapted to floods for improving household income during the flood season.

			socioeconomic and natural flood characteristics of the delta. The samples were chosen on the basis of social groups: poor, medium-income and better-off households. The total sample size in each case study was 150. The exception was Thanh My Tay commune, for which there were 159 samples.	structured questionnaires for the household survey in August 2010.Quantitative data were collected by household questionnaire.	(Nguyen & James 2013, p. 13)
11	Xin et al. (2013, pp. 387-94) Resilience of Vietnamese refugees: resources to cope with natural disasters in their resettled country	Qualitative study Family resilience framework informed this study	A total of 20 adult Vietnamese refugees in USA, including 10 ethnic Vietnamese majorities and 10 Montagnard Vietnamese minorities, participated in the study from September 2010 to January 2011.	Data were collected by in-depth interviews.	Family level resilience factors included: shared family belief systems-sprituality; family communication processes—collaborative problem solving; family organizational patterns-economic resources and emergency supplies. (Xin et al. 2013, pp. 390-2)
12	Sun et al. (2012, pp. 865-77) Farmers' response to agricultural drought in paddy field of southern China: a case study of temporal dimensions of resilience	Case study Decision tree methodology (DTM) was selected to assess the resilience.	384 households lived in 30 towns of Dingcheng County in Hunan Province, China.	Data were collected by in-depth interviews from 2006–2008	Farmers' response mechanisms have evolved, expanding from short-term adjustments to long-term adaptations, and switching focus from securing reliable water sources to improving irrigation efficiency and diversifying both on- and off- farm productions. (Sun et al. 2012, p. 865)

13	Hackbarth et al. (2012, pp. 340-51) Natural disasters: an assessment of family resiliency following Hurricane Katrina	Quantitative Survey(online or paper)	452 survivors of Hurricane Katrina, USA participated in this study.	Survey data were collected by utilizing the following measurements (1) the Family Crisis Oriented Personal Evaluation Scales(F-COPES) (2) the Adult State Hope Scale (3) the Family Hardiness Index(FHI) (4) an adapted Spirituality/Religiosity measurement comprised of three modified domains of the Brief Multidimensional Measure of Religiousness/Spirituality:1999 (5) a resource Loss scale (6)10 separate demographic questions	Results showed that there were positive relationship between hope, family hardiness , spirituality/religiosity and family's effective coping for a natural disaster. (Hackbarth et al. 2012, p. 344)
14	Greeff and Lawrence (2012, pp. 210-24) Indications of resilience factors in families who have lost a home in a shack fire	Cross-sectional survey Resiliency model of family stress, adjustment and adaptation informed this study	Adult representatives of 38 African families who had lost a home in a shack fire in South Africa participated in this study through a convenience sampling strategy	Survey data were collected by the following measurements and questionnaire: (1) Biographical questionnaire (2) Family attachment changeability index 8(FACI8) (3) Family Hardiness Index(FHI) (4) Social Support Index(SSI) (5) Relative and Friend Support Index; (6) The Family Problem Solving and Communication Scale(FPSC) (6) Open-ended questions	Factors facilitating the family to overcome the crisis and being resilient were: supportive communication; a sense of being in control; having internal strengths and dependability ; working together as a family; material support from the municipality and extended family; shelter provided by members of the extended family; financial support from the extended family. (Greeff & Lawrence 2012, p. 210)

15	Motsholapheko, Kgathi and Vanderpost (2011, pp. 984-95) Rural livelihoods and household adaptation to extreme flooding in the Okavango Delta, Botswana	Survey study The sustainable livelihood and the socio-ecological frameworks were employed to inform this study.	The study was undertaken in the Okavango Delta situated in Ngamiland District of Botswana. A simple random sample of 623 households representing 40% of the accessible population was drawn.	Data were collected by a survey of 623 households in five villages, key informant interviews, focus group discussions and review of literature.	(1) The main household coping strategies were: labour switching to other livelihood activities; temporary relocation to less affected areas;use of canoes for early harvesting or evacuation and government assistance,particularly for the most vulnerable households. (2) Household adaptive strategies included livelihood diversification, long-term mobility and training in non-agricultural skills. (Motsholapheko, Kgathi & Vanderpost 2011, p. 984)
16	Mills et al. (2011, pp. 425-44) Shocks, recovery trajectories and resilience among aquaculture-dependent households in post-tsunami Aceh, Indonesia	Action research	161 aquaculture-dependent households were randomly selected for survey from nine sub-districts in post-tsunami Aceh, Indonesia. 58 senior members of communities participated in three focus group discussions(FGDs).	Data were collected by FGDs and household surveys.	Diversification in household livelihood strategy, aquaculture species availability and market options for aquaculture produce were important factors contributing to recovery and resilience. (Mills et al. 2011, p. 425)
17	Peek, Morrissey and Marlatt (2011, pp. 1371-96) Disaster hits home: a model of displaced family adjustment after Hurricane Katrina	Qualitative Research Family stress theory informed this study.	30 parents and 55 children (between the ages of 5 and 18 years) from 23 families who were displaced to Colorado after Hurricane Katrina, USA participated in this study. Purposeful and theoretical sampling strategies	Data were collected through face-to-face in-depth interviews.	A model of displaced family adjustment was developed which included four stages: (1) family unity stage; (2) prioritizing safety stage (parents) and missing home stage(children); (3) confronting reality stage (parents) and feeling settled stage (children); (4) reaching resolution. Ensure family member stay together; allocate additional social, academi, and psychological support to children and provide support with housing, employment, child care and education were recommended to facilitate family adjustment after a disaster. (Peek, Morrissey & Marlatt 2011, pp. 1371, 92-93)

18	Caldwell and Boyd (2009, pp. 1-10) Coping and resilience in farming families affected by drought	Qualitative research	11 members of 5 families from Blighty, southern New South Wales, Australia, who experienced drought and decreased water allocation to their local area participated in this study. Purposive sampling using a snowballing technique was employed.	Data were collected through interviews on two separate occasions at the family home for approximately 1 hour.	Three master themes were identified: (1) problem-focused coping; (2) psychological coping strategies (individual) (3) collective coping strategies Factors facilitating the family to cope with the drought included: planning ahead for future generations; expansion and diversification(earn more money); positive appraisals; optimism; comparative methods; cognitive dissonance and denial; support from partners and children; community as a resource; history in the area; social debriefing; community acts of caring; avoidance of negative social influences (Caldwell & Boyd 2009, pp. 4-7)
19	Smucker and Wisner (2008, pp. 190-215) Changing household responses to drought in Tharaka, Kenya:vulnerability, persistence and challenge	Longitudinal study design	Households living in Tharaka District, Kenya.	Household survey data on land use and management, land rights, economic activities and drought coping mechanisms (or responses) collected by Wisner in 1971 and Smucker in 2001 respectively were used. These two studies employed random stratified sampling strategy to recruit participants. Census and other secondary data were also used.	Households' response to drought experienced changes from 1971 to 2001. (1) livestock movement has decreased drastically due to generally declining livestock numbers, particularly among the poor; (2) assistance from family has fallen significantly though it remains important for poor households; (3) the seeking of assistance from government has increased; (4) hunting, fishing and consumption of wild foods likewise have suffered drastic decline; (5) livestock sales remain a preferred form of coping; (6) Out-migration in search of wage labour decreased, households were more likely to engage in local wage labour. (Smucker & Wisner 2008, pp. 207-10)

20	Kirschenbaum (2006, p. 23) Terror, Adaptation and preparedness: a trilogy for survival	Survey	The sample was obtained through a random-digital-dial computer-assisted telephone interview of households in Israel. A total of 800 household heads were interviewed by a structured questionnaire over a three-week period.	Data were collected by survey.	Eight adaptation factors were identified: avoidance, religiousness, professional help, insurance, information, future plans, coping and protective actions. (Kirschenbaum 2006, p. 23)
21	Wan et al. (2008b, pp. 122-6) Drought resilience in view of income diversity of peasant household: a case study on Xinghe County, Inner Mongolia (In Chinese)	Case study	291 farming household living in the Xinghe County, China participated the survey.	Data were collected by two field observations and questionnaire survey.	Results showed that income diversity helped farming household to be resilient to drought. (Wan et al. 2008b, p. 125)
22	Wan et al. (2008a, pp. 66-9) The influence of migrant laborers on resilience of hazard bearing bodies---a case study on drought survey in Xingtai County, Hebei Province (In Chinese)	Case study	149 farming household living in Xintai County, China participanted in the survey.	Data were collected by questionnaire survey.	Results showed that if a householder was a migrant labourber, his income contributed to family's drought economic recovery. However if the children were the migrant labourber, their income contributed to family's drought economic recovery was limited. (Wan et al. 2008a, p. 68)

Appendix 2 Ethics Approval to Conduct Research

FINAL APPROVAL NOTICE

Project No.:	**5953**
Project Title:	Understanding and identifying family resilience to disaster
Principal Researcher:	Ms Huahua Yin
Email:	huahua.yin@flinders.edu.au
Address:	14 Peppertree Grove Marion SA 5043
Approval Date:	25 March 2013
Ethics Approval Expiry Date:	**30 March 2016**

The above proposed project has been **approved** on the basis of the information contained in the application, its attachments and the information subsequently provided with the addition of the following comment:

Additional information required following commencement of research:

1. Please ensure that copies of the correspondence requesting and granting permission to conduct the research from the Community Committee (on formal letterhead) is submitted to the SBREC *on receipt.* Please ensure that the SBREC project number is included in the subject line of any permission emails forwarded to the Committee. Please note that data collection should not commence until the researcher has received the relevant permissions (item D8 and Conditional approval response – number 3).

RESPONSIBILITIES OF RESEARCHERS AND SUPERVISORS

1. Participant Documentation

Please note that it is the responsibility of researchers and supervisors, in the case of student projects, to ensure that:

- all participant documents are checked for spelling, grammatical, numbering and formatting errors. The Committee does not accept any responsibility for the above mentioned errors.
- the Flinders University logo is included on all participant documentation (e.g., letters of Introduction, information Sheets, consent forms, debriefing information and questionnaires – with the exception of purchased research tools) and the current Flinders University letterhead is included in the header of all letters of introduction. The Flinders University international logo/letterhead should be used and documentation should contain international dialling codes for all telephone and fax numbers listed for all research to be conducted overseas.
- the SBREC contact details, listed below, are included in the footer of all letters of introduction and information sheets.

This research project has been approved by the Flinders University Social and Behavioural Research Ethics Committee (Project Number 'INSERT PROJECT No. here following approval'). For more information regarding ethical approval of the project the Executive Officer of the Committee can be contacted by telephone on 8201 3116, by fax on 8201 2035 or by email human.researchethics@flinders.edu.au.

2. Annual Progress / Final Reports

In order to comply with the monitoring requirements of the *National Statement on Ethical Conduct in Human Research (March 2007)* an annual progress report must be submitted each year on the **25 March** (approval anniversary date) for the duration of the ethics approval using the annual progress / final report pro forma. *Please retain this notice for reference when completing annual progress or final reports.*

If the project is completed before ethics approval has expired please ensure a final report is submitted immediately. If ethics approval for your project expires please submit either (1) a final report; or (2) an extension of time request and an annual report.

Your first report is due on **25 March 2014** or on completion of the project, whichever is the earliest.

3. Modifications to Project

Modifications to the project must not proceed until approval has been obtained from the Ethics Committee. Such matters include:

- proposed changes to the research protocol;
- proposed changes to participant recruitment methods;
- amendments to participant documentation and/or research tools;
- change of project title;
- extension of ethics approval expiry date; and
- changes to the research team (addition, removals, supervisor changes).

To notify the Committee of any proposed modifications to the project please submit a Modification Request Form to the Executive Officer. Please note that extension of time requests should be submitted prior to the Ethics Approval Expiry Date listed on this notice.

Change of Contact Details

Please ensure that you notify the Committee if either your mailing or email address changes to ensure that correspondence relating to this project can be sent to you. A modification request is not required to change your contact details.

4. Adverse Events and/or Complaints

Researchers should advise the Executive Officer of the Ethics Committee on 08 8201-3116 or human.researchethics@flinders.edu.au immediately if:

- any complaints regarding the research are received;
- a serious or unexpected adverse event occurs that effects participants;
- an unforseen event occurs that may affect the ethical acceptability of the project.

MODIFICATION (No.1) APPROVAL NOTICE

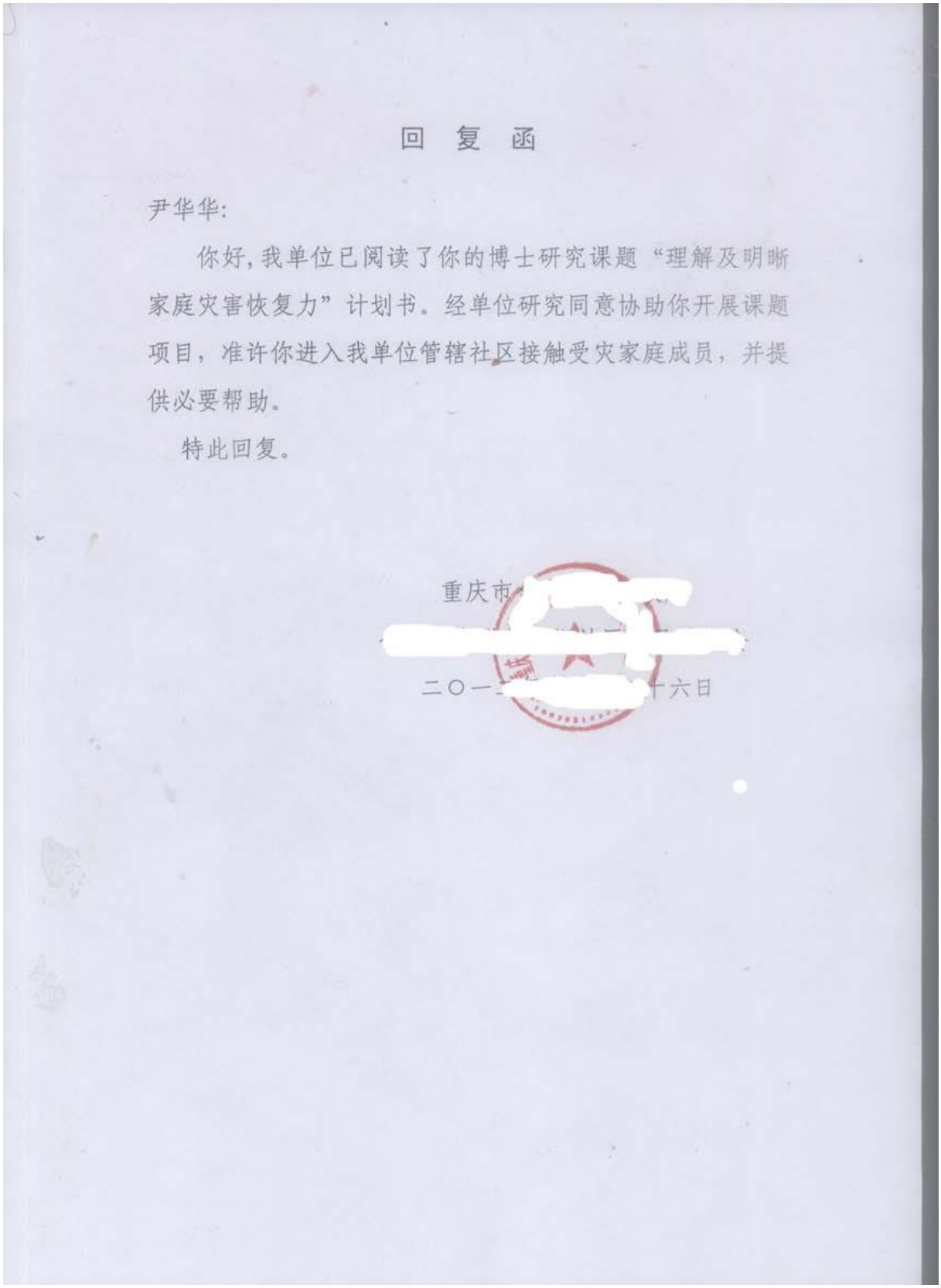
Project No.:	**5953**
Project Title:	Understanding and identifying family resilience to disaster
Principal Researcher:	Ms Huahua Yin
Email:	huahua.yin@flinders.edu.au

Modification Approval Date:	22 May 2013	Ethics Approval Expiry Date:	**30 March 2016**

I refer to your modification request for the project above that has been approved previously. I am pleased to inform you that the Chairperson has approved your request to modify the project as outlined below:

✓	**Approved Modification(s)**	**Details of approved modification(s)**	
✓	Modified research protocol:	Approval to interview participants from the XX community and neighbouring communities who have experienced flooding and have expressed interest in participating.	
✓	Documentation Amendments and/or Additions	Amended Documents	
		New Documents	B community permission letter C community permission letter

Appendix 3A Letter of Granting Permission from Community A



回 复 函

尹华华:

你好,我单位已阅读了你的博士研究课题“理解及明晰家庭灾害恢复力”计划书。经单位研究同意协助你开展课题项目,准许你进入我单位管辖社区接触受灾家庭成员,并提供必要帮助。

特此回复。

重庆市[redacted]

二〇一[redacted]十六日

English Translation of Letter of Granting Permission from Community A

CORRESPONDENCE GRANTING PERMISSION

Ms Huahua Yin

We have read your PhD proposal entitled “Understanding and identifying family resilience to disaster”. After the consideration and discussion of the community committee, we are pleased to inform you that we grant you the permission to approach the residents with disaster experience within our community. In addition, we would like to provide the relevant assistance to you if you request.

A Community Committee
X District
Chongqing
China
26 November, 2012

Appendix 3B Letter of Granting Permission from Community B

重庆市

回 复 函

尹华华：

你好，我单位已阅读了你的博士研究课题“理解及明晰家庭灾害恢复力”计划书。经单位研究同意协助你开展课题项目，准许你进入我单位管辖社区接触受灾家庭成员，并提供必要帮助。

特此回复。

重庆市

2013

地址：重庆市 邮编：

电话：023-

English Translation of Letter of Granting Permission from Community B

CORRESPONDENCE GRANTING PERMISSION

Ms Huahua Yin

We have read your PhD proposal entitled “Understanding and identifying family resilience to disaster”. After the consideration and discussion of the community committee, we are pleased to inform you that we grant you the permission to approach the residents with disaster experience within our community. In addition, we would like to provide the relevant assistance to you if you request.

B Community Committee
X District
Chongqing
China
8 May, 2013

Appendix 3C Letter of Granting Permission from Community C

重庆市

回 复 函

尹华华：

你好，我单位已阅读了你的博士研究课题“理解及明晰家庭灾害恢复力”计划书。经单位研究同意协助你开展课题项目，准许你进入我单位管辖社区接触受灾家庭成员，并提供必要帮助。

特此回复。

重庆

2013年5月8

地址：重庆市 邮编：

电话：023-

English Translation of Letter of Granting Permission from Community C

CORRESPONDENCE GRANTING PERMISSION

Ms Huahua Yin

We have read your PhD proposal entitled “Understanding and identifying family resilience to disaster”. After the consideration and discussion of the community committee, we are pleased to inform you that we grant you the permission to approach the residents with disaster experience within our community. In addition, we would like to provide the relevant assistance to you if you request.

C Community Committee
X District
Chongqing
China
8 May, 2013

Flinders UNIVERSITY
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Appendix 4 Advertisement for Recruitment of Participants

Family experience during Flood

- **What elements do you think assist your family make decisions and take actions during and after the flood?**
- **What lessons does your family learn from this experience and become stronger for the future disaster?**

Would you like to tell your

Family members:

- Has your family experienced flood between 2008 and 2012?
- Are you over 18 years old?
- Would you be willing to share your experiences?

My name is Huahua Yin. I am a PhD student from the Flinders University School of Nursing and Midwifery, Australia. I am looking for volunteers to take part in a study entitled: "Understanding and identifying family resilience to disaster". If you are interested in this study, you are invited to take part in a one-on-one interview about your and your family's experience of the flood. The interview will last for approximately 45-60 minutes. All the interview information will be kept confidential.

If you are willing to share your experience, please contact me for further information.

Huahua Yin
Phone: 13996492801
Email: huahua.yin@flinders.edu.au

This research project has been approved by the Flinders University Social and Behavioural Research Ethics Committee(Project Number:5953). For more information regarding ethical approval of the project the Executive Officer of the Committee can be contacted by telephone on 82013116, by fax on 82012035 or by email human.researchethics@flinders.edu.au

inspiring achievement

Chinese Version of Advertisement for Recruitment of Participants

Flinders UNIVERSITY
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“理解及明晰家庭灾害恢复力的研究”招募参与者

您的家庭在洪灾中的经历？

- **您认为哪些因素帮助了您的家庭在洪灾发生后做出明智的决定和采取合适的行动？**
- **您的家庭从洪灾经历中学到了什么？您觉得您的家庭能更好地应对将来的洪灾吗？**

您愿意分享您的故事吗？

尊敬的社区居民：

如果，您的家庭在 2008-2012 年期间经历过洪灾;
如果，您大于 18 岁;
如果，您愿意分享您的经历;

那么，我诚挚地邀请您参与一个“理解及明晰家庭灾害恢复力的研究”。此项研究主要想了解您的家庭在洪灾中的经历，哪些因素帮助了您的家庭对洪灾的应对及恢复。参与此项研究即参加一次面对面的访谈，访谈内容主要围绕您的家庭的洪灾经历。访谈时间约 45-60 分钟。访谈信息将严格保密。

如果您对本研究感兴趣，请及时与我联系以获得更多关于本研究的信息，衷心感谢您的支持！

尹华华
澳大利亚弗林德斯大学护理与助产学院
电话：13996492801
E-mail: huahua.yin@flinders.edu.au

该研究项目已获得澳大利亚弗林德斯大学社会及行为研究伦理道德委员会的批准（项目号:5953），有关伦理的详细信息，您可以与委员会执行官通过以下方式联系，电话：+61 8 8201 3116, 传真：+61 8 8201 2035，电子邮箱：human.researchethics@flinders.edu.au

Professor Paul Arbon
Dean
School of Nursing & Midwifery
Faculty of Health Sciences
Flinders University
GPO Box 2100 Adelaide SA 5001
Tel: +61 8 8201 3558
Fax: +61 8 8276 1602
paul.arbon@flinders.edu.au

http://www.flinders.edu.au

CRICOS Provider No. 00114A

Appendix 5

Flinders UNIVERSITY
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Appendix 5 Letter of Introduction

Dear family member,

This letter is to introduce Ms Huahua Yin who is a PhD student in the School of Nursing & Midwifery at Flinders University, Australia. She will present her student card as proof of identity.

She is undertaking research leading to the production of a thesis on the subject of "Understanding and identifying family resilience to disaster". This project aims to identify the factors assisting families to cope with and recover from disaster, and to develop a family disaster resilience model. This model is expected to provide research based evidence for health professionals and policy-makers to develop interventional strategies for building family disaster resilience thereby improving community disaster resilience.

She would be most grateful if you would volunteer for this project, by participating in an interview regarding your family's experience of disaster. This interview will take around 45-60 minutes. The interview will be audio taped using a digital recorder in order to capture your opinions for later data analysis. You will be asked for your consent by reading and signing a consent form.

Be assured that any information provided by you will be kept confidential and participants will not be identified individually in the resulting thesis, report or other publications. You are entirely free to withdraw your participation at any time or decline to answer particular questions.

Any enquiries you may have concerning this project should be directed to me at the address provided above or by telephone on +61 8 8201 3558, or by email (paul.arbon@flinders.edu.au).

Thank you for your assistance.

Yours sincerely,

Prof Paul Arbon PhD, RN
Dean: School of Nursing and Midwifery

This research project has been approved by the Flinders University Social and Behavioural Research Ethics Committee (Project Number :5953). For more information regarding ethical approval of the project the Executive Officer of the Committee can be contacted by telephone on 8201 3116, by fax on 8201 2035 or by email human.researchethics@flinders.edu.au

Professor Paul Arbon
Dean
School of Nursing & Midwifery
Faculty of Health Sciences
Flinders University
GPO Box 2100 Adelaide SA 5001
Tel: +61 8 8201 3558
Fax:+61 8 8276 1602
paul.arbon@flinders.edu.au
http://www.flinders.edu.au
CRICOS Provider No. 00114A

Chinese Version of Letter of Introduction

Flinders UNIVERSITY
ADELAIDE • AUSTRALIA

给参与访谈的社区居民的介绍信

尊敬的社区居民：

您好！

这封信是向您介绍目前就读于澳大利亚弗林德斯大学护理学博士研究生尹华华和她正在从事的博士研究课题“理解及明晰家庭灾害恢复力的研究”。她将出示学生证作为身份证明。

此课题旨在明晰哪些因素帮助了家庭对灾害的应对及恢复，从而构建一个家庭灾害恢复力理论模型。为从社区居民家庭层面上的灾害准备，灾后应对及灾后恢复相关干预政策的制定提供研究证据。课题研究结果将用于毕业论文的撰写。

如果您能抽出宝贵的时间协助她开展此项研究，参与一个面对面的访谈，分享您的家庭的灾害经历，她将不胜感激。访谈大约持续 45-60 分钟。为了准确记录您的观点，访谈内容将录音，以作为后续资料分析的依据，这需要您的书面同意。您将在充分知情的基础上与尹华华签订知情同意书。

请放心您所提供的全部信息都将严格保密，任何有关您的身份的信息都不会在最后形成的论文、报告或其他出版物中被识别。您有权利在任何时候退出本研究或在访谈过程中拒绝回答任何您不想回答的问题。

假如您有任何与此研究课题有关的疑问，请直接与我联系。我的通信地址如信笺右上角所示，我的电话号码： +61 8 82013558，电子邮箱地址：paul.arbon@flinders.edu.au

该研究项目已获得澳大利亚弗林德斯大学社会及行为研究伦理道德委员会的批准（项目号 5953 ），有关伦理的详细信息，您可以与委员会执行官通过以下方式联系，电话：+61 8 8201 3116, 传真：+61 8 8201 2035，电子邮箱：human.researchethics@flinders.edu.au

非常感谢您协助开展此项研究。

此致，

保罗.阿本 教授 博士
院长
弗里德斯大学护理与助产学院
澳大利亚

Ms Huahua Yin
School of Nursing & Midwifery
Faculty of Health Sciences
Flinders University

Level 3, Sturt Building
Bedford Park SA 5042

GPO Box 2100
Adelaide SA 5001

Tel: +61 8 8201 3452
Huahua.yin@flinders.edu.au

CRICOS Provider No. 00114A

Flinders UNIVERSITY
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Appendix 6 Information Sheet

Title: ' Identifying and understanding family resilience to disaster'

Investigators:
Ms Huahua Yin
School of Nursing & Midwifery
Faculty of Health Sciences
Flinders University
Ph: 82013452
E-mail: huahua.yin@flinders.edu.au

Description of the study:
This project is entitled 'Identifying and understanding family resilience to disaster'. This project will interview family members with disaster experience within the past 5 years, in order to identify the elements of family disaster resilience and develop a family disaster resilience model. This project is supported by Flinders University School of Nursing & Midwifery.

Purpose of the study:
This project aims to develop a family disaster resilience model. This model is expected to provide research based evidence for health professionals and policy-makers to develop interventional strategies for building family disaster resilience thereby improve the entire community disaster resilience.

What will I be asked to do?
You are invited to attend a one-on-one interview with the researcher who will ask you a few questions about you and your family's experiences about the disaster. The interview will take about 45-60 minutes. The interview will be recorded using a digital voice recorder to help with looking at the results. Once recorded, the interview will be transcribed (typed-up) and stored as a computer file and then destroyed once the results have been finalised. Participating in this study is entirely voluntary. Your identity will not be indicated in the final report.

What benefit will I gain from being involved in this study?
The sharing of your and your family's experiences may assist you to reflect on disaster preparedness, cope and recovery strategies and be better prepared in the future.

The wider population will benefit from you and your family's experiences as the research result will provide research evidence for the health professionals and policy makers to develop the interventional strategies to assist families to build their disaster resilience accordingly. These will facilitate the entire community's capability in disaster reduction.

Will I be identifiable by being involved in this study?
We do not need your name and you will be anonymous. Once the interview has been typed-up and saved as a file, the voice file will then be destroyed. Any identifying information will be removed and the typed-up file stored on a password protected computer that only the researcher will have access to. Your comments will not be linked directly to you. Any publication of this project will not contain any information regarding your identity.

Are there any risks or discomforts if I am involved?
The investigator anticipates few risks from your involvement in this study. However, you might feel emotional depress or anxiety during or after the interview if you had difficult experiences during a disaster. If you have any concerns regarding anticipated or actual risks or discomforts, please raise them with the investigator. In addition, you can seek psychological support by contacting the professional psychological counsellor Lifei Wang. She works in the School of Nursing at Third Military Medical University and she has volunteered to be the counsellor for this project. Her phone number is: 023-68752268. E-mail: lifeiwang1120@gmail.com

How do I agree to participate?
Participation is voluntary. You may answer 'no comment' or refuse to answer any questions and you are free to withdraw from the interview at any time without effect or consequences. A consent form accompanies this information sheet. If you agree to participate please read and sign the form.

How will I receive feedback?
If you are willing to read the transcriptions of your interview, please leave your contact information with the researcher. You will be contacted after the transcription is completed. A copy of the transcription will be sent to you by a secure way. Outcomes from the project will be summarised and given to you by the researcher if you request them.

Thank you for taking the time to read this information sheet and we hope that you will accept our invitation to be involved.

This research project has been approved by the Flinders University Social and Behavioural Research Ethics Committee (Project number:5953). For more information regarding ethical approval of the project the Executive Officer of the Committee can be contacted by telephone on 8201 3116, by fax on 8201 2035 or by email human.researchethics@flinders.edu.au

Chinese Version of Information Sheet

Flinders UNIVERSITY
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给参与者的研究说明书

题目：理解及明晰家庭灾害恢复力的研究

研究者
尹华华
护理与助产学院
澳大利亚弗林德斯大学
电话:+61 8 8201 3452
E-mail: huahua.yin@flinders.edu.au

研究描述

此研究的主题是“理解及明晰家庭灾害恢复力”。该研究将通过访谈近 5 年内有受灾经历的家庭成员，从其灾害经历中深入理解及明确哪些因素帮助其家庭对灾害的应对及恢复，从而构建家庭灾害恢复力理论模型。此研究已获得澳大利亚弗林德斯大学护理与助产学院的支持。

研究目的

此研究旨在明确家庭灾害恢复力的相关因素及提升灾害恢复力的过程，从而构建家庭灾害恢复力的理论模型。为从社区居民家庭层面上的灾害准备，灾后应对及灾后恢复相关干预政策的制定提供研究证据。为促进整个社区的灾害恢复力奠定坚实的基础。

参与研究涉及哪些内容？

您将受邀参加由研究者进行的一对一的个体访谈，其中研究者会问你一些关于您和您的家庭灾害经历的问题。访谈约持续 45-60 分钟。为了协助研究者记录信息，访谈过程将录音，而后转录成文本资料，录音资料和文本资料都将储存于研究者办公室的加密电脑上。待研究完成后，这些资料将予以销毁。整个研究过程中，您的参与都是自愿的，您的身份将在研究结果报告中采用匿名的形式，并完全保密。

参与研究涉及哪些利益？

或许，您不能从参与此研究中直接受益，但分享您和您家庭的经历可能会让您思考如何更好地进行灾害准备及灾害发生后的应对及恢复。

然而，该研究预期使更大的群体受益，因为您和您家庭的经历将促进对于家庭灾害恢复力的理解，为提升家庭灾害恢复力的相关干预政策的制定提供研究证据。从而为促进整个社区的灾害恢复力奠定坚实的基础。

参与研究我是否会被识别？

参与研究是完全保密的。我们不会问及您的姓名，而是采用匿名形式。一旦访谈完成转录，音频文件将予以销毁。任何可识别的信息都将删除，访谈后的转录文本资料将存储在加密电脑中，只有研究者有权限接近。您所提供的任何信息都不会直接追踪到你个人，本研究的相关出版物都不会包含任何可以识别您身份的信息。

参与研究是否有风险或不适？

参与本研究，不会导致明显的风险。然而，在访谈过程中或访谈结束后，您有可能会产生情绪上的困扰或忧虑。如果您有任何担心的问题，请向研究者提出。此外，如果您需要心理上的支

持，您可以与心理咨询师王立菲联系以获得相应的帮助。她志愿对本研究的参与者提供心理支持。她的联系方式：第三军医大学护理学院心理教研室 电话: (+86) 023-68752268 E-mail: lifeiwang1120@gmail.com

如何参与研究？

参与研究是完全自愿的，您可以拒绝回答任何问题，或在访谈过程中随时退出研究，而没有任何负面后果或影响。在此说明书后附有一份知情同意书，若您同意参与本研究，请签上您的名字。

我如何获得有关研究的反馈

如果你想阅读您的访谈转录文本，请在访谈后告知我您的联系方式。我会在完成转录后与您联系，以最为安全的方式给您传递转录文本。若您需要，研究报告摘要也可以反馈给您。

非常感谢您花时间阅读此说明书，衷心希望您能够接受参与本研究的邀请！

该研究项目已获得澳大利亚弗林德斯大学社会及行为研究伦理道德委员会的批准（项目号:5953），有关伦理的详细信息，您可以与委员会执行官通过以下方式联系，电话：+61 8 8201 3116, 传真：+61 8 8201 2035，电子邮箱：human.researchethics@flinders.edu.au

Appendix 7

Appendix 7 Consent Form

CONSENT FORM FOR PARTICIPATION IN RESEARCH

(by interview)

Understanding and identifying family resilience to disaster

I ….....

am over the age of 18 years and consent to participate in the research project on Understanding and identifying family resilience to disaster.

1. I have read the information provided.
2. Details of procedures and any risks have been explained to my satisfaction.
3. I agree to audio recording of my information and participation.
4. I am aware that I should retain a copy of the Information Sheet and Consent Form for future reference.
5. I understand that:
   - I may not directly benefit from taking part in this research.
   - I am free to withdraw from the project at any time and am free to decline to answer particular questions.
   - While the information gained in this study will be published as explained, I will not be identified, and individual information will remain confidential.
   - I may ask that the recording be stopped at any time, and that I may withdraw at any time from the session or the research without disadvantage.
6. I have had the opportunity to discuss taking part in this research with a family member or friend.

Participant's signature……Date……...

I certify that I have explained the study to the volunteer and consider that she/he understands what is involved and freely consents to participation.

Researcher's name…….…….....

Researcher's signature……..Date…….

Chinese Version of Consent Form

参与者知情同意书

我**……**大于 18 周岁，同意参加研究课题：**理解及明晰家庭灾害恢复力的研究**。

1. 我已阅读了有关该研究的信息。
2. 我满意研究过程细节及可能的不利因素的解释。
3. 我同意访谈内容被录音以作为研究资料使用。
4. 我知道我应该保存一份研究说明书及知情同意书以便将来参考。
5. 我明白如果我同意参与此研究：

- 我或许不会直接受益。
- 我有权利在任何时间退出此研究，也有权利拒绝回答任何我不想回答的问题。
- 如果此研究所获得的信息用于今后发表，我的身份不会被识别，所有个人信息都将保密。
- 在访谈中，我有权力在任何时候提出停止录音的要求，也有权利在任何时候退出此研究，我提出的这些要求均不会对我产生任何不利后果。

6. 我已被给予了机会和我的家人/朋友讨论有关参与此项研究课题的事宜。

参与者签名：…… 日期：……..

我确认已向参与者解释了此研究，并考虑到参与者理解研究所涉及的内容，自主同意参与本研究。

研究者姓名：……..

研究者签名：…… 日期：……..

Appendix 8 Interview Schedule

Initial Open-ended Questions

1. Tell me something about you and your family (Who is in the family? Where do they live? Where do they work or study? How about their educational background?)
2. Tell me something about your family's experience of the disaster. (Shortly after the disaster and in the long term)
3. What factors do you think helped your family's decisions and actions to the disaster?

Intermediate Questions:

1. Tell me how you would describe the way your family communicates. (Within family, with friend/ work place /school/ community /other organisations) Has any particular way of communication been helpful in relation to the disaster? How has it been helpful?
2. Tell me something about the problems or difficulties your family encountered after the disaster (Life, health, finance). How did your family solve them? Have any of these ways been used in problem-solving in other adverse situation that your family has experienced? Have any of them has not been employed before?
3. Tell me how you would describe the characteristics of your family (Humour, family connectedness, boundaries, beliefs, harmony, sharing, 1 person in charge). Have any of these helped your family to cope with and recover from the disaster? How does it help?
4. Tell me something about your family's disaster preparedness (Family plan? Family insurance? Family norms/rules?). Have any of these helped your family to cope with and recover from the disaster? How does it help?
5. Could you describe the lessons your family learned through experiencing the disaster? What positive changes have occurred in your family since the disaster happened?

Ending Questions:

1. Is there something else which helped your family through the disaster that has not been described or discussed?
2. After having these experiences, what advice would you give to other families which might experience the unexpected disaster in the future?
3. Is there anything you would like to ask me?

Chinese Version of Interview Schedule

访谈提纲

初始的开放式问题：

1. 能否告诉我您和您的家庭的一些基本情况？（家庭成员，在何处学习，工作，受教育情况）

2. 能否告诉我您和您的家庭成员在灾害中的经历？（灾害刚发生时和发生一段时间后）

3. 您觉得有什么因素帮助了您的家庭在灾害发生后的决定和行动？

中间的问题：

1. 您的家庭成员平时如何沟通和交流？（与其它家庭成员，朋友，单位，学校，社区）灾害发生后这些沟通交流渠道有帮助吗？如何起作用的？

2. 您的家庭在灾害发生后遇到了哪些困难？（生活，健康，经济）如何解决的？这些方法在平时家庭生活中用到过吗？哪些是以前有的哪些是新的方法？

3. 您能描述一下您的家庭的特点吗？（幽默，团结，家庭内部的约定，信仰，对待问题的态度，和谐，分享，分工明确）哪些特点帮助了您的家庭对灾害的应对和恢复？如何起作用的？

4. 您的家庭有灾害准备方案吗？能描述一下吗？灾害发生后有帮助吗？

5. 您的家庭从以往的灾害经历中有没有学到一些经验或产生一些好的改变？能描述一下吗？

结束的问题：

1. 还有没有其它的因素帮助了您的家庭对灾害的应对和恢复刚才没有提及？

2. 通过您和您的家庭的经历，您对其它未经历过灾害的家庭如何更好的应对将来的未知灾害有何建议？

3. 您有什么需要问我的问题吗？

Appendix 9

Appendix 9 Demographic Information Sheet

Instructions: Please answer each question either by filling in the blank or tick (√) one of the appropriate answers. All your answers will remain confidential. Thank you for your help!

Date:
1. Your age:
2. Your gender: Male Female
3. Your ethnic identity:
4. Your occupation:
5. What is your highest level of educational completion? ▪ Below high School ▪ High School ▪ Associate's/Vocational degree ▪ Bachelor's degree ▪ Master's degree or above
6. How many family members in your family live together? Who are they? (Please describe their relationship with you)
7. What is your approximate per capita family annually income? (Annually family income divided by the total number of family members living together) ▪ Below 10,000 RMB ▪ 10,000-49,999 RMB ▪ 50,000-100,000 RMB ▪ Above 100,000 RMB

If you are willing to be contacted by the researcher for clarifying some issues in this interview in the future, please leave your detailed contact information (Name, Postal address/ e-mail/ phone number/other).

Thank you very much for your participation!

Chinese Version of Demographic Information Sheet

基本信息表

填写要求：请在相应的空白处填上答案，或在您认为最符合的选项上打“√”，您所提供的信息将严格保密。衷心感谢您的支持！

日期：
1. 您的年龄：
2. 您的性别: 男　女
3. 您的民族：
4. 您的职业：
5. 您的最高学历 ▪ 高中以下 ▪ 高中或中专 ▪ 大专 ▪ 本科 ▪ 硕士及以上
6. 您的家庭有多少人现在住在一起？分别是谁？（请描述一下他们/她们与您的关系）
7. 您的家庭人均年收入？（家庭所有居住在一起成员的年度总收入除以家庭所有居住在一起成员数） ▪ 10,000 元以下 ▪ 10,000-49,999 元 ▪ 50,000-100,000 元 ▪ 100,000 元以上

如果您愿意研究者将来联系您以澄清访谈中的一些不清楚的地方，请留下您的具体联系方式。(姓名，地址，e-mail 邮箱,电话号码等)

感谢您参与本研究！祝您一切如意！

Appendix 10 Conference presentation arising from this study

Huahua Yin, Paul Arbon, Lynette Cusack, Kristine Gebbie. Family resilience and its implication in building disaster resilient community. Poster presentation. 25th World Conference on Disaster Management, Toronto, Canada. June 2015.

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