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Perceptions of social responsibility for community resilience to extreme flooding

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PERCEPTIONS OF SOCIAL RESPONSIBILITY FOR COMMUNITY RESILIENCE TO EXTREME FLOODING

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Abstract

Extreme weather events are becoming more frequent and more severe, with extreme flooding one of the biggest risks faced by increasingly vulnerable UK communities. There are complexities and inconsistencies within policy guidance, failings within technological measures of resilience and an over-reliance upon interconnectedness within modern society. Physical and economical resilience measures are not able to completely protect communities, as they do not account for the perceptual motivations behind pro-environmental behaviour. Research into perceptions needs to be conducted within the community, allowing behaviour of individuals to be contextualised within a social group and exploration of interrelationships between different community groups. The research explores perceptions of social responsibility in relation to extreme flooding for householders, local small to medium enterprises (SMEs) and policy makers. The influence of experience of flooding and the demographics of age, gender and ethnicity are also explored. The aim of the research was to explore perceptions of social responsibility, in relation to extreme flooding, within four communities in Birmingham and SE London, three with recent experience of flooding and one without. The research had two main objectives designed to meet this aim. The first objective was to establish and empirically investigate a theoretical framework for community level social responsibility research and a conceptual model of community group perceptions of social responsibility. The second objective was to explore factors which were considered to be related to perceptions of social responsibility, these being age, gender, ethnicity and experience of flooding. The two objectives were explored through a mixed methodological approach which combined quantitative questionnaires and qualitative cognitive mapping analysis. There were 343 questionnaires and 112 cognitive mapping transcripts from Birmingham communities. There were also 138 questionnaires and 62 cognitive mapping transcripts from a SE London community. The questionnaires were analysed using Predictive Analytic Software (PASW) and the transcripts were analysed using cognitive mapping, with visual maps created in Decision Explorer. The results show support for utilising the community social responsibility framework to structure research and for the majority of aspects within the conceptual model of community group perceptions of social responsibility. The results indicate that older participants report higher levels of self-rated social responsibility because they are considered to be more vulnerable to extreme events and were therefore more willing to take action for mitigation and adaptation. There were no gender differences found, suggesting that factors which influence perceptions of risk do not necessarily influence perceptions of social responsibility. The Asian ethnic group reported higher levels of self-rated social responsibility than the White ethnic group, who in turn reported higher levels than the Black ethnic group. There were no ethnic differences within the policy maker group. Social responsibility reported by participants within the community which had not experienced recent flooding was far lower than those reported by participants within communities which had experienced recent flooding. Policy makers are perceived as possessing a particular level of social responsibility, regardless of whether the community has experienced recent flooding or not. The importance and focus of their work was considered to override any individual ethnic or experience differences which may have been present. The results are also discussed in relation to existing institutional policies and agendas and existing measures of community resilience. The application and limitations of the research are considered, with contributions to new knowledge highlighted and recommendations made for future research.

Key Words: Social Responsibility, Perceptions, Behaviour, Community Resilience, Extreme Weather, Flooding, Climate Change, Cognitive Mapping, Age, Gender, Ethnicity

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Publications

The two publications from this thesis at the time of completion have been added as appendices.

Appendix 35: Mullins, A. and Soetanto, R. (2011) Exploring the effect of perceptions of social responsibility on community resilience. In Flood Hazards, Impacts and Response for the Built Environment, Proverbs, D.G., Lamond, J., Booth, C. and Hammond, F. N. (eds.). CRC Press. ISBN 978-1439826256.

Appendix 36: Mullins, A. and Soetanto, R. (2011) Enhancing community resilience to flooding through social responsibility. "Social and economic impacts of flooding", special issue of the International Journal of Safety and Security Engineering. WIT Press.

Glossary of Key Terms

Term	Definition/Explanation
Community	Community is defined in geographical terms as the members of these communities not only share the resources of that area but also have a shared risk of hazards. A community is where the individual resilience levels of people, businesses and policy makers within any given geographical area combine to produce an overall level of community resilience.
Community Resilience	Resilience must be thought of as containing elements of learning and adaptation to events so that community resilience can be increased. This is because the resilience of a community is determined by the interconnected system's ability to absorb disturbance, self-organise and contain the capacity to learn and adapt. It is also understood as being the link between individual and national resilience.
Extreme Floods	The community locations chosen by this research have had to meet three conditions to ensure that that they have experienced weather that is extreme for their location. This holistic approach reflects the key characteristic of relativity and acknowledges the potential disruptive aspects associated with social and psychological impacts, rather than simply focusing on physical or economical measures of extreme. The three conditions are 1) Communities must be urban-based and have experienced a period of higher than normal period of precipitation which resulted in flooding within the community, 2) It must be acknowledged within the local area of each community that an extreme flood has taken place in that location, as this common perception would be indicative that the community groups psychologically perceive themselves to have experienced an extreme flood and can relate to the purpose of the research, 3)The flood-experienced communities will have experienced disruption to their daily lives, caused by levels of precipitation and flooding.
Social Responsibility	Social responsibility is recognised as relating to the relationships between the economic, environmental and social aspects of an organisation or groups activities that endeavour to benefit society.
Experience of Flooding	In this investigation, experience of flooding is divided into two types of communities and community groups. Firstly these are those who have experienced flooding. These are householders, SMEs and policy makers who live or work within communities which have experienced a flooding event, regardless of whether they themselves were directly flooded by that event. This is in contrast to the second group who live or work within a community which has not experienced a flooding event.

Householder	Refers to a member of the public who resides within the case study area.
SME	Refers to either the owner, manager or a person of senior standing within a small or medium local business with a staff range of between 5 and 250 employees.
Policy Maker	Refers to an individual who is in a position within the local authority or other organisation that is able to have an influence upon the decision making process, including category 1 responders listed within the local flood resilience plans of each community. This individual may be a policy implementer, in addition to being a policy maker.
Meso	Meso level of research is in-between the micro (individual) and macro (national) levels, characterised by interactions within and between people in social units.
Power Distribution Category	Relates to perceptions of what people or groups are able to achieve or have responsibility for.
Awareness Barriers Category	Relates to perceptions, behaviours or observations that represent barriers to increasing knowledge and awareness of extreme flooding events.
Awareness Drivers Category	Relates to aspects which represent perceptions, behaviour and observations which can increase knowledge and awareness of extreme flooding events.
Negative Behavioural Intention Category	Relates to people or groups whose perceptions or lack of pro-environmental behaviour represents barriers to community resilience to extreme flooding.
Information Exchange Category	Relates to the perceptions that people or groups have about the way in which information is gathered or disseminated, as well as perceptions regarding the quality of that information.
Powerlessness Theme	Relates to an individual's perception that they are unable to influence the thoughts or behaviour of others, or change any given situation or measure.
Empowerment Theme	Relates to policy makers attempting to empower people and businesses to become more resilient.
Disinterest Theme	Relates to an individual being or appearing uninterested in resilience related matters.
Education Theme	Relates to an individual lacking knowledge about resilience related issues.
Educating Others Theme	Relates to policy makers attempting to educate people and businesses on resilience related matters.
Information Driver Theme	Relates to information being used as a tool to provide answers and promote resilient enhancing perceptions and behaviours.
Experiential Learning Theme	Relates to an individual learning from their previous experience of flooding.
Lack of Preparedness Theme	Relates to an individual being unprepared for extreme flooding.
Lack of Responsibility Theme	Relates to an individual blaming others for their lack of resilience, or believing it is someone else's duty.
Cost Barrier Theme	Relates to the high cost of resilience measures hampering their uptake.

Lack of Preparedness in Others Theme	Relates to an individual believing that other people or other social groups are unprepared for extreme flooding.
Cost Barrier for Others Theme	Relates to an individual believing that the high cost of resilience measures hampers their uptake for other people.
Language Barrier Theme	Relates to the terminology of resilience issues, where the perceptions related to specific word usage may create barriers due to confusion or misunderstandings.
Trust Barrier Theme	Relates to the lack of trust that exists between community groups.

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1. INTRODUCTION

Perceptions of social responsibility for community resilience to extreme flooding, is an important, yet understudied, area of research. Social responsibility research has largely focused on corporate social responsibility, which was not designed for application to community resilience research and therefore cannot adequately integrate the perceptions held by key community groups into resilience promoting measures. In order to counter these failings, the current investigation will propose a new framework for investigation of community social responsibility, which can account for the effect of perceptions within and between several key community groups. This framework will be supported by both theory and real world examples of the way in which perceptions of social responsibility may influence decision making and behaviour. The current investigation will also demonstrate that perceptions of social responsibility may differ between community groups in different locations and research should therefore explore and compare perceptions in a number of different communities. The importance of social responsibility will be highlighted by its inclusion within institutional aims and agendas and it will be demonstrated that further research is required to inform policies at both national and international levels, as well as policies aimed at local communities.

This investigation will also argue that perceptions of social responsibility may have their own influencing factors, with experience of flooding and the demographics of age, gender and ethnicity being highlighted as potential factors that require further research. The investigation will then review a number of existing measures of community resilience. These measures will be shown to support the notion of viewing communities as social units, with householders, SMEs and policy makers supported as the three key community groups. There is also support for the effect that perceptions of social responsibility may have upon decision making and behaviour, as well as further highlighting the influence of demographic characteristics. A number of failings of the measures of resilience will also be highlighted by the literature review. In particular, it will be demonstrated that there is a lack of cohesion within the measures of resilience, which is brought about by a lack of depth in the knowledge that research currently has about these individual factors and how they affect community resilience. This leads to a number of issues that research needs to address in order to inform both these and future measures of community resilience.

It will be argued that climate change is altering weather patterns across the globe, making extreme weather events (EWEs) more frequent and more severe. This means that extreme

flooding is now one of the biggest risks faced by communities in the UK, with the merging of our built and natural environments also increasing vulnerability to flooding events. Physical and economical resilience measures are not able to completely protect communities. This is because they can become overwhelmed when an extreme event occurs and do not account for the perceptual motivations behind pro-environmental behaviour, both as individuals and as community groups.

It will be argued that UK communities have not adopted pro-environmental behaviours. Research has largely focused upon measuring observed aspects of behaviour, rather than exploring the perceptual motivations behind pro-environmental behaviours, which have been found to make people deny the risks they face. Therefore, research needs to explore in greater depth the perceptual factors which can influence resilience. This research needs to be conducted within the community as this would counter the failings of macro level research, which is not fully able to capture perceptions and tends to focus on making sweeping generalisations. Community level research allows perceptions to be contextualised within a social group, which then allows exploration of the interrelationships between different community groups. The complexities and inconsistencies within policy guidance, the failings of technological measures of resilience and the over-reliance upon interconnectedness within modern societies will be presented as reasoning for the importance of finding alternative ways of increasing resilience to extreme flooding events.

The multi-disciplinary nature of the current investigation requires it to draw upon a number of academic fields, but the main research focus on social responsibility and the emphasis on the social level places it largely within the field of vulnerability. Definitions of both resilience and community resilience in the context of the current investigation will be established. The literature review will highlight that research is required to explore perceptions within community groups in order to determine their influence upon resilience to extreme flooding events. The current investigation will also highlight that householders, small and medium enterprises (SMEs) and policy makers are the three community groups which are the key to increasing resilience to extreme flooding events, with their importance evident in community resilience models and both policy and academic research.

In order to gain a deeper understanding of the way in which perceptions of social responsibility may affect community resilience to extreme flooding, and in turn may be affected by other factors, appropriate case study communities must be used as a focus for research. The research will present communities in Birmingham and London as appropriate locations in which to conduct the research. This is because these two UK cities have the largest population sizes and contain communities which have recent experience of flooding. Four communities in two separate cities will be chosen because the discussion of literature and review of measures of community resilience will highlight the need for separate communities to be compared to each other. This will allow comparison between communities in different locations who face different levels of risk, as well as between communities who have experienced flooding and those who have not. It is also noted that the current investigation is not suggesting that either of these areas are more susceptible to flooding than other similar areas of the UK. They were chosen based on the characteristics they possess, discussed later in their respective chapters, which will enable the research to be conducted in full and the findings to be generalised to other communities within the UK.

The review of literature will highlight a number of gaps in knowledge and competing arguments where significant contributions to new knowledge can be made. These gaps in knowledge will be expressed as a number of key research needs which the current investigation will attempt to address. These needs will be based around gaining a better understanding of ways to improve non-technical flood resilience measures, in particular perceptual factors associated with perceptions of social responsibility and community resilience to extreme flooding. This includes exploring perceptions within UK communities, in order to allow comparison with other countries. It also includes the need to explore perceptions related to extreme flooding, in order to allow comparison with other extreme weather events. The literature will also highlight that perceptions need to be explored at the community level, as well as comparing perceptions between different communities. This will allow further research needs to be met, including the need to explore perceptions within and between the three key community groups of householders, SMEs and policy makers in a number of different communities.

The research area of social responsibility itself will also be shown to require a greater depth of knowledge regarding the effects of social responsibility, which can be used to inform academic research, measures of community resilience and institutional policies and agendas. Research also

needs to explore factors which may influence perceptions of social responsibility, in particular age, gender, ethnicity and experience of flooding. In order to achieve this then the first research need that the current investigation will address is the need to provide common definitions and frameworks so that social responsibility research can be both understood and be comparable across a number of academic disciplines and within institutional policies and agendas.

The review of literature will highlight the existence of many conceptualisations and definitions of social responsibility, with many of these definitions arising from current understanding of corporate social responsibility. The business-centred focus of existing conceptualisations and definitions will be shown to limit the application of social responsibility, making corporate social responsibility frameworks unsuitable for exploration of social responsibility in relation to human perceptions, rather than business practices. Therefore, the current investigation will argue that a defining framework is required to aid research in exploring social responsibility in relation to vulnerability and resilience issues. Establishing this theoretical framework for social responsibility research in the community will be the first objective for the current investigation.

The gaps in knowledge highlighted by the review of literature and their associated research needs will be used to generate two research objectives to meet the overall aim of the current investigation, which is to explore perceptions of social responsibility and its influencing factors in relation to extreme flooding within different community contexts. The aim and objectives together will address all of these research needs, as well as providing further in-depth information to a number of specific areas of research. The two objectives designed to achieve the aim of the current investigation are as follows:

1) Establish and empirically investigate a theoretical framework for community level social responsibility research and to create and empirically investigate a conceptual model of community group perceptions of social responsibility

With the first part of this objective having provided a framework for researching social responsibility in the community, the second part will be to create a conceptual model of perceptions of social responsibility. This conceptual model will indicate the way in which research suggests that perceptions of social responsibility may influence decision making and behaviour, while also accounting for a number of factors which research has highlighted may influence

perceptions of social responsibility. The current investigation is to assess the validity of the theoretical framework for community social responsibility research and the conceptual model of community group perceptions of social responsibility. Firstly, this will be achieved by conducting an empirical investigation of social responsibility that adheres to the recommendations within the framework. This means conducting an exploration of perceptions of social responsibility within each of the key community groups, as well as exploring the perceptions that they hold of each other. The evidence emerging from this research will be discussed in relation to its usefulness in understanding and exploring social responsibility in this manner. Secondly, this will be achieved by exploring the effect that each of the factors which have been highlighted as potentially influencing perceptions of social responsibility (age, gender, ethnicity, experience of flooding) have upon self-rated perceptions of social responsibility within each of the key community groups.

The second objective is to:

2) Explore the effect of factors such as age, gender, ethnicity and experience of flooding on perceptions of social responsibility for extreme flooding

The second objective will explore factors which may have an effect upon perceptions of social responsibility. These four factors are age, gender, ethnicity and experience of flooding. These objectives will be achieved by investigating whether or not these factors are related to self-rated perceptions of social responsibility.

These objectives will be explored through a mixed methodological approach which combines quantitative questionnaires and cognitive mapping analysis of qualitative transcripts. This will allow a large amount of complex data to be obtained and analysed, while also retaining the ability provide a context for the research findings. The results will be discussed in relation to how each of the key findings has met the research needs and objectives. The discussion will also identify the application and limitations of the findings, as well as highlighting where contributions to new knowledge have been made.

2. EXTREME WEATHER EVENTS AND KEY COMMUNITY GROUPS

This chapter explores why the increase in frequency and severity of extreme weather events, particularly extreme flooding within UK communities, makes finding ways to increase resilience to such events an important area of research. Drawing upon a number of disciplines, this chapter also highlights why modern communities have an increased vulnerability to extreme weather events, discusses the failures of technical resilience measures and proposes how new research which explores social factors, specifically perceptions and behaviours of individuals and community groups, can provide new knowledge to increase resilience. This chapter establishes definitions of resilience and community resilience, as well as discussing why research must now be based at the underdeveloped community level.

The chapter also highlights how exploring the effect of perceptions of individuals and community groups on community resilience to extreme flooding would develop research at the community level. It would also provide a greater depth of new knowledge in a largely understudied area of research and counter some of the failings of national level research. This chapter will also highlight which community groups are key to increasing community resilience to extreme flooding and why a deeper understanding of the relationship between perceptions and behaviour within these community groups is required. These perceptions are shown to be an understudied area of research which can counter both legislative and technological failings, as well as reducing vulnerabilities that arise from the over-reliance upon interconnectedness within modern society. Drawing on evidence from a number of academic fields, this chapter highlights that the effect of perceptions of social responsibility on behaviour is one of the most important areas of research for creating new knowledge which can be used to increase community resilience to extreme flooding.

2.1. Climate Change and Extreme Weather Events

It is argued that climate change is altering weather patterns across the globe and creating changes that our global ecosystem is now struggling to cope with (Ge et al. 2010, IPCC 2007). Extreme weather events have not only become more frequent and more severe, but also society has become more vulnerable to the effects of these events (Ge et al. 2010). This increase in frequency can be seen in the steady rise in number of disasters over the last 20 years, with the increase in severity highlighted by unprecedented disasters, such as Hurricane Katrina (Ge et al. 2010). Further evidence for this can be seen in the August 2003 heat wave that caused a large loss of life

throughout parts of Europe, particularly France and the south of England, as the infrastructure of society was not able to cope with such extreme temperatures (Poumadère et al. 2005, Salagnac 2007). This heat wave caused over 2000 premature deaths in the south of England (Kovats, Johnson and Griffiths 2006). Climate models have continuously predicted more extreme weather, with temperatures increasing during the 21st century, leading to drier summers and wetter winters in the future (Ström et al. 2011, Hulme et al. 2002). The UK Climate Projections 2009 predict that temperatures across the UK will rise, there will be more seasonal rainfall and the height of tidal surges will increase (UKCP 2009). It has also been suggested that there is the possibility of a worldwide catastrophic event taking place, such as the thawing of the permafrost, which may trigger further extreme weather events (Lenton et al. 2008).

The general consensus has been maintained that human activity is having a large, detrimental effect upon the environment, increasing climate change and thereby increasing the likelihood of severe flooding (UKCP 2009, IPCC 2007, IPCC 2001a, IPCC 2001b, Meehl et al. 2000). This was recognised within climate policy, with many member states of the European Union accepting the need to reduce greenhouse gas emissions. In the UK the Committee on Climate Change recommended at least an 80 percent cut in national emissions by 2050 (London: The Stationery Office 2008). The need to reduce emissions that cause climate change have also been demonstrated by ocean and atmosphere general circulation models (Wilby and Dessai 2010). There are difficulties though in assessing and discussing the climate change debate due to the large number of uncertainties, and 'the lack of a framework to talk about the climate debate in the social realm' (Hoffman 2011:5). Hoffman (2011) indicates that this lack of a common framework means that researchers currently need to research and discuss climate change within the existing frameworks of their own research disciplines (for example Hoffman (2011), from an organisational theory background, uses social movement theory and the concept of institutional logics).

The epistemological and ontological considerations of this investigation are discussed later in chapter 5.4., p.128. What should be noted now is that the philosophical framework within which this investigation is situated is based upon the understanding that society is more vulnerable to extreme weather events and that the climate change predicted by climate models will occur. However, it is also noted that there exists an opposing view that believes that human activity has a negligible effect upon the environment, with climate change viewed as a completely natural

phenomenon (see Hoffman 2011, Dawson and O'Hare 2000 for discussion). It is recognised that there is an organised climate change denial movement that exists in opposition to the generally accepted view (Dunlap and McCright 2010, McCright and Dunlap 2010, Oreskes and Conway 2010). One major argument of climate change deniers is that peer review on the subject has become biased, being based on the political and social biases of scientists in editorial positions at academic journals, rather than on quality of research conducted (McCormick 2009). Hoffman (2011) noted that there is a belief among climate change deniers that climate change is being used as an excuse for governments to interfere in the personal lives of the public. In summary, Hoffman (2011) found that the ideology of climate change deniers is based upon 'a deep suspicion of environmentalists, perceiving them to be a threat to freedom, capitalism, and democracy' (Hoffman 2011:12). It should be noted that Hoffman's (2011) view is based largely upon the observance of the ideology of American climate change deniers, which may differ from the views of other climate change deniers around the world, particularly those from outside Western culture. The UK does represent Westernised culture though, making these observations more relevant for the current investigation.

It is important to recognise opposing views that exist as these conflicting perceptions can affect decision making and behaviour, which in turn can affect the level of resilience communities have to extreme weather events. The social sciences were much slower than the physical sciences in turning their attention to the climate change issue (Goodall 2008), but it is has been the generally accepted view within academic research that anthropogenic climate change is a problem (Hoffman 2011). This may be because, despite some ideological differences of opinion, the physical evidence of climate change discussed so far indicates that the weather patterns are changing and will continue to do so in the future. Therefore, it is an issue that many understand must be addressed.

Recently in the UK, like many other places, there has been a decline in concern and an increase in scepticism regarding the anthropogenic causes of climate change (Leiserowitz, Maibach, and Roser-Renouf 2010, YouGov/EDF 2010, European Commission 2009). Much of the scepticism within the research and public surveys surrounds the impact that humans are having upon climate change. This has arisen from well publicised events, such as the leaked emails claiming that climate scientists manipulated or withheld data, although subsequent investigations cleared the scientists of wrongdoing (Adam 2010). Outside the UK, findings by the Pew Research Center

(2009) indicated that belief in the science of climate change among Americans had fallen from 71% to 57%. However, it has also been suggested that this doubt regarding climate change may actually be reflective of the reduced attention, due to more pressing matters, in particular the recent economic recession (Derbyshire 2009). Given that the UK was also experiencing an economic recession, then it is reasonable to suggest that this may have also influenced the UK based findings.

The purpose of this research is not to discuss the ideological standpoints surrounding the degree of effect human activity has upon the environment. The opposing views climate change have been acknowledged, but it is the view of this investigation that the climate models that predict more extreme weather (Ström et al. 2011, UKCP 2009) and the ocean and atmosphere models that demonstrate the link between emissions and climate change (Wilby and Dessai 2010) are supported by the findings of research and reviews (Ge et al. 2010, Stern 2007). It is also important though to understand how these sceptical views may arise.

2.2. Exploring the Evidence

The main problem lies in the fact that climate change is not a directly observable phenomenon (Spence et al. 2011, Kollmuss and Agyeman 2002). It is instead an average of climate conditions over a long period of time and is based upon the measurement of daily and seasonal changes (Spence et al. 2011). The weather and its related seasonal events provide the primary means by which people then judge the impact, or even existence of, climate change (Spence et al. 2011). In the UK, evidence for the existence and impact of climate change has been recorded in events such as the early arrival of swifts in the summer, in addition to evidence suggested by the reduced number of seals within Arctic regions (Lawrence 2009). It is acknowledged that climate change predictions can only highlight an increased risk of particular weather patterns and events occurring (Pidgeon and Butler 2009).

Many areas of the UK are predicted to suffer from drought (Blenkinsop and Fowler 2008). However, when exploring the combined impact assessment from six regional climate models, Blenkinsop and Fowler (2008) are only able to predict increases in short-term summer droughts, with long-term drought highly uncertain. More recently it has been suggested that the location of the UK makes it highly unlikely to experience drought caused by climate change due to 'its northern temperate latitude, surrounded by water bodies (Atlantic, North Sea, Irish Sea and

English Channel), on the west side of a continental mass, in a zone of predominantly west winds' (Fielding 2011:5). Fielding (2011) goes on to suggest that flooding will be of greater concern in the UK due to its widespread impact, above and beyond the water damage itself. This is supported by further evidence which indicates that flooding damages transport, public service and utilities infrastructures, as well as damaging industrial and commercial properties, people's homes and brings an increased risk of disease (Environment Agency, 2009; Wheater and Evans, 2009; UK: GOS Land Use Futures, 2010).

It has been suggested that because climate change cannot be attributed to a single event, then it may be more appropriate to view weather events as being the result of hybrid weather co-produced by natural and cultural climate systems (Hulme 2010). Again, it is not the intention of this investigation to discuss the causes of climate change, but to instead investigate the more extreme weather to which it has been linked. That is why one of the most important aspects for this investigation is the finding that there is an explicit link between anthropogenic greenhouse-gas emissions and flood risk in England and Wales (Pall et al. 2011).

Pall et al. (2011) argue that although anthropogenic causes cannot be attributed to individual flooding events, they can be responsible for altering the risk of these events (supported by Stone and Allen 2005). This is in line with earlier research regarding increased extremes of precipitation related to anthropogenic warming (Allen and Ingram 2002). Pall et al. (2011) recognise though in their review of flooding science and literature that the complex weather associated with flooding cannot be fully accounted for by such a simple relationship. Therefore, Pall et al. (2011) used a Probabilistic Event Attribution framework to estimate the degree to which anthropogenic greenhouse gas emissions in England & Wales contributed to flood risk, in relation to floods in the Autumn of 2000. This was achieved by comparing daily river runoff realisations under Autumn 2000 scenarios, both with and without emissions, to create several thousand seasonal forecast resolution climate model simulations (Pall et al. 2011). The climate model by Pall et al. (2011) was found to be representative of both autumn synoptic conditions and the variability in precipitation runoff in England and Wales. The findings indicate that the flood risk in Autumn 2000 in England and Wales was significantly (at 10% level) increased by anthropogenic emissions, with estimates indicating that these emissions trebled that risk (Pall et al. 2011).

The findings by Pall et al. (2011) are also supported by other researchers. It is now becoming widely acknowledged that although a single event cannot be attributed directly to climate change, it is possible to explore increased risks (Kay et al. 2011). The data resulting from the findings of Pall et al. (2011) was further tested by Kay et al. (2011) who entered the data into continuous simulation rainfall-runoff models which had been calibrated to represent eight catchment areas in England affected by the Autumn 2000 floods. This additional testing in different catchment areas ensures the data is more 'robust to temporal and spatial variation of rainfall inputs and to antecedent conditions so that differences due to catchment characteristics and location are better accounted for' (Kay et al. 2011:98). This testing also included the application of a snowmelt module because 'increased temperatures due to climate change are likely to mean a decreased chance of large snowmelt-induced flood events' (Kay et al. 2011:98). The results by Kay et al. (2011) are based upon calculation of the fraction of attributable risk, with the positive median values of this risk indicating that, for all but one catchment, emissions are likely to have increased the chance of flooding.

It is acknowledged that these findings by Pall et al. (2011) and Kay et al. (2011) are related to the Autumn 2000 floods and further research is required to see if these findings remain consistent in relation to other floods. In addition, these studies only explored climate data over a period of 1 year and further research is required to explore this data over a longer period of time. However, the research discussed so far not only provides evidence to support the view that climate change and flooding can be affected by human action, but also justifies the need for research to explore ways of becoming more resilient to flooding in the UK.

2.3. Extreme Flooding

The Stern Review (2007) states that immediate action is required to tackle climate change, as the costs and consequences of inaction will increase dramatically over time. Extreme flooding should regarded as one of the most potentially damaging of these threats, as climate change and the fragile infrastructure of our everyday lives combine to create this modern risk (Ge et al. 2010). It is acknowledged that Ge et al. (2010) conducted their research in the Yangtze River Delta region in China. However, the threat of extreme weather damaging fragile infrastructure in the UK has already been recognised by many sources (Fielding 2011, Environment Agency 2009c, Wheater and Evans 2009, UK: GOS Land Use Futures, 2010). This does highlight is the global nature of the issue. The 2011 flooding in Australia, which caused a number of death and thousands of people to

be evacuated, is considered to be Australia' most expensive natural disaster (BBC News 2011a). Further recent extreme flooding in Brazil killed over 420 people (BBC News 2011b).

In England there are 2.4 million properties at risk of flooding from both river and sea water and another 2.8 million properties at risk of surface water flooding, which translates to one in six properties in England being at risk of flooding (Environment Agency 2009a). Nicholson-Cole (2005) found that the most common descriptions of climate change that people visualised were those related to flooding in the UK. This research by Nicholson-Cole (2005) is based upon exploring visualisations, which are recognised to be subject to viewer interpretation, largely due to the issue of attempting to represent uncertainty and depict abstract issues as simplified, generalised interpretations (see Trumbo 1999 for discussion of visual literacy and science communication). There is also an existing argument regarding the validity of using imagery to represent future changes (see Daniel & Meitner 2001). However, it is the commonality of the flooding aspect within Nicholson-Cole's (2005) results, which acknowledge these inherent subjectivity issues, which are of interest to the current investigation. The two main commonalities within almost all participants visualisations of the future was of extreme flooding in the UK and abroad, and a generally pessimistic view of climate change as a whole, as 'most participants expressed their feelings about climate change in a negative and distant sense, abstract from their personal lives and present situation' (Nicholson-Cole 2005:263). This indicates that flooding in the UK has been of concern to the general public for a long period of time and is the weather event most associated with visualisations of climate change in the UK.

This apparent negativity appeared justified when in 2007 there was widespread flooding throughout the UK, which caused an enormous amount of damage as again our fragile infrastructure was not able to cope with such extreme weather. The national media reported on the most severe of these, in particular the flooding in Hull 2007, but flooding occurred in many places (Don and Upper Thames Valley 2007, Tewkesbury 2007, Bocastle 2004, Lewes 2000) and has continued to do so in localised cases over the last fifteen years (Fielding 2011, Jennings 2010, Pitt 2008, Stern 2007). As climate change becomes an ever more serious threat, then flooding in our communities will become ever more frequent and more severe (Pall et al. 2011, McCarthy 2007, Easterling et al. 2000). This is of great concern because our built environments have become increasingly merged with the natural environment, making both more susceptible to flooding (Get et al. 2010, Wheater and Evans 2009).

The ageing physical infrastructure, rapid economic development and growing populations all add to the vulnerability of our built environments to severe floods (Morss et al. 2011, Bouwer 2011, Stewart and Bostrom 2002). It is of no surprise to learn then that extreme weather events are increasing in frequency and severity in the UK (Pall et al. 2011, Ekstrom et al. 2005), flooding is the most common natural disaster in Europe (Pitt 2008, Hajat et al. 2003) and is particularly prevalent in the UK which has seen a steady increases in heavy rainfall over the past few decades (Pall et al. 2011, Fowler and Kilsby 2003). It has been predicted that climate change will result in greater urban flooding (Fielding 2011). This is because the run-off from heavy rainfall is unable to be absorbed, leading to sewerage and drainage being unable to cope (Fielding 2011). This will result in four times the number of people being at high risk of flooding in the future (Fielding 2011). Given the more frequent occurrence and greater severity of flooding events, combined with increased vulnerability to these events, it is reasonable to suggest that it is of utmost importance that research explores every possible avenue to increase resilience to extreme flooding events in the UK.

2.4. Current Resilience Issues: Vulnerability and Risk

Whilst governing bodies recognise that society must undergo significant changes in order to counter climate change (Richardson et al. 2009), these are still largely based upon technological and economical solutions due to much of the focus of climate change agendas being based upon reducing greenhouse gas emissions (Spence et al. 2011, IPCC 2007). For example, it has been suggested that existing technologies, such a nuclear power, can greatly reduce climate change (Visschers, Keller and Siegrist 2011, Pacala and Socolow 2004). It is important though to acknowledge the role of human perceptions within society. It is understood that complex socio-technical relationships exist between people and technology (Geels 2010, also see Bijker, Hughes and Pinch 1987 for discussion of early theory). The implementation of new measures, or proposed physical changes, often require community approval and engagement to be successful (Haggett 2009, Owens and Driffill 2008). It is of little surprise to discover then that researchers have stated that many of the physical resilience measures and tools for predicting and dealing with extreme weather events have been inadequate or lacking fail to acknowledge all aspects of resilience (Spence and Pidgeon 2009, Sarewitz, Pielke & Byerly, 2000). In particular, these measures fail to fully acknowledge the human, social and cultural drivers of climate change (Spence and Pidgeon 2009).

Current flooding related failings can be found within climate models which are not currently able to predict with a good degree of accuracy regional differences in rising sea levels (Lonsdale et al. 2008a). This is because the warming of the oceans and the resulting expansion of ocean water is not equally distributed, which when combined with variations in ground settlement, atmospheric pressure and changes in ocean circulation creates regional differences that can vary by up to 50% above or below the global average (Lonsdale et al. 2008a, Shennan and Horton 2002). These uncertainties surrounding climate change are mirrored in the uncertainties surrounding changes that will happen at the social and economic level over the course of time, notably those involving land use and social structure (Lonsdale et al. 2008b). Therefore, it's important for research to discover new ways in which we may increase resilience to extreme flooding.

Unfortunately, communities, organisations and people in general are often ill-prepared to cope with flooding, becoming overly reliant upon physical resilience measures which prove to be largely ineffectual and forecasts based on past events which are unable to accurately predict our ever changing world (Wedewatta et al. 2011, Pidgeon and Butler 2009, Stewart and Bostrom 2002). There is a general consensus on this point, with even the most recent of models which demonstrate increased risk of flooding in the UK due to anthropogenic emissions (Pall et al. 2011, Kay et al. 2011) being unable to provide 100% accuracy and being based on testing floods from 2000. Research must find new ways then for people and communities to be able to become more resilient.

The National Risk Register in the UK contains details of the risks faced by the UK and extreme weather events, such as flooding, are labelled as hazards (Joyner and Raiborn 2005). Climate change and extreme weather events are not sudden new hazards faced by communities as they have been known about and documented over a long period of time. This is how we know that the risks we face are increasing, with the failings of previous resilience measures and the damage caused by recent extreme weather events indicating that we have not yet found a sufficient way to counter this risk. It is the view of this investigation that the failing of physical measures and undervaluing of perceptual and behavioural aspects has meant that society has become more vulnerable to the effects of flooding. This was highlighted in 2007 when there was widespread flooding in the UK which caused an enormous amount of damage as our fragile infrastructure was not able to cope with such extreme weather (Pitt 2008). It has been stated that physical flood

defences will never be able to completely prevent flooding (DEFRA 2005) and, therefore, other ways should be explored to mitigate the impacts of extreme flooding (Johnson and Priest 2008, DEFRA 2006, Environment Agency 2003). This has lead to a shift in the research focus of flooding research and extreme weather events as a whole, with the social aspects of disasters becoming ever more recognised as important a study area as the physical properties (Spence et al. 2011, Wisner et al. 2004, Canon 2000). The emphasis of this research has been on the need to explore the vulnerability of individuals and communities to extreme weather events.

Vulnerabilities within modern society are not limited to flooding events, as evidenced by the 2003 heat wave that caused a large loss of life throughout parts of Europe (Salagnac 2007, Poumadère et al. 2005), as well as the snow storms that occurred in 2009. As evidenced in the opening sections, extreme flooding still poses one of the biggest threats to UK society due to the combination of climate change and the fragile infrastructure of modern societies. To ensure the survival and well being of individuals, it is of upmost importance that appropriate strategies are devised to improve the resilience of the community where these individuals live. Before these strategies can be conceptualised, research must provide a greater understanding of the factors which influence can influence resilience. It should be noted that, so far this literature review has discussed both the risks faced by modern society and their increased vulnerability to these risks. However, these are two qualitatively different areas of research. It is important to identify that the theoretical basis for the current investigation is considered to be within the field of vulnerability. This is because it explores how different perceptions of social responsibility affect community resilience (i.e. vulnerability) to extreme flooding, through investigation of the social aspects of disasters (e.g. human perceptions and behaviour) rather than the physical impacts of flooding.

One of the key differences between the fields of risk and vulnerability is highlighted by researchers who have found that the creation of policy based on a probabilistic understanding of risk can actually increase vulnerability to that risk (Sellke and Renn 2010, Sarewitz, Pielke and Keykhah 2003). This is because people often follow set procedures to counter a theoretical threat, which may not be representative of the threat they currently face. Therefore, it is more important to research and understand vulnerability, as finding ways to reduce vulnerability will always, by default, reduce risk, but reducing the outcomes of the risk event will not always reduce vulnerability (Sarewitz, Pielke and Keykhah 2003). However, due to the similarities and sometimes

merging of the two fields of research (Sarewitz, Pielke and Kaykhah 2003) it is also noted that the risk research literature can also provide many insights which may be applicable to exploring vulnerability and the current area of this research, particularly perceptions of risk. Therefore, given the multi-disciplinary nature of the research area, each separate field of research will be drawn upon where appropriate, but social responsibility as a research area itself lies within the field of vulnerability research, which places the current investigation at the forefront of the shift in focus to exploring the social aspects of resilience to extreme weather events.

The research focus on these social aspects takes on even greater importance when we examine the impacts of extreme flooding in more detail. It has long been suggested by many researchers that an extreme flooding event is a social event and research must recognise and further explore the social context of flooding (Tapsell et al. 2010, Wisner et al. 2004, Canon 2000, Fordham 1998). It has also been stated that the one of the main lessons to learn from Hurricanes Katrina, Rita and Ike is that the social effects of storms and floods, their impact on socially vulnerable populations, has been significantly understudied (Dunning and Durden 2011). It is important this is addressed because there is a clear indication that flooding is becoming more frequent and severe, with extreme floods occurring across the UK in spring 1998, in autumn 2000, in the north of England in 2005, in summer 2007, and in Cumbria in 2009. The severe flooding of 2007 came after the wettest May to July period ever recorded since records began in 1766, with an unprecedented 414.1mm of rain falling across England and Wales (Environment Agency 2010b, Pitt 2008). This indicates that the flood risks we face are increasing and we have not yet found a sufficient way to counter this risk.

In addition to the earlier criticism of climate change agendas which have so far failed to fully incorporate the need to understand human behaviour, the UK government has been attempting to adapt to new risks through the creation of new legislation and implementation of new civil protection measures. This investigation argues that the majority of these have been built around an already stretched communication network and use already stretched resources. This investigation also argues that it should not fall to the formal organisations and institutions, which are functioning arm of the overburdened network, to increase resilience to such events as they are too far embedded within the fragile infrastructure itself, adding frailties to resilience measures themselves. These interdependent organisations have their place to increase resilience, but it may not be possible for them to achieve the kind of results that could protect modern

society to a sufficient level. Instead it is the extended branches of the network, the communities themselves, who could make the greatest advances in creating resilience to flooding. This is a view echoed by the *Foresight Future Flooding* report (Evans et al. 2008) and the Stern Review (2007), both of which highlight the importance of informing everyone about the risks posed by climate change and how it may affect their daily lives. Therefore, research should fully investigate the impact of these findings within the built environment with which we are most familiar and is most salient to our needs, our own community.

2.5. Community Level Resilience

Reid, Sutton and Hunter (2010) define households as being at the meso level of research, in-between the micro (individual) and macro (national) levels, characterised by interactions within and between people in these social units which can create and support pro-environmental behaviours. The current investigation suggests that communities can therefore also be considered to be at the meso level of research because, similar to households, they contain a smaller group of people (than the macro level) in a social unit, whose interactions and interdependencies may affect levels of pro-environmental behaviour. In turn, the same characteristics are found if we group individuals into social units representing community groups (see figure 1).

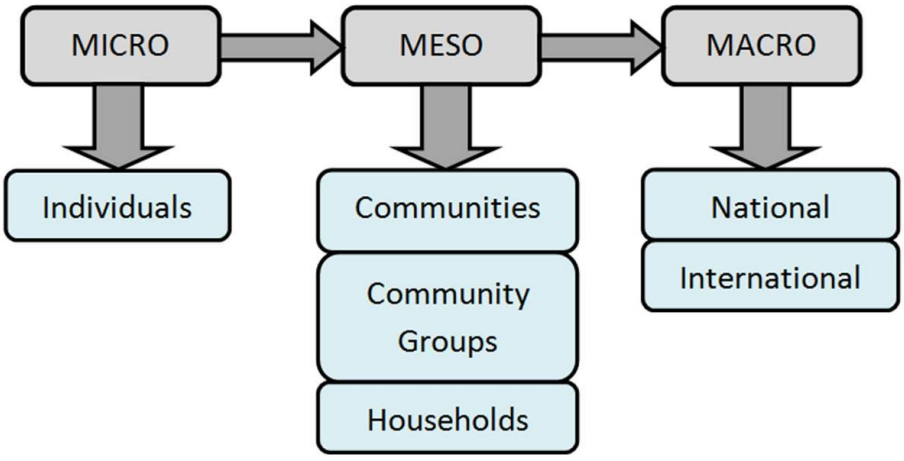

Figure 1: Micro, Meso and Macro Levels of Research

Visual representation in figure 1 created by this investigation, based upon the definition of the meso level by Reid, Sutton and Hunter 2010

Categorising communities and community groups in this way provides an important platform for investigation because it has been suggested that the future of disaster research should be to explore the social processes within communities (Spence et al. 2011, Tapsell et al. 2010,

Quarantelli 2005). This is supported by earlier calls for research in this area by Fordham (1998) and Blaikie et al. (1994) who highlighted the importance of exploring the underlying social aspects within communities. However, while there has been much research conducted on a number of aspects of extreme events and climate change, such as resilience, adaptive capacity and vulnerability at the national, regional and sector levels (Gallopin 2006, Dahlstrom and Salmons 2005, Adger and Vincent 2005, Adger and Kelly 2000), assessing the impacts of extreme weather events at a local level is less well developed.

Tapsell, Tunstall and Wilson (2003) noted previously that, despite the recognition of the importance of social aspects of disasters, minimal research had been conducted at the community level. Tapsell et al. (2010) re-emphasise this earlier view, while discussing ways in which social vulnerability might be better understood. One suggested explanation for the slow uptake in community level research is that, while it is possible that interactions can occur across the theoretical levels of research (micro, meso and macro), research has often tried to generalise too much from individual behaviours straight to national trends (Reid, Sutton and Hunter 2010). Macro level approaches have been criticised for making sweeping generalisations that relies too heavily upon top down analysis and policy making (Schenk, Moll and Uiterkamp 2007). Furthermore, macro level research often fails to fully incorporate the diversity of perceptions and behaviour present within society as they often explore the behaviours of a single organisation and generalise this as being the norm for organisations at the national level (Tudor, Barr and Gilg 2007). Findings are taken and applied out of context. These generalisations do not account for perceptions and behaviours further down the chain, as they are focused upon even further up scaling to try and discover international trends (Schenk, Moll and Uiterkamp 2007, Haanpaa 2005). Therefore, the macro level offers limited scope for providing a detailed understanding of factors which can affect community resilience, supporting the view that further research is required at the meso (community) level, which can provide a useful platform for exploring perceptions and behaviours (Reid, Sutton and Hunter 2010).

Meso level research would allow the behaviour of individuals to be contextualised within a social unit, while also allowing a deeper understanding of how to make changes at the macro level (Reid, Sutton and Hunter 2010). In the context of the current investigation, this approach would allow the effect of individual perceptions of social responsibility (micro level) to be contextualised

within the social units of community groups (meso level), representing the community itself. It is acknowledged that the aim of Reid, Sutton and Hunter (2010) was to discuss a new way of conceptualising pro-environmental behaviour and represents a break away from the previous dichotomous (micro and macro) view. Despite being portrayed as a new way of thinking, it shares many similarities with other calls for community level approaches already discussed (e.g. Tapsell et al. 2010). Therefore, this community (meso) level approach would allow a more thorough exploration of the effect that perceptions may have upon community resilience.

Further support for investigating community groups in this manner can be found when we consider the importance of understanding the complex interactions associated with perceptions and behaviour of individuals within these groups. Researchers understand that community resilience involves complex interdependencies between key community groups, but the precise nature of the relationship within and between these groups, particularly behavioural and perceptual aspects, is less well understood (Spence et al. 2011, Spence and Pidgeon 2009, Smit and Wandel 2006). Therefore, further research is required into perceptions and behaviours that can affect resilience at the level of the community (definitions of the term community itself are discussed later in section 2.6., p.20). Psychological research has suggested that perceptions of climate change as a distant issue may leave people more vulnerable to their impacts (Spence et al. 2011, Swim et al. 2009, Lorenzoni and Pidgeon 2006). This is due to people having reduced ability to make judgements and react to distant threats (Willians and Bargh 2008). Therefore, highlighting the impact of climate change at the local level may improve engagement with environmental issues (Spence et al. 2011, Weber 2006).

This is supported by research which states that people's visual expressions of climate change are often related to local examples, which can enhance their perception of the importance of climate change issues as people seek to identify the complex phenomena of climate change with more familiar surroundings (Tapsell et al. 2010, Nicholson-Cole 2005). The current investigation proposes that a localised approach would provide a better context for understanding the perceptions that lead to resilience related decisions and behaviours, particularly for members of the community who fail to engage in resilience promoting actions. Researchers support this view, stating that, although there is concern regarding climate change present in Europe and the USA, it is not a high enough concern to change behaviours in daily lives and therefore saliency of risk must be increased by concentrating on research at the community level (Tapsell et al. 2010,

Lorenzoni and Pidgeon 2006). This view is also supported by the Social Amplification of Risk Framework which states that the interaction of a number of psychological, social, institutional and cultural factors combine with the physical aspects of an extreme weather event (Renn 2008), indicating that the localised nature of risks in the community, where these factors combine, would be the most appropriate place to explore these interactions and responses. There is a large amount of support then for investigating resilience at the community level. However, there are a number of issues regarding definitions of the terms 'community' and 'resilience' which first require consideration.

2.6. Defining Community Resilience

Definitions of resilience have often described communities dealing with the effects of an extreme weather event and then returning to their normal functioning prior to the event. However, if a community returns to its previous state, then it may have bounced back from the event but it may not have actually increased its resilience to similar events. Instead, resilience must be thought of as containing elements of learning and adaptation to events so that community resilience can be increased (Daly 2009, Peek 2009, Norris et al. 2008). This is because the resilience of a community is determined by the interconnected system's ability to absorb disturbance, self-organise and contain the capacity to learn and adapt (Norris et al. 2008, Walker and Salt 2006). It is acknowledged that other definitions of community resilience exist, many of which are tailored to personal agendas, or have become outdated. For example, Klein, Nicholls and Thomalla (2003) defined community resilience as primarily being the amount of disturbance a system can absorb while still remaining in the same state. While Klein, Nicholls and Thomalla (2003) recognised the need for self-organisation and the capacity for learning and adaptation, overall community resilience is represented as possessing somewhat less flexible attributes than the more dynamic adaptive capacities described by Norris et al. (2008). What this does highlight is the progression that conceptualisations of community resilience have made since early, rigid perceptions of community resilience as simply being the ability to withstand external disturbances. For example the definition provided by Adger (2000), which describes community resilience as being the ability to withstand external shocks to social infrastructure.

The current investigation proposes that it is the attitudes, perceptions and behaviours that members of a community adopt or display prior to an extreme weather event that can determine the ability of that community to absorb the disturbance. Furthermore, these aspects may also

then determine their motivation and ability for self-organisation during the event and how much they are willing to learn from the event in order to change their perceptions and behaviours. The current investigation will therefore utilise the definition of resilience provided by Walker and Salt (2006) (and other recent supporting researchers, e.g. Norris et al. 2008), as it accounts for interactions at the community level, providing support for the focus of the current investigation.

Exploring explanations of resilience itself, it is widely accepted that there are four main stages to the resilience process, collectively known as the social resilience cycle (Maguire and Hagan 2007). This is similar in nature to other resilience cycles, containing the same core components as the disaster risk management cycle (Keim 2008) and the emergency management cycle (Fillmore et al. 2008). It can be thought of as a cycle because after the final recovery stage, a community returns to the mitigation stage in order to try and prevent future disasters, preferably having incorporated new knowledge from the previous event. Figure 2 displays a visual representation of this cycle (image created by the researcher for visualisation purposes).

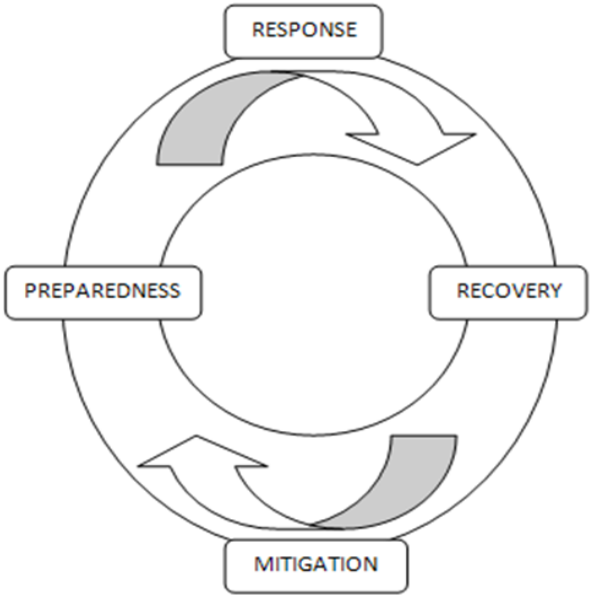

Figure 2: Visual Representation of the Social Resilience Cycle

Visual representation in figure 2 created by this investigation, based upon the definition of the social resilience cycle by Maguire and Hagan 2007

The first stage is mitigation where there is a general process of increasing a community's ability to cope with a flooding event (Maguire and Hagan 2007), for example by not building on flood plains or by better protecting buildings. In addition to these physical aspects, there are also the social

aspects to consider. For example, the decisions associated often with this stage are the planning and preparation decisions made before the flooding occurs, such as training staff, which provide a basis for community resilience to the extreme event (Fillmore et al. 2008, Maguire and Hagan 2007). This investigation believes that the first stage is arguably the most crucial stage in determining the degree of resilience that a community will have to a flood as it can also affect the capabilities of the later stages. The first stage is also the phase where perceptions, beliefs and other human barriers can create the most diverse behaviour, as trying to convey the dangers of a flood which has not yet occurred is infinitely more difficult than pointing out the danger and destruction that surrounds people in the later stages. Therefore, these potential barriers to resilience need to be better understood, with the perceptions associated with the first stage of the social resilience cycle containing some of the greatest potential to finding a way to increase community resilience. The social resilience cycle itself though underpins the definition of resilience utilised within the current investigation, as it contains the potential to factor in learning and perceptual aspects at any given stage of the process.

When investigating community resilience, it is noted that issues exist regarding various definitions of 'community'. However, the current investigation argues that it is not necessary to precisely define the exact boundaries of what constitutes a community in order to be able to explore community resilience. What constitutes a community is a much debated theoretical topic that discusses numerous hypothetical community boundaries that goes beyond the scope of this research (see Pahl 2005 for a detailed discussion of this topic). For example, community can be thought of as being networks of people linked by common interests, or shared identity and set of norms (Bradshaw 2008).

Therefore, it is important for any piece of research to establish the definition of community by which it is working to. Within the context of this thesis and the Community Resilience to Extreme Weather (CREW) project with which the researcher has been associated, the term 'community resilience' is collectively understood as being the link between individual and national resilience. This is supported by the earlier discussion of community being a valuable research area at the meso level (see previous discussion of Reid, Sutton and Hunter (2010) in chapter 2.5., p.17).
As a conceptual framework it is helpful to understand a community in geographical terms, as the members of these communities not only share the resources of that area, but also have a shared risk of hazards. This spatial view of community is supported in academic research, where it is

often defined as people living in the same area or sharing the same risks (Twigg 2007), as well as being supported in policy research, where community is often defined by proximity (Shaw 2007, Marsh and Buckle 2001). Furthermore, if members of these communities share common resources and hazards it may be easier to identify the differences between individuals that display varying levels of pro-environmental behaviour and engagement with the issue of climate change. Why would two people who live on the same street have different perceptions of the level of risk they face to any given hazard? The answer to this question again comes down to understanding the perceptions that people hold and the effect that these perceptions have upon an individual's decision making process and thereby their behaviour.

It is noted that the spatial view of community may not be suitable for all investigations, as an extreme weather event may take place over an area that encompasses parts of 2 or more communities. It could then be argued whether it would be more appropriate to consider the affected area itself as the community, joined together through experience. However, this conflict is not applicable to the chosen case study areas for this investigation, as the floods are contained within individual communities (discussed in chapter 4.7., p.98 and chapter 4.11., p.114), and as such the spatial view of community is sufficient and of benefit for the reasons previously discussed.

It has become apparent that when we speak of community resilience, what we are actually referring to is the resilience level of the individuals and groups within that community. The current investigation proposes that if an individual's perception can affect their own level of resilience, then the collective perceptions of these individuals can affect the resilience levels of their respective community groups (community groups explored in chapter 2.8., p.25 and defined as participants in this investigation in chapter 5.2., p.125). In turn, the collective resilience levels of these community groups can affect the level of resilience within the community to which they belong. Therefore, the relationship between the perceptions within these community groups and community resilience is an important area of research.

2.7. Summary of Extreme Weather Events and Community Resilience

This chapter highlighted that climate change is altering weather patterns across the globe, making extreme weather events more frequent and more severe. This means that extreme flooding is now one of the biggest risks faced by communities in the UK, with the merging of our built and natural environments also increasing vulnerability to flooding events. Physical and economical resilience measures, as well as prediction tools, have been shown to be inadequate in creating the necessary increases in resilience. This is because they do not take into account the way in which humans behave, both as individuals and as community groups. Therefore, research needs to explore in greater depth the perceptual and behavioural factors which can influence resilience. This research needs to be conducted within the community, at the meso level of research, as this local level has been largely understudied and would counter the failings of macro level research, which does not capture perceptions and behaviour and tends to focus on making over-generalisations from one group or organisation. Community level research allows behaviour of individuals to be contextualised within a social group, which then allows exploration of the interrelationships between different community groups.

The multi-disciplinary nature of the current investigation requires it to draw upon a number of academic fields, but the main research focus on social responsibility and the emphasis on the social level places it largely within the field of vulnerability. Definitions of both resilience and community resilience in the context of the current investigation were established. It was noted that the perceptions, decision making and behaviours that form the focus of the current investigation are associated with the mitigation stage of the social resilience cycle and because a geographical community shares resources and hazards, then this is the most appropriate conceptualisation of the community as a research area. Overall, this chapter has highlighted that research is required to explore perceptions and behaviours within community groups in order to determine their influence upon resilience to extreme flooding events. Therefore, the current investigation will now explore which community groups would be the most appropriate for further investigation and why the relationship between perceptions and behaviour is of such great importance to this area of research.

2.8. Three Key Community Groups

The continued successful resilience of the community in the short to medium term relies upon the groups which make up that community (Ingirige and Wedawatta 2011, Pitt 2008, Buckle, Marsh and Smale 2001). The three community groups considered by this research to be the most important being householders, SMEs and policy makers. This is supported by the identification of the importance of these three groups in community resilience models (e.g. Cutter et al. 2008) and in the Pitt (2008) review. Furthermore, the identification of the importance of studying social units at the meso level of research, discussed earlier (chapter 2.5., p.17), supports the idea of studying key community groups.

It is noted that householders, SMEs and policy makers are not the only community groups that exist within the meso level of a community. Specifically, the 'third sector' community groups that encompass charities, non-Government organisations (NGOs), religious organisations and other such groups may also be considered a potential community group. However, given the time and resource constraints placed upon this research, this group was not considered to be one of the most important to be included. In addition, the community resilience models discussed later in chapter 4.1., p.77, stress the importance of householder emergency plans and business continuity plans, thereby emphasising the importance of these two community groups. The three chosen community groups are specifically highlighted within community resilience models (e.g. Cutter et al. 2008), with 5 of Paton's (2007) 7 aspects that influence community resilience being either personal or institutional in nature. These three groups are also highlighted by the Pitt (2008) review as possessing the ability to make the greatest changes to community resilience. Also, while the third sector groups are obviously part of a community, they are not considered to represent a large enough proportion of the community, compared to householders and businesses. They also do not have the extent of influence that policy makers have within the community and upon the decision making process.

Therefore, the importance of householders, SMEs and policy makers within the existing literature, as well as their size and importance within the community, meant that these were considered to be the three key community groups to research. It is also noted that in order to gain a complete picture of a community, then it may be necessary to explore perceptions within every community group, including the third sector organisations. While beyond the scope of the current research, it is something that should be considered by future research. It is also noted that by not including all

potential community groups within the current research, then the data gathered and the results are limited to the perceptions of householders, SMEs and policy makers only.

The importance of exploration of perceptions within the three community groups chosen as the most appropriate by the current investigation is also supported by research into institutional policies and agendas, and psychological research, both of which have highlighted the importance of attempting to understand motivating factors behind pro-environmental behaviour (Quimby and Angelique 2011, Uzzell et al. 2006, Jackson 2005, Darnton 2004). Further academic research has also attempted to provide a better understanding of the determinants of pro-environmental behaviour (Leary, Toner and Gan 2011, Hobson 2006, Barr and Gilg 2005, Gatersleben, Steg and Vlek 2002). This once again highlights the importance of understanding perceptual factors that can affect behaviour. However, despite the amount of research conducted and resilience measures created to date, recent research states that pro-environmental behaviours have still not been incorporated into mainstream UK culture (Reid, Sutton and Hunter 2010).

The academic literature has concentrated on determining what factors affect pro-environmental behaviour by measuring observed aspects of behaviour, such as switching off lights or recycling, and then trying to discover what motivates people to engage in these behaviours. Using the householder community group as an example, early research found that whether a household recycles or not is based upon the perceptions, decision making and behaviours of individuals within that household (Yi, Hartloff and Meyer 1999). This supports the idea that it would be judicious to explore perceptions of social responsibility within a community group by exploring the perceptions, decision making and behaviour of individuals within that group. Yi, Hartloff and Meyer (1999) used data from 1993 International Social Survey Program: Environment and conducted comparative analysis of household recycling in the UK, Italy and the Netherlands, noting variations. However, what they discovered was extreme variation in locus of control, sense of responsibility, knowledge of choices, and attitude toward the decision problem (Yi, Hartloff and Meyer 1999). Therefore, although attitudes, decision making and behaviours play an important role in determining pro-environmental behaviour, it is not yet certain how to consistently achieve positive results.

This is supported by researchers who have found that changes in pro-environmental behaviour are difficult to gain and rarely last in the long term (Haq et al. 2008, Jackson 2005, De Young

2003). An example of this can be seen where a review of 38 interventions related to household energy use discovered less than 5% reduction, or no reduction at all, in almost all interventions (Abrahamse et al., 2005). It is acknowledged that not all attempts at influencing pro-environmental behaviour in this manner have failed, which is why this has become the normal approach (Steg and Vlek 2009, McKenzie-Mohr, 2000). Despite the difficulties in changing behaviour, there has been some success in changing attitudes (Kennedy et al. 2009, Barr 2004, Kollmuss and Agyeman 2002). Unfortunately, these few achievements in behavioural change also contain negatives, as changing one behaviour may lead to an individual neglecting another more important pro-environmental behaviour (Whitmarsh 2009). What can be deduced from this apparent contrast in fortunes is that it may be more appropriate, and even necessary, to explore attitudes and perceptions in greater depth, before attempting behavioural change.

Therefore, the approach the current investigation adopts is to actually identify and explore in greater depth an aspect that has been highlighted as a potential factor that affects behaviour, social responsibility. This provides both a context for behaviour and a better understanding of social responsibility itself. This qualitatively different approach already begins then at a further stage to previous research because it has identified the 'what' factor, and can now try to provide a deeper understanding of 'how' it may affect behaviour. Therefore, exploring perceptions held by individual householders, SME's and policy makers can potentially help researchers to find ways to instil pro-environmental behaviours within these community groups.

It is important to investigate the collective perceptions of individuals in this manner because communities are made up of individuals, each of whom can have an effect upon their personal level of resilience to extreme weather events, which in turn will have an effect upon their community resilience. Individuals have a responsibility then to increase their resilience and they can do so through their lifestyle choices and the decisions they make about being aware of the risks faced by their community. Unfortunately, many people are unaware or are in denial about the risks they live with each day (McCright and Dunlap 2011, Lorenzoni and Langford 2001). Furthermore, even individuals who display pro-environmental perceptions may not take that to the next stage and actually engage in pro-environmental behaviour because they do not feel that they personally need to (Steg and Vlek 2009, Hobson 2003). These counterproductive attitudes and perceptions will need to be changed to increase resilience.

In order to instigate the necessary changes, researchers need to firstly understand how and why people reach the decisions they do about the risk of extreme weather events, as well as understanding how the interdependencies within the community and societal infrastructure as a whole can affect these decisions. For example, why do local policy makers make the decision to build houses on flood plains when they know that this decreases their community resilience to an extreme flooding event? Why do householders and businesses make the decision to occupy buildings on flood plains when they know that this decreases their personal resilience to an extreme flooding event? These questions support the concern of many researchers that there is very little known about perceptions of climate change amongst stakeholders (Dallimer et al. 2009, Klein et al. 2007, McEvoy, Lindley and Handley 2006). This further highlights the need for research to investigate levels of social responsibility in key community groups.

The flood plains example above indicates that there may be a lack of understanding of individual and social responsibility being taken for actions that can affect personal, community and national resilience to extreme weather events. It is also indicative of the complexities that exist between the competing factors that can influence decision making and behaviour. There appears to be a lack of accountability for the tragedies that occur when the effects of disasters are increased because individuals have made less than optimum decisions, which may have decreased their resilience to such events. Therefore, it is of vital importance that research investigates the relationship between perceptions and behaviour.

2.9. The Relationship between Perceptions and Behaviour

Recent research in disaster management stresses the importance of exploring the gap between behavioural intention and actual behaviour (Soffer et al. 2011). This call came from research by Soffer et al. (2011) which explored the relationship between demographics and perceptions, in relation to earthquake mitigation. The results found gender differences in perceptions regarding earthquakes (Soffer et al. 2011). It is acknowledged that this research was conducted in Israel and in relation to earthquakes, but it is able to highlight the gap in knowledge that needs to be addressed. Therefore, it would be important to investigate whether there was a relationship between demographic factors and perceptions in relation to flooding in the UK.

Further research has found that perceptions of need and ability to mitigate climate change are precursors to personal behaviour change (American Psychological Association 2010, Spence and Pidgeon 2009). When exploring perceptions, research has stated that the way in which people

perceive their own roles and responsibilities in relation to climate change, as well as how they view the responsibilities of others, can be of great significance to policy making, adaptation and climate change mitigation (Nicholson-Cole 2005).

Recently, Sinatra et al. (2012) found that an individual's openness to change and ability to consider deep issues were able to predict both change in attitudes and behavioural intention, in relation to pro-environmental behaviour. It is recognised that the research by Sinatra et al. (2012) was conducted on US college students and research should further explore the factors that affect attitudes and behavioural intention in the UK and amongst general members of the public. In addition, Sinatra et al. (2012) used a persuasive text to attempt to change the attitudes of their participants, with pre and post testing taking place. However, this is only able to demonstrate short term changes and it is unknown whether the general perceptions that people hold over the long term will have the same motivational basis, or will be so readily altered. It appears to be in opposition to the researchers who have found that pro-environmental perceptions and behaviours are hard to instil or maintain (Steg and Vlek 2009, Whitmarsh 2009, Haq et al. 2008). Therefore, while demonstrating that change may be possible through an understanding of motivational factors, perceptions and behavioural intention; these findings are not in line with the overall consensus discussed earlier in this chapter. This indicates that further research is required in this area.

Early research by Ajzen (1991) stated that behaviour is determined by intention (the decision to engage in a particular behaviour). Intention itself is understood to be determined by an individual's motivational factors (Sinatra et al. 2012, Armitage and Connor 2001). It is recognised that attitudes (perceptions) are one of these key motivational factors, with their relevance varying for each individual and for the context of the behavioural intention (Sinatra et al. 2012, Collins and Chambers 2005, Corraliza and Berenguer 2000, Ajzen 1985). The evidence presented here provides the current investigation with enough information to construct a basic conceptual model of the relationship between perceptions, decision making and behaviour, presented in figure 3.

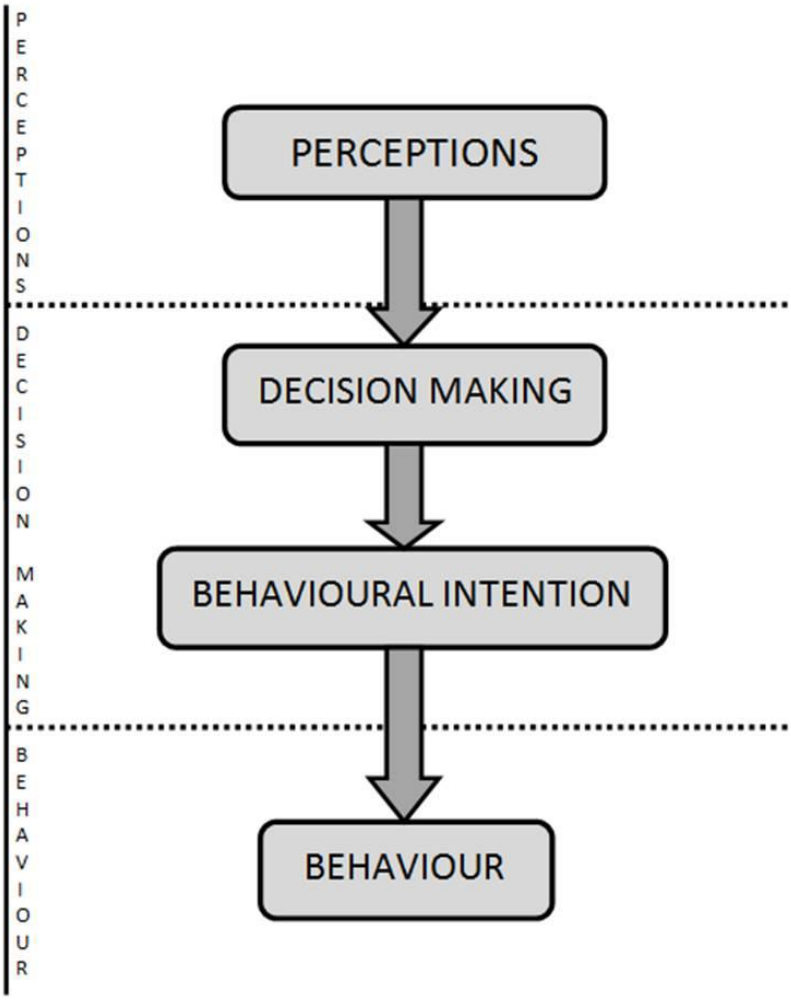

Figure 3: Basic Conceptual Model of Perceptions, Decision Making and Behaviour

The evidence discussed so far and the basic conceptual model created by the current investigation supports the idea that perceptions of social responsibility can have an effect upon decision making and behaviour. This notion of a lack of social responsibility is supported by research which states our modern society is based on unsustainable decision making, which tends to prioritise short-term interests over long-term consequences (Haq et al. 2008, Zohar and Marshall, 2004). This often leads to differences between an individual's knowledge regarding climate change and them actually using this knowledge to make the decision to engage in pro-environmental behaviour (Kennedy et al. 2009, Kollmuss and Agyeman 2002). People's perceptions of climate change issues creates a number of barriers and challenges to the successfully communicating and instilling positive behaviour (Whitmarsh 2009, Stamm, Clark and Eblacas 2000).

Healey and Enns (2002) suggested that individual interpretation, and the resulting perceptions, can often be more important than the physical event itself. This supports earlier research by Myers (1994) who found that people's prior perceptions influence their behavioural disposition towards images of climate change. This is also supported by risk-based research which found that perceptions of risk can affect a community's ability to control risk (Dominey-Howes and Minos-Minopoulos 2004) and that resilient behaviour to reduce the risk of earthquake damage is affected by perceptions of the hazard (Lindell and Perry 2000). More recently, Adger et al. (2009) stated that attitudes to risk create social limits for adaptation to climate change. These findings indicate that many researchers have highlighted the ways in which perceptions of the self and others, in relation to climate change issues, can affect behaviour.

It is acknowledged that the findings by Healey and Enns (2002) and Myers (1994) are based upon visualisation and imagery research, the problems of which have already been discussed previously in chapter 2.2, p.9 (see Daniel & Meitner 2001, Trumbo 1999). In addition, the more recent comment on the role of risk attitudes by Adger et al. (2009) was based upon a review of the findings from a number of disciplines, but did not contain their own empirical work to confirm or dispute their conclusions. The results of these previous researchers are supported though by research by Butler and Pidgeon (2009) who found that, while perceptions of required behavioural change, perceptions of societal change and perceptions of control were recognised by individuals who had experienced flooding in summer 2007, these perceptions did not necessarily lead to an acceptance of a greater level of social responsibility.

Butler and Pidgeon (2009) conclude that there is a need for a better understanding of the relationship between responsibility and climate change perceptions, in order to provide further evidence for the link between the impacts of extreme flooding and the need for behavioural change. This research by Butler and Pidgeon (2009) is of particular importance for the current investigation because it is based upon empirical research into perceptions (6 focus groups) conducted within the UK (3 separate areas) and in relation to flooding. One of Butler and Pidgeon's (2009) main recommendations also states that wider systems of responsibility and governance should be more aware of the link between climate change, flooding and the need for behavioural change. This supports the need for research to explore the perceptions held by those in governance or holding wider responsibilities, justifying the importance of policy makers as one of the key community groups for the current investigation. Overall, the evidence discussed here

indicates that research from a number of fields have highlighted the importance of gaining a deeper understanding of the relationship between perceptions and behaviour, with social responsibility emphasised as being one of the key perceptions that requires further research.

The importance of conducting an investigation of perceptions at the community level is further supported by research which indicates that there is a link between perceptions of hazards and perceptions that people hold of key community groups, for example perception of trust in authorities (Su et al. 2008, Whitmarsh 2008). This suggests that perceptions of other community groups may affect the perceptions that people have about extreme flooding, which in turn may affect their level of pro-environmental decision making and behaviour. For example, as a key community group, policy makers could be perceived to be failing in their responsibility to the community because many of the policies, guidance, codes and regulations in the UK tend to be complex and difficult to apply consistently (Spence 2004). Jain and McLean (2003) and Doppelt, Hamilton and Vynne (2011) all support this view, stating that there has also often been insufficient compatibility between emergency response planning, training for responders, coordination of responses and the decision-making processes of each agency involved. This concern is also supported by the OECD (2003) and more recently by Doppelt, Hamilton and Vynne (2011) who state that responses to extreme events can lack coordination between agencies.

It is acknowledged that the conclusions by Doppelt, Hamilton and Vynne (2011) are based on research involving US emergency agencies. However, there have been supportive findings within the UK, where local governance agencies have to overcome similar barriers to achieve urban climate change mitigation, including planning challenges for multi-level governance (Bulkeley et al. 2009). The results suggest that emergency responders should make better use of both trans-national and sub-national networks, as well as increased engagement and education within communities (Bulkeley et al. 2009). This highlights similarities in the challenges faced by both US and UK policy makers in working effectively together, and within the community.

The general view is that traditional ways of dealing with extreme weather events, including power structures, have sometimes acted as a barrier to the implementation of successful, long-term resilience measures (Doppelt et al. 2011, Spence et al. 2011, Ribot 2002, Patt and Gwata 2002). Mansourian, Rajabifard and Zoej (2006) highlighted some of these failings, stating that it is not just a lack of compatibility between the technology used by the different agencies, but also non-

technical barriers such as the policies and standards of each individual agency that prevent better collaborative planning and decision-making. These findings support the overall view that it is the perceptions that influence the decisions we make regarding our behaviour, whether it be as individuals or as part of a team, creates an obstacle to successful measures for dealing with extreme flooding events.

So we are presented with a situation where the decision making process of individuals is recognised as being a vital part of community resilience, but a number of perceptual factors can negatively affect the decision to positively engage with the issue. Further support for perceptions of social responsibility being one of the key factors is indicated in research which has found that increased knowledge of hazards that a community faces increases both an individual's ability to assess risks and increases their perception of their ability to cope with risk (Sinatra et al. 2012, Pomeroy et al. 2006, Johnston et al. 2005). This is supported by recent research which indicates that perceptions of threat and coping ability are key determinants of awareness of the risks posed by earthquakes (Soffer et al. 2011). This suggests that, in the same way as risks are perceived in the research discussed here, perceptions of social responsibility may also be affected by knowledge. This in turn suggests that the key community groups would display different perceptions of social responsibility, with policy makers (considered to be the most knowledgeable) perceiving themselves to have the highest level of social responsibility and householders (highlighted by the review of literature as often lacking knowledge) displaying the lowest level of social responsibility. It is acknowledged that the research discussed here is based on limited types of extreme weather events, earthquakes by Soffer et al. (2011), Asian tsunami by Pomeroy et al. (2006) and US tsunami preparedness by Johnston et al. (2005), or on the views of US college students (Sinatra et al. 2012). Therefore, research is required to further explore and compare these findings to perceptions of social responsibility in relation to extreme flooding within community groups in the UK.

This review of literature has so far highlighted the importance of gaining a better understanding of perceptions and their influencing factors which may lead to better decision making and pro-environmental behaviour. But while it has long been noted by numerous researchers that the link between perceptions and behaviour is an important area of study (Spence et al. 2011, Stedman 2004, Langford 2002, Lazo, Kinnel and Fisher 2000, Adelekan and Gradegesin 2005, McDaniels, Axelrod and Slovic 1996, Axelrod, McDaniels and Slovic 1999, O'Connor, Bord and Fisher 1999),

these perceptions have not yet been fully investigated (Spence et al. 2011, Grothmann and Patt 2005). In particular perceptions related to climate change has been highlighted as one of the most important, yet still understudied, areas of research (Spence et al. 2011, Wolfsegger, Gossling and Scott 2008). It is important then that research further investigates perceptions of social responsibility within and between key community groups in the UK.

It is noted, however, that knowledge of a hazard may only be one of a number of factors which can influence perceptions and behaviour. As every person is a unique individual within their environment, there are a broad range of personal and social factors related to the issue of resilience to flooding, such as experience or prior knowledge, personal and community beliefs and the level of trust (Sinatra et al. 2012, Steg and Vlek 2009, Lorenzoni and Langford 2001). These elements can all contribute to the difficulties related to making decisions concerning resilience. The effect of these personal and social factors can be seen in event specific research from the field of risk perception which indicates that perceptions can affect an individual's decision to prepare for a number of extreme weather events. This research includes earthquakes (Soffer et al. 2011, Whitney, Lindell and Nguyen 2004, Lindell and Perry 2000), hurricanes (Peacock, Brody and Highfield 2005, Sattler, Kaiser and Hittner 2000), tornadoes (Mulilis and Duvall 1997), volcanoes (Perry and Lindell 1990) and tsunamis (Johnston et al. 2005).

More importantly for the current investigation, it also includes extreme flooding (Spence et al. 2011, Tapsell et al. 2010, Keller, Siegrist and Gutscher 2006, Grothmann and Reusswig 2006, Siegrist and Gutscher 2006). Wolf et al. (2009) found that perceptions of heat waves and an individual's ability to cope with them were linked with mortality rates. Therefore, the effect of perceptions of risk has been noted across a wide range of extreme weather events, with higher perceived risk found to increase pro-environmental behaviour (Whitmarsh and O'Neill 2010, Floyd, Prentics-Dunn and Rogers 2000, Neuwirth, Dunwoody and Griffin 2000) and lower perceived risk leading to a lack of pro-environmental behaviour (Whitmarsh 2011, Spittal et al. 2005, Johnston 1999, Harris 1996). The recent research conducted from the UK perspective (Whitmarsh 2011, Whitmarsh and O'Neill 2010) is of particular importance for the current investigation, as it is conducted from a psychological standpoint and supports other psychological perspectives, such as Spence et al. (2011). Together, these UK based psychologists conclude that exploring perceptions is important, as they are related to pro-environmental behaviour in the UK.

Unfortunately, despite the increased occurrence and severity of extreme weather events, research has found that people in the UK are becoming more sceptical about the risks posed by climate change (Leiserowitz et al. 2010). In addition to the discussion of increasing public scepticism discussed previously in chapter 2.1., p.6, Spence et al. (2010) conducted a survey of public opinion regarding climate change issues with 1822 participants from the UK, aged 15 years and over being interviewed in their own homes. It was found that there was falling concern within the population, with 18% of people surveyed even stating that they believed that there are benefits of climate change for the UK (Spence et al. 2010). Furthermore, only 10% of people surveyed thought that individuals and their families are responsible for helping to counter climate change (Spence et al. 2010). This highlights the effect that perceptions can have upon behaviour and suggests that individuals with higher perceived social responsibility would display increased pro-environmental behaviour, but individuals with lower perceived social responsibility would display a lack of pro-environmental behaviour. It should be noted however that, although there was near equal age and gender representation, 93% of participants in the study were from a White ethnic background. This limits the generalisability of the findings and further research should explore other UK ethnicities views in greater detail. This investigation intends to address this aspect with increased diversity in ethnic representation amongst participants.

Early research conducted by Lorenzoni and Langford (2001) identified four perceptions of risk present within a community, denial, disinterest, doubt and engagement. The focus of more recent research supports the validity of these four perceptions of risk, with particular emphasis being given to climate change denial and disinterest (Whitmarsh 2011, Dunlap and McCright 2010, Grothmann and Reusswig 2006). It is important to note though that perceptions of risk are only one of numerous perceptions which may affect community resilience to extreme flooding. For example, it has been shown that perceived level of social support and perceived ability to cope after an extreme weather event can have an effect upon the levels of stress and anxiety that people experience (Tapsell et al. 2010, Declerq and Palmans 2006, Peres, Mecante and Nasello 2005, Ozer et al. 2003). This highlights the important influence that perceptions relating to extreme weather events can have on both physical and mental health. The risk research discussed here highlights the important role that perceptions play in shaping our behaviour, providing further support for an investigation into the effects of perceptions of social responsibility on decision making and behaviours related to community resilience.

These perceptions are held, and decisions take place, within the mind and there have been a number of psychological aspects suggested as to why actions to counter climate change and increase resilience to extreme weather events have been so difficult to conceptualise and implement (see Rachlinski 2000 for a review of early literature). Research has largely focused upon the micro level, the individual, by exploring determinants of behaviour (Spence et al. 2011, Barr 2006, Jackson 2005, Darnton 2004). This is because, within psychology, perceptions that people hold, particularly a lack of acceptance of risk, are highlighted as being barriers to an individual engaging with the issue of climate change and taking action to increase their personal and community resilience to extreme weather events (Quimby and Angelique 2011, Pidgeon and Butler 2009, Langford 2002).

It should be acknowledged that there were initially many different views on how much of a threat climate change actually posed. Some researchers suggested that immediate action should be taken, others suggest that the scientific evidence is unreliable, or given the uncertainty nothing should be done until there is more reliable evidence, or simply not believing that climate change affects their lives in any way (see discussion by Lorenzoni and Langford 2001). Even after an individual has been flooded their perceptions still affect the way they view and behave within their local community, with evidence suggesting that an individual's perception of home as a secure place changes after experiencing a flooding event (Tapsell and Tunstall 2008). Therefore, the influence of perceptions on decision making and behaviour in relation to extreme weather events is highlighted as being both an important and complex area of research in the field of psychology. However, what has changed since the discussion by Lorenzoni and Langford (2001) is that 97% of climate scientists now agree that human activity is having an effect upon climate change (results of survey by Doran and Zimmerman 2009). This indicates overwhelming support for research that attempts to understand and address these issues.

One of the key ways in which research has attempted to both explain and predict behaviour is by referring to the Theory of Reasoned Action (TRA) (see Ajzen 1985), which later became the Theory of Planned Behaviour (TPB) (see Ajzen 1991). These models state that one of the main factors for explaining and predicting behaviour is by understanding the effect that attitudes (perceptions) have upon behavioural intention (decision making) and therefore upon behaviour (Gifford 2011, Fogarty and Shaw 2010, Ajzen 1991). These models also note that these attitudes towards behaviour (perceptions) themselves also have influencing factors, labelled as behavioural beliefs

(Gifford 2011, Fogarty and Shaw 2010, Ajzen 1991). Numerous researchers have proposed that the theory behind these models, the effect of perceptions upon decision making and behaviour, can form the basis for understanding pro-environmental behaviour (Fogarty and Shaw 2010, Jackson 2005, Barr and Gilg 2005, Darnton 2004, Gatersleben, Steg and Vlek 2002). Many researchers have also adapted or modified the models themselves in order to explore various aspects of pro-environmental behaviour (e.g. Fogarty and Shaw 2010, Collins and chambers 2005, Mannetti, Pierro and Livi 2004, Knussen et al. 2004, Joireman et al. 2004). The consistent results produced by these models indicate that there is a link between attitudes, behavioural intention and behaviour (Fogarty and Shaw 2010, Burton 2004). This suggests that the theory that underpins these models might be the most appropriate approach for the current investigation to adopt in order to explore the affect of perceptions of social responsibility on decision making and behaviour.

Therefore, the TPB appears to support the wider view that interpretation of the perceptions that people hold will influence behaviour. However, it is important to critically assess the basis of this supporting evidence, by acknowledging opposing views that existed when the TPB was conceptualised. Seemingly in contrast to acknowledging the affect of perceptions upon behaviour, some researchers have previously proposed rational rules that have attempted to predict behaviour by applying systems or frameworks to the decision making process (see Hastie and Dawes 2001). However, these rational rules have largely been flawed, as many people do not behave in a manner considered to be reflective of a rational decision maker (Hastie and Dawes 2001). Even early evidence suggested that rational decision making would not take place during a crisis because individual aspects can affect normative, rational decision making (Hitt and Tyler 1991, Duhaime and Schwenk 1985).

One of the main reasons why the current investigation has not simply attempted to apply either the TRA or TPB models to a new area of research is that the ability of these models to predict behaviour may be reliant upon the individual being able to behaviours that they consciously wish to perform (Burton 2004). This is because these models were founded on the early assumption that behaviour is completely controlled by the individual (Sheppard et al. 1988). It has been argued then that these models may actually be behavioural representations of rational choice theory (Reid, Sutton and Hunter 2010) and as such may contain similar failings as those previously discussed. Therefore, given that the evidence suggests that rational decision making is not taking

place, then it is reasonable to accept the evidence that suggests that the perceptions that people hold will have an influence upon their behaviour.

Support for the need to gain a deeper understanding of perceptions can also be found when we consider another failing levelled at the TRA and TPB models, in that they can only really account for general attitudes, which are too abstract, rather than exploring the effect of specific attitudes (Reid, Sutton and Hunter 2010, Norlund and Garvill 2002). It has even been stated that this distinction is the very reason that research has so far found it difficult to fully explore and understand the complex relationship between environmental attitudes and behaviour (Steg and Vlek 2009, Gatersleben, Steg and Vlek 2002). This indicates that the approach adopted by the current investigation, in identifying a specific perception that research has indicated may affect pro-environmental behaviour, is a better supported and more widely validated approach.

An additional point raised by the critical assessment of the TRA and TPB models is that these perceptions may be influenced by external factors over which people have less control. This suggests that investigation of perceptions *between* key community groups is just a vital as exploring perceptions *within* these groups. Early support for the importance of research between groups was indicated by Olli et al. (2001) who found that perceptions between individuals within community groups can affect pro-environmental behaviours, for example, the uptake of neighbourhood kerbside recycling routines. Reid, Sutton and Hunter (2010) support this view, suggesting that interactions between social units at the meso level (for example between key community groups) may influence pro-environmental behaviour, specifically the perception of an individual's behaviour in relation to that of others. This further reinforces the need to explore the interrelationships between key community groups in relation to perceptions of social responsibility. The nature of these interrelationships between key community groups takes on even greater importance when we consider the level of interconnectedness within modern communities. This is because the over reliance upon others that is fostered through our modern interdependent lifestyles may also contribute to attitudes, decisions, expectations and behaviours which are detrimental to our resilience.

2.10. Modern Communities: Overreliance on Interconnectedness

Modern society is built around a vast network of social and economic interdependencies which has created a fragile society that relies heavily upon mass communication to provide the many goods and services that our modern lifestyles demand (Barratt, Pearman and Waller 2010). The majority of people in the UK live in urban areas that rely upon an enormous amount of support from organisations to provide them with the water, electricity, gas, communications, transport and food that are necessary elements of everyday life (Kazmierczak and Cavan 2011). The systems of this critical infrastructure are reliant upon increasingly complex technology to provide them with greater interconnectedness. However, the networks that organisations use to support such a large amount of interdependencies are based upon an outdated infrastructure that lacks the capacity to support our ever more complicated lifestyles (Kazmierczak and Cavan 2011).

Our societal infrastructure struggles to support us now and the demands placed upon this system of networks will only become greater over time (Pitt, 2008). This enormous amount of interconnectedness means that, should an extreme flood take place, then these interdependencies leave communities vulnerable to the effects of flooding. Disasters often strike at the heart of the critical infrastructure. In a system where even the smallest of disturbances to the network can create enormous amounts of disruption to many people, disasters contain the potential to devastate our national infrastructure and thereby affect every aspect of modern life (Kazmierczak and Cavan 2011). This is a risk we are living with every day it is important that society finds new ways to reduce its vulnerability and increase its resilience to extreme weather events.

This investigation believes that social interconnections can be thought of as ways in which people can communicate and interact with each other, whether this is in the form of friends and family, or the interaction between a business and its customers. One of the main reasons why society has been able to become more interconnected is through technological advancement. However, the 2007 floods highlighted the danger of becoming reliant upon technology. In the Thames Region, the Regional Telemetry System partially failed, thus providing no data to the National Flood Forecasting System (Pitt 2008). On one site, a failed river alarm resulted in 23% of all properties not receiving a flood warning in time (Pitt 2008). A number of Environment Agency river level gauges reached their recordable limit, were inundated by flood water or lost power, while others were inaccessible due to extreme flood conditions and could therefore not be read (Pitt 2008).

During the summer 2007 flood, 50% of the flood defences that were tested by the flood waters were overtopped (Pitt 2008).

These failings were found in technological resilience measures across the country and together they demonstrate why new, non-technological solutions should be explored, assessed, developed and applied as appropriate. This is further reinforced when we consider that perceptions, decision making and behaviour associated with social responsibility have been a common failing throughout the resilience measures discussed in this chapter. They are also at the heart of the discussion regarding our modern societal failing of overreliance upon others. One of the main areas to emerge from the discussion of resilience throughout this research is the idea of individuals being more socially responsible by accepting a greater level of individual responsibility for community resilience. Given the perceptual barriers discussed in previous chapters, it is reasonable to suggest that it is this lack of individual and social responsibility which must be better understood in order to understand its relationship to community resilience to extreme weather events.

2.11. Summary of Key Community Groups, Perceptions and Behaviour

This chapter highlighted that householders, SMEs and policy makers are the three community groups which are the key to increasing resilience to extreme flooding events, with their importance evident in community resilience models and both policy and academic research at the meso level. UK communities have not adopted pro-environmental behaviours and research has largely focused upon measuring observed aspects of behaviour, rather than exploring the perceptual motivations behind pro-environmental behaviours which have been found to make people deny the risks they face. These underlying perceptions and their affect upon behaviour is an understudied area of research, with perceptions of social responsibility, both regarding the self and others, highlighted by a number of fields as being a key perception that requires further research. The complexities and inconsistency within policy guidance, the failings of technological measures of resilience and the over-reliance upon interconnectedness within modern societies further increases the importance of finding alternative ways of increasing resilience to extreme flooding events through investigation of perceptions of social responsibility. Therefore, the current investigation will now explore the conceptual and practical aspects of social responsibility in greater detail.

3. SOCIAL RESPONSIBILITY

This chapter explores definitions of social responsibility, establishing the most appropriate definition for the current investigation before critically assessing the differences between corporate social responsibility and the current definition of social responsibility. This chapter presents the community social responsibility framework as more representative conceptualisation of the way in which social responsibility should be explored within the community resilience research. Real world examples and the identification of social responsibility throughout local, national and international policies and agendas are used to support the theory behind this framework. This chapter then demonstrates how perceptions of a number of issues relate to climate change are not well understood, with perceptions of social responsibility differing between community groups and between communities themselves, highlighting where further research is required and contributions to new knowledge can be made. Finally, this chapter goes on to suggest that the level of social responsibility an individual has may itself be influenced by a number of factors, including experience of flooding, age, gender and ethnicity.

3.1. Social Responsibility as a Concept

Social responsibility is a term that has been utilised in a variety of forms but is widely recognised as relating to the relationships between the economic, environmental and social aspects of an organisation or groups activities that endeavour to benefit society (ISO 2010). This definition is a broad representation of the informational guidelines contained within the ISO 26000: Guidance on Social Responsibility document, created by over 500 experts from 75 countries (ISO 2010). The current investigation will adopt this definition of social responsibility, as the focus of the research is to explore the relationship between social aspects (social responsibility) and environmental aspects (resilience to extreme weather events), through the investigation of community group's perceptions and behaviours.

It is important to note that there are key differences between this definition of social responsibility and other conceptualisations of social responsibility, which the current investigation suggests may not provide an appropriate framework from which to explore community groups. For example, conceptualisations of social responsibility within the majority of literature have largely been business-based, exploring corporate social responsibility (CSR) (Hahn 2012, Waddock 2008, Banerjee 2007). The rise in awareness of CSR emanated from the public demanding access to more information about how companies were working and the public are now being

recognised by companies as a key stakeholder group (Waddock 2008, Horgan 2005 and Clark 2000). Businesses are intricately connected with society and therefore have a responsibility to be aware of and respond to societal needs (Waddock 2008, Valor 2005 and Clark 2000). It is largely agreed that social responsibility is an important topic, not only for the business environment but also for wider society, with negative effects, such as new legislation and adverse publicity, seen as arising from a failure to recognise and maintain a suitable level of social responsibility (Waddock 2008, Peterson and Jun 2007).

In many countries, it has been found that social responsibility is perceived as being voluntary actions which go beyond existing legal obligations, with the two being viewed as separate elements (Banerjee 2007, ISO 2004). Pressure from societal groups, such as environmentalists and the media, often call into question the practices of larger corporations (Han 2012. Waddock 2008, Kitchin and Wilson 2005). Regulations and legislation often deal with environmental responsibility of organisations and this has lead to an imbalanced approach where the improvement of social responsibility has been confused and often seemingly replaced by environmental responsibility (Han 2012, Banerjee 2007, ISO 2004). Policy makers often create legislation to tackle climate change issues, such as air and water pollution, that enforce an environmental accountability, with particular focus on the social responsibility of larger companies (Waddock 2008, Peterson and Jun 2007, Adams 2005, Doonar 2005 and Preston 2005). This illustrates the way in which environmental responsibility can often be viewed solely as social responsibility, when in reality tackling these physical environmental aspects of a corporation are only one element of social responsibility. What this does illustrate though is that perceptions of social responsibility have affected behaviour in the business environment (i.e. working practices), suggesting further changes is possible.

Social responsibility has long been an important field of research for both academics and business practitioners and continues to provide a valuable research area for those wishing to investigate modern societal issues (Han 2012, Peterson and Jun 2007, Gorte 2005). Social responsibility has been the focus of research that has investigated business social responsibility by exploring and comparing the perspectives of businesses and social workers (Boehm 2009), investigated the relationship between perceptions of personal and social responsibility and intrinsic motivation in the field of education (Li et al. 2008) and explored social responsibility as a factor when investigating genetic and environmental components of pro-social attitudes (Rushton 2004).

These studies indicate that personal responsibility for behaviour is related to the perceptions that people hold. This adds further support to the idea that perceptions of social responsibility and their affect upon decision making and behaviour is an important area to explore, in relation to resilience to extreme weather events. This is because understanding how people perceive themselves and each other in relation to a particular aspect may be a useful way of investigating that aspect itself. Therefore, exploring perceptions of social responsibility for extreme flooding events will provide an excellent platform from which to investigate community resilience.

3.2. Social Responsibility as a Research Tool

As previously discussed, one of the positive aspects to emerge from the CSR research is that it has highlighted the ability of social responsibility to alter perceptions, for example, a corporation's behaviours have been shown to effect consumer attitude towards that business (Waddock 2008, Lichtenstein, Drumwright and Braig 2004). However, the current investigation is not an exploration of business practices and is based upon a more encompassing definition of social responsibility than CSR would allow. This distinction becomes even more important when we critically assess the differences between these two perspectives in the application of social responsibility as a research tool.

The current investigation suggests that the framework for investigating community resilience must explore social responsibility from a person-centred perspective, rather than the business-centred perspective associated with CSR. This is particularly relevant when we consider that, due to the broadness of the social responsibility definition, CSR has been perceived in many different ways and as such no single authoritative definition of CSR exists (Hahn 2012, ISO, 2004). Views on what constitutes a responsible business or organisation also differ both between and within countries (Hahn 2012, Clark 2000). In addition, evidence suggests that conceptions of CSR differ when looking at national social and economic priorities (Banjeree 2007, Clark 2000). These have arisen from varied historical and cultural aspects and can also be influenced by the different types of social actors, who are applying their own agendas to engage with social responsibility (Banjeree 2007, Clark, 2000).

The terminology relating to social responsibility also holds different meanings to different people in different locations (Banjeree 2007, Peterson & Jun 2007, Clark 2000). These issues have led to disagreement between different corporations about what level of social responsibility is actually

required from them and still remains a vague issue (Hahn 2012, Banjeree 2007, Ostas 2005, Saha and Darnton 2005, Vogel 2005). This is because CSR fails to adequately integrate the perceptions of the different key stakeholders involved with the issue. This is a failing that can be overcome by using the more encompassing definition of social responsibility adopted by the current investigation, which allows inclusion and exploration of perceptions within and between all the key community groups.

Further support for the approach adopted by the current investigation can be found in the complications that arise when we consider the foundations of CSR in more detail. As stated earlier, the majority of social responsibility research has largely focused on how businesses attend to societal needs through CSR. However, it could be argued that this has largely been an investigation of public relations rather than actually exploring the processes associated with social responsibility itself (see figure 4 for a representative model of this process created by the current investigation for visualisation purposes).

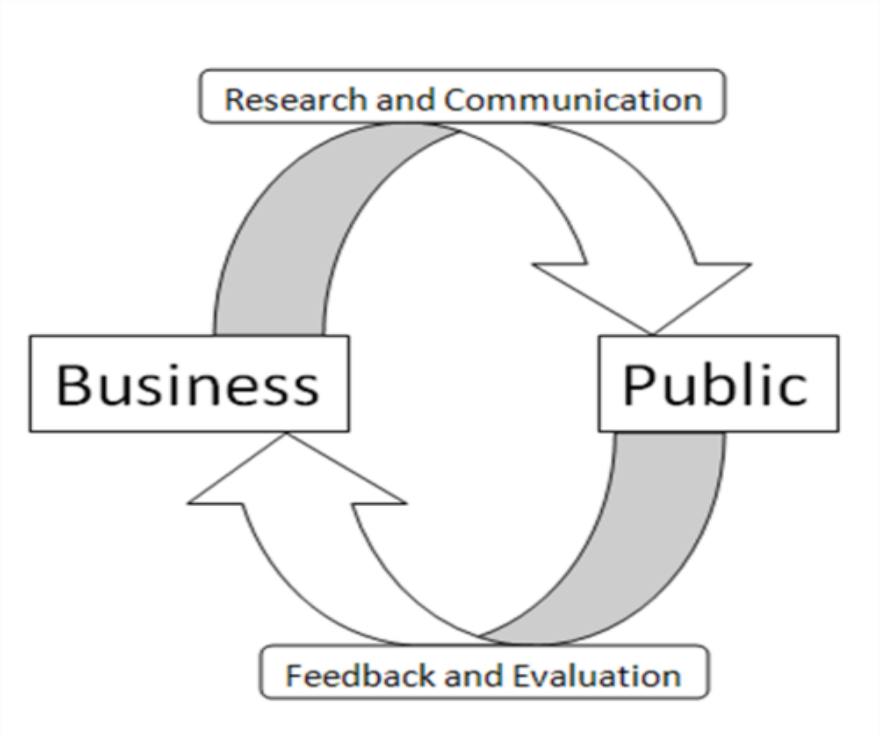

Figure 4: Representative Model of the Public Relations Process

Visual representation in figure 4 created by this investigation, based upon an understanding of the public relations process

CSR and public relations share such strong similarities in their origins, theories and practices that the distinction between the two fields has become blurred. It has even been considered that public relations may simply be the practice of social responsibility, despite there being key differences between these two fields (Banjeree 2007, Clark 2000). Therefore, when one thinks of social responsibility they often think of the responsibility that businesses have to the general public and how they communicate information to the public and act upon the feedback (Waddock 2008, Joyner and Raiborn 2005, Trainer 2005), however this may actually be a more fitting description of the foundations of public relations models, such as the four step management process (Cutlip and Center 1978) and the RACE framework (Marston 1979), rather than social responsibility.

Even the foundations of CSR models themselves, such as the four-step process of corporate social involvement (Preston and Post 1975), may not be suitable to investigate the relationship between social responsibility and community resilience. This is because CSR models are built with the purpose of being related to the business, with the public being a part of this particular business process (Waddock 2008). CSR is influenced by a number of driving actors, such as investors, consumer demand, government regulation, supply chain requirements and civil groups, all of which apply in varying degrees to different businesses (Waddock 2008, Clark 2000). Therefore, CSR can be considered to be based around a relatively short time frame, as the current needs and views of the public are assessed and feedback is used to inform the current operation of the business.

However, the type of social responsibility being explored by the current investigation relates more to long-term responsibility for actions, i.e. pro-environmental behaviours for long-term risks which have less immediate feedback and less perceived immediate value for a business or individual. Furthermore, research has found that businesses are not able to instigate and sustain behavioural change through CSR, making CSR inadequate for the needs of modern society (Rundle-Thiele 2009). Therefore, the current investigation proposes that a new framework for exploring social responsibility in relation to community resilience to extreme weather events is required, which can account for the perceptions, decision making and behaviour of a number of community groups.

This is of even greater importance when we consider the nature of community resilience, where it is not solely the community group's responsibilities to each other which are being investigated, but also their responsibilities to the community itself and their roles within it. This is an important distinction that highlights why social responsibility is an independent aspect. It is not CSR, which is a business orientated view of social responsibility. It is not public relations models, which although do allow a two-way flow of information, are not suitable for community resilience research as they do not provide true equality and integration between multiple community groups, as again they have been created for a different purpose. It is unknown therefore whether the drivers identified for social responsibility in a corporate context will apply to perceptions of social responsibility in relation to community resilience to extreme flooding. These concerns are in addition to the differences in time frames between CSR and social responsibility which can lead to different motivations and perceived value in pro-environmental behaviours. Therefore, this research proposes a different use of social responsibility as a research tool.

Given that community resilience to extreme flooding events relies upon the successful integration of each of the three key community groups, householders, SMEs and policy makers (as highlighted in earlier discussions), then it is reasonable to suggest that social responsibility research should not be conceptualised or investigated as a circular process, as this limits integration. The current investigation suggests that exploring perceptions between, as well as within, key community groups may be a necessary component of future community resilience measures. This would be more reflective of the modern interconnected societies in which we live and from which our perceptions are built. There should be an emphasis upon the integration of multiple components, rather than just the interaction between businesses and the public, as expressed by CSR. Therefore, social responsibility research instead needs to investigate perceptions of the roles and responsibilities that the key community groups have not only of themselves, but also how they perceive the other groups, with new ideas generated and communicated by each of the groups, rather than the public simply providing feedback on business ideas or policies (a criticism of the public relations process, figure 4), as this would create a multi-path framework of perceptions and provide a basis for integrated community resilience (see figure 5).

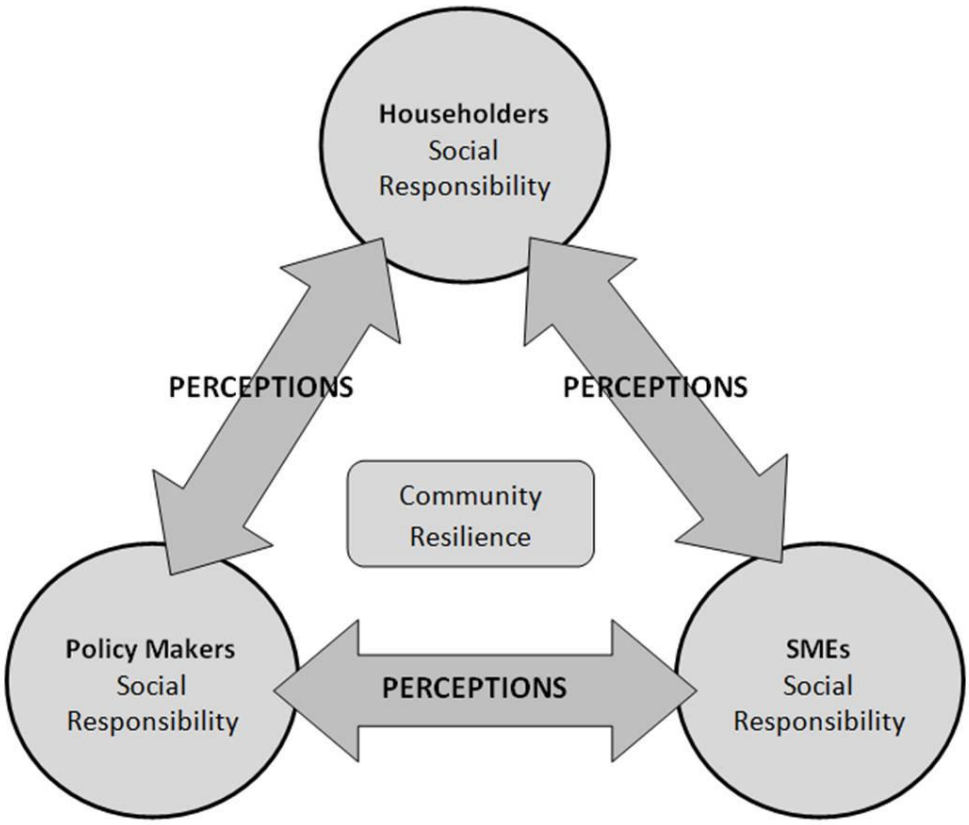

Figure 5: Community Social Responsibility Framework

Exploring social responsibility in this integrated manner will highlight potential links between these community groups, how they are contextualised by social responsibility and how they may affect overall community resilience. For example, it is reasonable to suggest that householders may expect policy makers (within their policies and through their designated policy implementers) to do everything they can to prevent flooding. In turn, policy makers may expect householders to do everything they can to lessen the impact if it does flood. However, history shows us that householders do not do anything until it is too late, such as ignoring flood warnings due to experience of false alarms, and when it does go wrong they then shift the responsibility to the policy makers (Pitt 2008). But the policy makers have to follow procedures which often assume that the householders are actually taking actions to lessen the impact of flooding. It is these kinds of gaps and misunderstanding of social responsibilities that can cause failings in resilience measures and drain extra resources. The householders are blaming the policy makers when in fact they may have decreased their own resilience (by not taking actions to protect themselves) and their community's resilience (by allowing floods to cause greater damage and thereby using up more of the limited resources available).

A further real world example of social responsibility affecting community resilience to an extreme weather event in this way was observed in 2009 when the UK was hit by severe snow storms which tested the resilience of many communities. The storms highlighted major discrepancies between what householders believed the council were responsible for and what the council believed they were responsible for. An example of this can be seen when, as the snowfall became heavier, the council began prioritising main roads, meeting what they believed to be their responsibility to the community. However, in doing so they left many householders isolated and feeling that the council were not meeting their responsibility to the community. The resilience of many communities across the UK had been undermined by gaps in people's expectations of their own and other community group's social responsibilities.

These gaps are indicative of barriers to community resilience and are brought about by a lack of understanding about the different perceptions of social responsibility that exist between householders, local businesses and policy makers and how these affect decision making and behaviour. Householders were not aware of the decisions being made by the council or of resilience procedures which stated that grit bins would only be provided upon request. The council believed they were attending to the needs of the whole community as resilience measures were in place to provide grit bins. However the community was not aware of these measures and believed the council had failed them. In the eyes of the council staff though, the householders had failed to meet their own expectations of social responsibility by failing to request grit and maintain their own resilience levels. This real world example highlights the way in which perceptions have affected behaviour, in relation to community resilience, further supporting the need for a better understanding of perceptions of social responsibility within and between community groups.

3.3. Key Community Groups and Social Responsibility

In line with the conceptualisation of social responsibility and the research framework proposed by the current investigation, it has long been stated that community involvement is vital for successful disaster management (Tapsell et al. 2010, Buckle, Marsh and Smale 2001). The emergency services and utility companies are responsible for many of the immediate impacts of flooding in the built environment, but the continued successful resilience of the community in the short to medium term relies upon the groups which make up that community, including householders, SME's and policy makers. As discussed earlier, the Pitt (2008) review supports the

importance of these three groups, highlighting that local government plays a central role in managing flood risk, with community groups, such as local flood groups and the National Flood Forum, helping to inform the public of the risks they face before, during and after a flood event. The Environment Agency is forging stronger links within the community by further incorporating community groups within its policies and agendas (Pitt 2008). Businesses are beginning to understand the need for a business continuity plan, seeing it as a critical element of good business practice, gaining help from policy makers to increase their own level of resilience as well as better safeguarding the infrastructure which provide services to householders (Pitt 2008). The Climate Change Act 2008 also places a greater responsibility on community groups, with utility companies required to report their climate risks to the government (Greater London Authority 2010). This highlights some of the many complex interdependencies that the individuals within these three community groups possess. It also gives an indication of the responsibilities that community groups have to each other.

Exploring social responsibility within these community groups is important because communities are made up of individuals, each of whom can have an effect upon their personal level of resilience to flooding, which in turn will have an effect upon their community resilience. For example, it is noted that individuals and communities who follow their flood plan are better able to recover from the impact of flooding (Greater London Authority 2010). Therefore, individuals have a responsibility to increase their own resilience and they can do so through the decisions they make about being aware of the risks faced by their community, accepting these risks and engaging with the issue of flooding. Unfortunately, some people are unaware or are in denial about the risks they live with each day and research has shown that people shift the responsibility of preparing for flooding from themselves to the government (Werrity et al. 2007, Krasovskaia 2005). Over-reliance upon cheap insurance has also long been blamed for reductions in individual responsibility and new strategies are now required to increase personal responsibility (Michel-Kerjan and Kunreuther 2011, Work, Spencer and Osborne 1999).

This suggests that key community groups are still currently failing to be socially responsible for the risk of flooding. One reason proposed for this is that individuals may not engage with climate change issues because they perceive others to not be engaging either (Spence and Pidgeon 2009). This research suggests that it is these counterproductive perceptions and flawed decision making which needs to be better understood in order to increase community resilience to extreme

flooding. Therefore, research is required to explore the perceptions of social responsibility that people have of both themselves and the perceptions they have of others within their community.

Investigation of perceptions is important because, in order to be able to make suggested interventions for behavioural changes, researchers need to firstly understand how and why people reach the decisions they do about the risk of flooding. This includes understanding how interdependencies within the community can affect these decisions. These individuals may not simply be householders within the community, but also heads of businesses and local policy makers, each of which has a key role to play in increasing resilience. The evidence discussed suggests that there is a lack of individual and social responsibility being taken for actions that can affect personal and community resilience to flooding. The over reliance upon others that is fostered through our modern interdependent lifestyles can also contribute to perceptions, decisions, and behaviours which are detrimental to our resilience. It is time then for individuals to play a greater role in increasing both their personal and community resilience to ensure that in the future communities will be better protected against these events. Therefore, it is important that research gains a better understanding of the way in which individual perceptions of social responsibility can affect community resilience.

3.4. Understanding Individual Roles in Resilience

In the US, personal responsibility is recognised by the Federal Emergency Management Agency as being the key to building a resilient community (Colten, Kates and Laska 2008). However, there are many views on how much of a threat climate change poses. Some suggest that immediate action should be taken, others suggest that the scientific evidence is unreliable, or given the uncertainty nothing should be done until there is more reliable evidence, or simply not believing that climate change affects their lives in any way (Lorenzoni and Pidgeon 2006). It has been shown that households, SME's and policy makers underestimate risks that appear distant or global, such as the risk of extreme weather events which are rare (Viscusi and Zeckhauser 2006). These perceptions can affect the engagement that each community group has with extreme weather event issues, which can in turn affect the resilience of the community to extreme weather events. This is because the interpretation of these perceptions may determine behaviour (Sinatra et al. 2012, Steg and Vlek 2009, Lorenzoni and Pidgeon 2006).

Community groups not fully acknowledging the information available, and thereby not acknowledging the risk or understanding their roles and responsibilities, was seen in early studies in the USA, Canada and Europe (Bord, O'Connor and Fisher. 2000, Bord, Fisher and O'Connor 1998, Bostrom et al. 1994, Read et al. 1994). Recent research indicates that these issues are still present within modern community groups (McCright and Dunlap 2011, Dunlap and McCright 2010, Whitmarsh 2009). It is acknowledged that there are also examples that are in contrast to these findings, with the Pitt (2008) review detailing the real life example of a householder who was flooded in 2000 and then again in 2007, but having adopted a number of resilience measures after the first flood the householder had reached a level of resilience where they were able to return to normal very quickly. However, this type of behaviour is understood to be the exception, rather than the norm, hence why this individual was given attention as an exception in contrast to the majority of people.

Particular community groups may not even acknowledge that they have any roles or responsibilities towards extreme weather events or community resilience at all, as even simple denial of risk has consistently been found to justify lack of action on climate change (Dunlap and McCright 2010, Stoll-Kleemann, O'Riordan and Jaeger 2001). Furthermore, the basis of the field of risk research itself arises from the different perceptions of risk held by experts and the general public (Jia et al. 2008; Ho et al.2008). Given then that perceptions of risk are not well understood or even accepted by many community groups, then it is reasonable to suggest that perceptions of individual roles and social responsibilities relating to this risk may also contain both perceptual and behavioural aspects which are detrimental to community resilience.

Given that modern society contains masses of interdependencies to function efficiently, it is reasonable to determine that it may require further collaboration and joined-up thinking between key community groups to efficiently increase community resilience. This need for integration is reflected in community resilience models which stress the importance of characteristics of community groups (Tieney and Bruneau 2007), community participation and the ability to communicate community problems (Paton 2007) and the need to integrate community stakeholders (Cutter et al 2008). However, many existing models, while emphasising that understanding interdependencies between community groups will be beneficial, also note that generic models of community resilience have so far failed to specify the content of such interventions, knowledge that will be required to positively affect resilience factors (Paton 2008).

This aspect is further emphasised by the need to integrate community groups within climate change education, as top down information (i.e. policy makers telling people what should be done) does not work and bottom up information (i.e. community groups integrating information together) is needed to improve risk communication and community resilience (Webb 2011, Dufty 2008). Therefore, while social responsibility has been highlighted as a potentially key factor for affecting community resilience, it is yet to be explored in enough depth to provide contextual information towards understanding how and why these affects occur. However, what can be assumed is that in order to understand how and why people must be more socially responsible to increase their resilience to flooding, research must first understand what constitutes resilient behaviour.

If we take again the Pitt (2008) review example of the householder who had adopted a number of resilience measures after their first flood. This householder made the decision to increase their individual resilience to flooding, which in turn has increased the resilience level of their community and placed less of a strain on resources and infrastructure. Some of these practical resilient measures may mean additional costs, but will reduce flood damages in the future (Soetanto et al. 2008). Unfortunately, the overall take-up of resilience measures is low, even for simple, low-cost measures (Pitt 2008). Many tenants simply refused to accept that their properties may flood again, and it is this lack of responsibility to themselves and their community which undermines current resilience measures. Norwich Union found that 46 per cent of people did not believe that it was their responsibility to take resilience measures, stating that this responsibility lay instead with local authorities and the government (Pitt 2008). These kinds of perceptions create barriers to resilience, with each community group believing that the other is responsible for taking resilience measures. This further highlights the influence that perceptions of social responsibility can have upon behaviour, supporting the need for further research in this area.

In the same way that low levels of social responsibility have been shown to be linked to resilience reducing behaviour, so too have high levels of social responsibility been associated with resilience increasing behaviours. The Pitt (2008) review provides information about farmers in Upton-upon-Severn who used their equipment to minimise flood damage, displaying a high level of social responsibility. It is important then to identify the level of social responsibility an individual must

possess in order to make the decision to engage in resilience promoting behaviour, and what social and psychological barriers lie in the way of this being achieved.

The Pitt (2008) review calls for a greater degree of personal resilience and a community consisting of a greater number of socially responsible individuals would have a higher resilience to flooding due to their combined resilience levels. These individuals would understand their role within the community, rather than believing that it is someone else's responsibility and being overly reliant upon other community groups. In turn, the better prepared an individual, business or local authority is, then the less they will be affected by the flood and the more time and resources they will have to fulfil the roles that do require them to help others within the community. However, at the moment this is only an ideal aim for research, as currently the interdependencies between the three key community groups are causing confusion over where responsibilities lie and consequently creating barriers to resilience.

One of the reasons proposed for this is that the regulations that policy makers work to are thought to be too complex and inconsistent (Crichton 2006, Spence 2004). This means that householders and businesses do not know where assistance can be obtained, who should be giving this assistance and what they themselves should be doing (Crichton 2006). Furthermore, it has been suggested that each community needs to find its own way of dealing with their unique set of circumstances for the risks they face, potentially tailoring its own resilience measures to meet its vulnerability needs, rather than relying upon generic solutions (Norris et al. 2008, Smit and Wandel 2006). This suggests that the key community groups within any given community may differ in their perceptions of social responsibility, based on their unique set of circumstances. Therefore, research is required to explore perceptions of social responsibility in a number of different communities in order to determine the degree to which simple geographical location and physical circumstances may affect levels of social responsibility and in turn community resilience.

The evidence arising from this discussion also allows the current investigation to build upon the basic model of perceptions, decision making and behaviour presented in chapter 2 (page 21, figure 3), creating an updated basic conceptual model of perceptions of social responsibility (see figure 6).

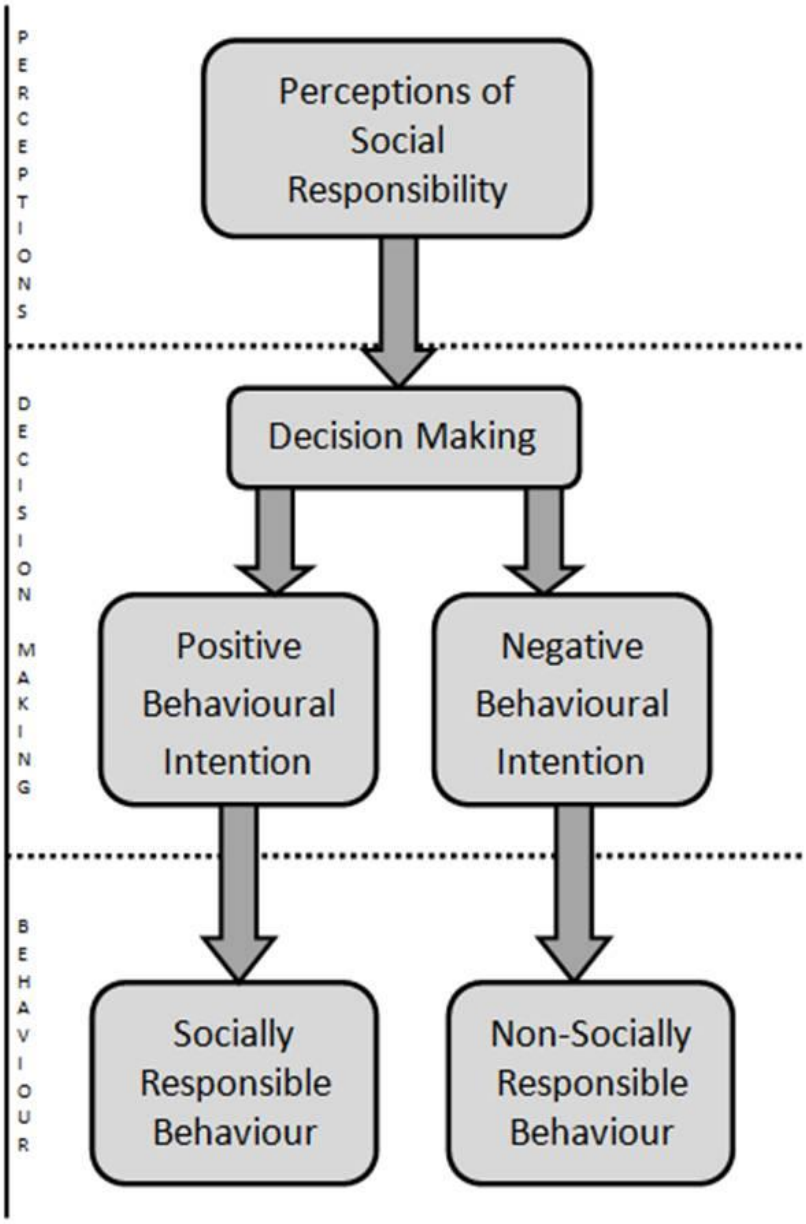

Figure 6: Updated Basic Conceptual Model of Perceptions of Social Responsibility

It is important to understand how the three key community groups perceive their own level of responsibility and what they perceive to be the responsibility of others, in order to highlight where barriers to resilience are being formed. If we understand communities as being a complex system of interdependencies, the resilience of that community is determined by the system's ability to absorb disturbance, self-organise and capacity to learn and adapt. Therefore, it is the perceptions, decision making and behaviours that members of a community adopt or display prior to a flooding event that can determine the ability of that community to absorb the disturbance. Furthermore, these aspects may also determine their motivation and ability for self-organisation

during the event and how much they are willing to learn from the event in order to change their perceptions and behaviours so that resilience can be increased in the future.

This highlights how social responsibility can be an important factor at each stage of the social resilience cycle previously discussed (see chapter 2, page 21, figure 2). The pro-environmental decision making and behaviours that this review of literature has highlighted as being required for successful future resilience measures cannot be achieved without first understanding their underlying perceptual factors. Therefore, research needs to fully investigate what current perceptions of social responsibility exist within the three community groups and how their interrelationships may affect their own resilience levels, as well as that of their community. It is only when we know what current perceptions of social responsibility exist within and between community groups that we can better understand its relationship to community resilience. The importance of this research is further emphasised when we explore the way in which communities and social responsibility are becoming increasingly prevalent within institutional policies and agendas.

3.5. Community and Social Responsibility in Policies and Agendas

Early research by Pain et al. (2001) stated that many institutional aims and agendas were becoming increasingly focused at the level of the community because it is a term which appeals to all political parties, with right wing parties supporting its notions of greater responsibility for the people, and left wing parties supporting its notions of collective responsibility. Modern institutional aims and agendas further reflect this community level involvement (Webb 2011, McCright and Dunlap 2010, Sellke and Renn 2010).

This view of community being related to responsibility is an increasingly popular one within the world of politics (Webb 2011, Macdonald, Edwards and Savage 2005). Day (2006) stated that this had lead to communities having an assumed role in the implementation of almost every government policy. This indicates that over the last decade the UK government has become more aware of the importance of communities and the need for people within these communities to take a greater responsibility for their individual roles within society. This is a view also supported recently by Bickerstaff, Simmons and Pidgeon (2008) who suggest that throughout the political reign of New Labour, new policies and agendas which emphasised active citizen responsibility were constantly being implemented, with the focus on shifting responsibility away from

government and onto individuals and communities. The current investigation suggests that this emphasis placed upon communities and individuals within government policies and agendas, and the increased importance of individual and community and responsibility, increases the importance of studying perceptions of responsibility within and between policy makers, businesses and householders at the community level. This suggestion is further supported when we explore the way in which specific policies and agendas have evolved in order to reflect these changing emphases within the government.

There has been a shift in the focus of disaster response of governments and disaster agencies, with greater emphasis being placed upon managing risk at the community level in an attempt to reduce the impact of disasters, rather than simply providing relief-based response (Sellke and Renn 2010, Barr and Gilg 2005, Briceño 2004). This is reflected in international policies, such as the United Nations International Strategy for Disaster Reduction, which proposes that the successful implementation of their key framework for increasing national and community resilience to disasters, the Hyogo Framework for Action 2005 – 2015, is reliant upon the involvement of local communities (UN/ISDR 2007a, UN/ISDR 2007b). This indicates that international policies recognise that responsibility levels within communities plays an important part in determining resilience to extreme weather events. This suggests that further research exploring the affect of perceptions of social responsibility on community resilience could help inform both current and future international policies of the most appropriate ways in which their aims can be achieved.

At the national level, the UK has also witnessed a shift in institutional agendas and policy changes which have increasingly focused upon managing the risk of flooding, rather than simply defending against floods, and which again emphasise the need for greater individual responsibility (Webb 2011, Ingirige and Wedawatta 2011, Barr and Gilg 2005, Johnston et al. 2005). The UK National Security Strategy states that communities play a key role in resilience (Cabinet Office 2008). This is also reflected in the UK Sustainable Development Strategy which emphasises the importance of finding ways to influence people's behaviour to be more pro-environmental (Barr and Gilg 2005). The need to recognise the social aspects of flooding and involve individuals and community groups in the management of flood risk is a fundamental element of one of the key flooding policies within the UK, DEFRA's 'Making Space for Water' (DEFRA 2005). This policy suggests that

individuals and communities should take it upon themselves to become more aware of and better prepared for extreme flooding (DEFRA 2008).

This is supported by the Pitt (2008) review, which has become one of the key reference documents for addressing flooding in the UK and which strongly approves of attempts to increase resilience at the community level. The suggestion within these key policies mirror the government agendas discussed earlier, which focus on a transfer of responsibility away from institutions and on to individuals and communities. This view of UK policy is supported by Arnoldi (2009) and Johnson and Priest (2008) who agree that households and businesses within the local community are having to adjust to an ever increasing level of responsibility.

The evidence indicates then that UK policy mirrors international policy in highlighting and incorporating the need for greater levels of community responsibility in order to promote resilience to natural disasters. However, it has been suggested that the key policy, within the UK, 'Making Space for Water' (DEFRA 2005) is actually more of a 'vision' rather than a 'policy' (Johnson and Priest 2008:516). In addition, this research suggests that this same criticism can be levelled at the Pitt (2008) review which makes a number of general recommendations, including suggestions for a government programme to encourage self-reliant communities and local authority programmes which promote community engagement, but lacks any form of detailed planning. The International Standards Organisation also highlighted that the social responsibility described in the ISO 26000 policy were a set of guidelines, rather than strict management system standards (Hahn 2012, ISO 2010). The current investigation suggests that one of the reasons for this is because there is not yet enough depth in the understanding of the ways in which social responsibility is perceived by individuals and communities, which makes it difficult for specific resilience measures to be conceptualised and successfully implemented, so further research is required in this area in order to better inform both these and future national policies.

The importance of understanding perceptions of social responsibility, highlighted by international and national policies, is also reflected in community-specific policies and agendas. For example, the Draft Climate Change Adaptation Strategy published by the Greater London Authority (GLA) was open for consultation and local householders could convey their opinions by voting, commenting and sharing their ideas on different aspects of the strategy (Greater London Authority 2010). In this document, the GLA highlights the need for individuals and communities to

increase their own resilience to flooding in order to increase London's overall resilience to flooding (Greater London Authority 2010). Furthermore, opening the document up for consultation indicates that the local authorities recognised the need to incorporate perceptions from within society into climate change policy in order to help shape the final adaptation strategy. This is supported in the aims proposed in the strategy, for example aim 6 is to 'encourage and help business, public sector organisations and other institutions prepare for the challenges and opportunities presented by climate change' (Greater London Authority 2010:16). Similarly, aim 8 is to 'raise general awareness and understanding of climate change with Londoners and improve their capacity to respond to changing climate risks' (Greater London Authority 2010:16). These aims indicate that it is important for householders, businesses and policy makes within the community to raise their own resilience levels and they are going to receive support to achieve this. Therefore, research is required to explore factors affecting resilience within these key community groups in order to determine how it may then affect wider community resilience.

The importance of understanding current perceptions of social responsibility that exist within key community groups becomes even greater when we consider the effect that flooding policies and agendas may have upon these perceptions. It could be argued that recognition of the role that individuals and communities have to play in resilience to disasters, and the resulting increase in responsibility, is a positive empowerment and acknowledgment of their right to be involved in resilience measures (Tapsell et al. 2010, Buckle, Marsh and Smale 2003). However, it could also be argued that greater responsibility, without specific programmes of support, could be perceived negatively as a way for governments and local authorities to reduce expenditure and shift the blame for failures in resilience measures (Webb 2011, Manuta et al. 2004, O'Malley 2004). This suggests that, if perceptions of social responsibility are not fully understood, then the resilience measures, policies and agendas proposed and implemented by the government and local authorities may actually have a negative effect upon community resilience to extreme weather. This is due to the association of negative perceptions already present within the community regarding these policies. Therefore, it is vital that perceptions of social responsibility within and between key community groups is explored in order to determine its effect upon community resilience, which can help guide future resilience measures, policies and agendas.

3.6. Experience of Flooding and Social Responsibility

The review of literature from a number of academic fields and policy research has so far highlighted the importance of researching perceptions of social responsibility as a way of better understanding the decision making processes and behaviours of individuals, in relation to community resilience to flooding. In order to fully investigate perceptions of social responsibility, one must consider that, in the same way that perceptions influence decision making and behaviour, so too may these perceptions have their own influencing factors. Research has found that experiencing a flooding event has long-term impacts upon people's lives (Tapsell et al. 2010, Tapsell, Tunstall and Wilson 2003, Tapsell 2000, Fordham 1998). This is supported by research which has shown that experience of a disaster can often have an influence upon an individual's motivation to cope with future risks (Siegrist and Gutscher 2008, Siegel et al. 2003). For example, previous experience of Hurricane Hugo in 1989 was found to be a predictor of an individual's level of preparation for Hurricane Emily in 1993 (Sattler, Kaiser and Hittner 2000).

Rose et al. (2010) stated that householders are less inclined to engage with the issue of extreme weather events if they do not have prior experience of such an event. Research by Nicholson-Cole (2005) indicates that personal experience can have a positive effect upon people's ability to visualise climate change and can alter perceptions of its importance, as well as perceptions of their ability to enhance their own resilience to it. This is supported by research which found that experiencing a flooding event can increase the sense of community within the affected area (Tapsell et al. 2010, Delanty 2003, Valentine 2001, Pain et al. 2001). Research has also consistently indicated that individuals who experience a high level of exposure to natural disasters are more likely to engage with the issue and create coping strategies (Spence et al. 2011, Fillmore et al. 2008, Work, Spencer and Osborne 1999, Lave and Lave 1991). This is supported by Spence et al. (2011) who found that individuals with experience of flooding 'express more concern over climate change, see it as less uncertain and feel more confident that their actions will have an effect on climate change' (Spence et al. 2011:1).

This body of research suggests that if an individual has experienced flooding then their perceptions may be more positive, which in turn suggest that they may show higher levels of social responsibility than people who had not experienced flooding. However, there has also been conflicting research which found that there was little difference between the climate change perceptions of individuals who had experienced flooding and those who had not (Whitmarsh

2008). In addition, an individual's level of property damage experienced in previous earthquakes was not a predictor of level of preparation for El Nino (Siegel et al. 2003). One potential reason for this is that research has indicated that past behaviour can give an indication of future behaviour, as people are unwilling to deviate from regular routines (Quimby and Angelique 2011, Ouellette and Wood 1998). This is supported by Whitmarsh (2008) who noted that not a single participant in their study explicitly mentioned strategies to adapt to climate change and flooding. This suggests that even experience of an extreme flooding event may not be enough to instigate long-term behavioural change. It should be noted that Whitmarsh (2008) did conclude that climate change and flooding may be seen as separate issues. This goes against the scientific understanding and academic research discussed previously in chapter 2.2., p.9, which links climate change and extreme weather events. This presents us with conflicting findings regarding flood experience, with perceptions potentially being key to understanding behaviour.

One reason for these conflicting findings is that research is often based upon the assumption of a rational, linear relationship between an individual experiencing flooding and it thereby becoming of greater importance to them. However, research indicates that people do not act in a rational manner when weighing up potential risks, but instead take a large amount of information from a broad range of factors into consideration (Steg and Vlek 2009, Jaeger et al. 1998). These factors can include previous experience, personal beliefs or the expected outcome of any risk related actions, which can account for the variety in perceptions of the risk posed by climate change (Steg and Vlek 2009, Jaeger et al. 1998, Myers 1994).

This poses the question as to whether, in the same way that experience of a flooding event may alter an individual's perceptions of the risk of flooding, would experience of flooding alter perceptions of social responsibility? Furthermore, would these perceptions be altered in a positive, rational manner, with a clear distinction between the perceptions held by those that had experienced flooding and those who had not? Understanding the origins of these influencing factors would provide a better understanding of perceptions of social responsibility, potentially leading to future resilience measures that create a more desirable mindset within the key community groups.

Based on the research discussed throughout the current investigation and the conceptual model of perceptions of social responsibility presented previously in this chapter (page 54, figure 6), this

would then filter through from being an influencing factor, to a perception being held, to a decision made and eventually to a behaviour being adopted. Therefore, the influence of experiencing a flooding event on other factors related to community resilience, such as social responsibility, presents itself as a worthwhile area of research. Further research is required to conduct a comparison of the levels of social responsibility between communities which have experienced flooding and those who have not.

Understanding the factors which may affect social responsibility becomes even more important and complex when we further explore the psychological influence of past experience. One of the most common cognitive heuristics within the research literature is the notion that people select which new information they acknowledge based upon continuation and consistency of their already held beliefs and biases in order to maintain an attitudinal certainty (Steg and Vlek 2009, Eiser 1994, Greenwald 1980). This suggests that people will base their future decisions on the outcome of past decisions, highlighting again the influence that previous experience may have in affecting perceptions. This in turn means that much of the new information relating to climate change can be omitted or overly emphasised according to existing opinions, meaning that opinions become polarised into either viewing climate change and the associated extreme weather events as being extremely important or completely unimportant (Steg and Vlek 2009, Langford, Marris and O'Riordan 1999). These opinions, both positive and negative, can be perpetuated and influenced by the media, especially as a large amount of information regarding climate change is not fully certain (Boykoff 2011, Steg and Vlek 2009, Bate 1997, Bell 1994, Lacey and Longman 1994).

These outside influences and individual biases can be detrimental to the effectiveness of environmental educational programmes as people are uncertain about the validity of new information, acknowledging only the aspects that support their already held beliefs (Kennedy et al. 2009, Kempton 1997). This is why persuading people to perceive climate change as a threat and recognising the need to respond to the threat has even been compared to requiring an act of faith (van Dommelen 1999). With regard to social responsibility, this suggests that people will carry on maintaining a particular level of social responsibility, based upon past experiences, with new flood risk information unlikely to change their perceptions of social responsibility. However, it is uncertain the extent to which actual recent experience of a flooding event can effect perceptions of social responsibility. Would experience of a flooding event raise the overall level of

social responsibility within the key community groups? Or do communities that have not experienced a recent flooding event feel that they have greater social responsibility because they have seemingly prevented an event from occurring?

Even those people whose expectations are raised about the seriousness of flooding and climate change in general may find that their expectations have been over-inflated. This is due in part to media misreporting which, when the foretold catastrophic events fail to appear, creates yet more uncertainty surrounding the subject, reducing their perceptions to be more in line with their personal experiences (Boykoff 2011). Early evidence for this exists where people, influenced by the media, reported future temperature rises as being nine times higher than the current information would suggest (Bell 1994). This suggests that communities that have not experienced recent flooding would have lower perceptions of risk, due to their perceptions falling in line with personal experiences. However, the role of previous experience as an influencing factor may actually not be as strong as research has suggested. This is because the public are susceptible to misquoting statistics and confusing causes and effects of a wide range of climate change issues, due to them having non-specific mental models about the subject (Moxnes 2009, Morgan et al. 1992).

One suggestion for this is that those people who are influenced in a positive manner by the media to respond effectively to climate change may be naturally motivated to respond to environmental issues in general (Boykoff 2011, Douglas et al. 1998). Therefore, these types of people would not fully acknowledge all the information available, but would instead only acquire general information that supports their existing beliefs. This suggests that, in contrast to the previous research which indicated that previous experience may polarise views, experience of flooding may actually have a negligible effect upon perceptions and behaviour as individuals may simply act in the same manner that they would anyway, regardless of experience. This in turn suggests that a community which has experienced flooding would have similar overall levels of social responsibility within its key community groups as a community that has not experienced recent flooding.

However, as previously stated, other research has suggested positive effects by increasing a sense of community (Tapsell et al, 2010, Gordon 2004, Delanty 2003, Valentine 2001, Pain et al. 2001). Yet more conflicting research though indicates that disasters cause community conflict (Shriver

and Kennedy 2005). One reason suggested for this difference of opinion is that the type of disaster can have an effect upon a community's reaction to the event, with natural disasters creating positive effects, but technological disasters creating conflict (Gordon 2007, Freudenberg 1997). However, flood research has not supported this division, with researchers finding that conflict can appear in communities following a flooding event (Tapsell et al. 2010, Tapsell and Tunstall 2008, Tapsell and Tunstall 2001, Fordham 1998). It is acknowledged that Shriver and Kennedy (2005) conducted their research in a rural Oklahoma community. In contrast, Tapsell and Tunstall (2008/2001) conducted their research in Banbury and over 30 further locations around the UK. Therefore, differences may have arisen due to these findings conflicting on rural and urban settings, as well as being conducted in different countries. What these conflicting findings do indicate is that the effect of flood-related perceptions within the community is an understudied area of research which contains a number of competing arguments, with the effect that perceptions have on the uptake of socially responsible behaviours being a particularly complex area. Therefore, further research is required to explore the effect of perceptions of social responsibility.

3.7. Consideration of Variables

The research discussed so far has indicated that, not only can two people from the same geographical community hold different perceptions of social responsibility and display different behaviours when presented with the same flooding event, but also that previous experience may or may not influence these perceptions. Given that this is a largely unexplored area of research though, it is not known the degree to which previous experience of flooding events is a influencing factor.

As the research discussed so far has indicated that many factors can affect perceptions of risk and further research has indicated that people are going to act in a similar manner regardless of previous experience, then it is reasonable to suggest that these other factors may also have an influence upon the perceptions of social responsibility. Socio-demographic characteristics are understood to be important factors in influencing environmental perceptions (Larson, Whiting and Green 2011). However, the influence of socio-demographics on pro-environmental perceptions and behaviour has not been fully explored (Larson, Whiting and Green 2011).

Early research by Lindell and Perry (2000) found that demographic characteristics affect the adoption of resilient behaviours to reduce the risk of earthquake damage, highlighting their potential importance as research variables. This is supported by more recent research emphasising the importance of demographic factors (Steg and Vlek 2009, Kennedy et al. 2009). This importance of the effect that demographics can have upon community resilience is also highlighted by its inclusion as an influencing factor in a number of community resilience models (e.g. Tieney and Bruneau 2007, Cutter et al. 2008). Furthermore, calls by recent research have indicated that further exploration is still required into the influence of demographic factors in the perceptions that individual's have of particular types of stressful events, such as disasters (Soffer et al. 2011).

Therefore, in order to be able to determine the degree to which previous experience is an influencing factor, and to provide an insight into other potential influencing factors, the current investigation will explore three demographic factors, age, gender and ethnicity, which research suggests may also have an effect upon perceptions of social responsibility (discussed individually in their following respective chapters).

When considering which variables to investigate, the researcher has taken into consideration a number of factors. It was important that each variable was able to be represented by as exhaustive a list as possible. For example, age is recorded by the participant and gender has limited responses. Ethnicity obviously has many possibilities, which represented an issue for the researcher. Therefore, it was important to use an already established format for gathering ethnicity data in the UK. The research adopted the format used by the UK Census, as this is already designed to record the ethnicity of people in UK communities. It lists the major ethnicities found within the UK and has an 'Other' option, which makes the potential responses exhaustive, without making the list too long. This also makes the potential responses for the age, gender and ethnicity variables mutually exclusive, as no participant is able to have two attributes simultaneously. It is recognised that using a limited number of potential ethnic responses may be considered a limitation of the research within our increasingly multicultural society. However, the chosen format was also supported by the pilot study research, which identified the ethnicities listed as the most prominent within the case study areas.

It is noted that the researcher had a wide range of demographic factors to choose from. The discussion of literature has so far highlighted age, gender and ethnicity as the most recurring and prominent of these factors. It is important to understand that the researcher is not stating that the other factors are not relevant, but simply that they were not the *most* relevant, given the review of literature conducted and the time and resource constraints placed upon the research.

Cross-cultural studies suggested that affluence is not always a determining factor for environmental concern and a conservation ethos (Whittaker, Segura and Bowler 2005, Dunlap and Mertig 1995). Therefore, income level and education level may not be the most appropriate factors when exploring environmental perceptions. Particularly for this investigation, socio-economic status was not considered to be one of the most relevant factors to explore within this study. This is because the participants within each case study area lived within the same radius of an extreme flooding event. This proximity of living accommodation, the majority of which is similar in house type and therefore cost, acts as a natural social leveller for socio-economic status amongst participants. It is recognised that socio-economic status may play a part in what people are able (or feel they are able) to achieve in relation to resilience-promoting measures. However, given that there are not expected to be great differences between the socio-economic statuses of participants, then it is reasonable to suggest that this would not be the most important of factors to explore within the research.

Similarly, religion was not thought to be one of the most important factors to explore because people can often have faith, without organised religion. It is also a deeply complex field of research that goes well beyond the scope of this investigation. For example, there are differences between religion, spirituality and transpersonal aspects (Hoot and Friedman 2011). Religion itself is only thought to be part of a broader experience, and only relating to an organised sociocultural system of spirituality at the level of the individual's quest for meaning and fulfilment, with transpersonal frameworks required for greater understanding of sacred aspects (Hartelius, Caplan and Rardin 2007, Pappas and Friedman 2007, Koenig, McCullough, & Larson 2001). It is unknown how much of the transpersonal experience extends beyond the sense of identity associated with an individual's religion to encompass wider aspects, known as the bridge between the consensual world of religion and the private world of spirituality to understand (Andreescu 2011, Hoot and Friedman 2011). Future research may wish to explore these religious, spiritual and transpersonal factors in greater depth, in relation to how they each may influence wider perceptions of climate

change. Given that the research is exploring perceptions anyway, then the importance of any religious or spiritual aspects may be highlighted within the participant responses, without having to specifically split each group by religion. In addition, the pilot study research suggested that it would not be practical to attempt to gain sufficient numbers of each religion type within the case study areas in order to be able to conduct statistical analysis to a sufficiently thorough degree. It was indicated instead that ethnicity would be a more prudent and less complex factor to use in this investigation.

It is acknowledged that socio-economic status and religion may have some influence upon the responses given by each participant and that not noting these aspects may be considered a limitation of this research. However, the researcher has chosen the most appropriate demographic factors to explore given the nature of this research and it is hoped that if other factors are of equal or greater importance then this may become apparent within the participant responses and the research would then be able to better inform future research in these areas.

As stated previously, one of the main reasons why the three variables of age, gender and ethnicity were chosen as being the most appropriate for this research is the large amount of literature which indicates that these three factors might be the most relevant and influential of the demographic factors for social responsibility. This research will now be discussed in the following chapters.

3.8. Age and Social Responsibility

Given that recent research has stated that an individual's potential to survive an earthquake is affected by their age (Soffer et al. 2011), then it is reasonable to suggest that resilience to other disasters, such as flooding, may also be influenced by age. This is further supported by the findings that perceptions related to the threat of earthquakes and perceptions of coping ability may also influence an individual's potential to survive an earthquake (Soffer et al. 2011). This indicates that perceptual factors and age are important variables, and in the same way that they were found to influence resilience to earthquakes, they may both also influence resilience to flooding. Therefore, it is important to use age as a research variable when exploring perceptions of social responsibility in relation to flooding.

In the same way that the human body undergoes changes as we age, so too does the human mind and as such our perceptions and behaviour develop over the course of a lifetime, influenced by our experiences. Furthermore, while acknowledging that there may be a number of reasons for age differences in values and behaviours which often vary between nations (Spence et al. 2011, Hofstede 2001), it may be more difficult to convey risks which are far away to younger members of society who are more used to immediacy in their lifestyles (Kennedy et al. 2010). This may be why it was found that older people estimate risks more precisely than younger people, i.e. their perceived estimation of risk is closer to the actual level of risk they are exposed to (Hakes and Viscusi 2004). These views are also supported by research which found that increasing age was related to greater pro-environmental behaviour in both seismic hazard adjustments (Lindell and Whitney 2000) and preparations for El Nino (Siegel et al. 2003).

More recently, Wells, Ponting and Peattie (2011) found that increasing age was related to an increase in general environmental responsiveness. This finding was exploring consumer responsibility, making the findings directly relevant to the current investigation. A total of 1513 participants took part in a survey exploring domestic consumption behaviours most closely associated with the issue of disruptive climate change (Wells, Ponting and Peattie 2011). However, it should be noted that this was a commercially motivated survey, making its aims beyond those of just a research based nature. The intention was to see if 'sociodemographic variables can aid the targeting of consumers by the level and type of responsibility and pro-environmental behavioural intentions expressed' (Wells, Ponting and Peattie 2011:1). Therefore, the commercial purpose of the survey is not considered by this investigation to have influenced the results. Given these findings, it is reasonable to suggest that older participants would be more likely to engage in pro-environmental behaviour in their resilience to extreme flooding than younger participants.

In contrast, early research by Tanida (1996) indicated that younger people were more likely to survive an earthquake. This is supported by more recent research which found that age had a negative influence on the perceived threat of climate change (Whitmarsh 2008). However, the research by Tanida (1996) is now considered dated, with the world having changed a great deal in that time. In addition, the findings by Whitmarsh (2008) were only partially significant and therefore require further exploration. These results do suggest that younger people are more prepared for, or more resilient to, extreme events. It may also be interpreted in another way. If

younger people are more likely to survive an extreme event, then they may be less likely to take measures to become more resilient to extreme events.

This is because people who perceive themselves to be most at risk from extreme events are more likely to take measures to counter that risk, including supporting government initiatives, even if they have to make personal sacrifices to do so (Armas et al. 2003). This may explain the increased interest and uptake of pro-environmental behaviour displayed by older people, as discussed in the previous research. Evidence for this line of reasoning can be found in risk perception research which states that elderly people were more fearful of earthquakes than younger age groups (Armas 2006). This is particularly true of people over 65 who are usually retired and therefore on lower incomes, with the majority of their finances tied up in their property, making them more vulnerable to extreme events (Armas 2006, Granger and Hayne 2001). Furthermore, older people will take longer than younger people to recover from mild to serious injuries which could occur as the result of an extreme weather event (Dwyer et al. 2004).

This interpretation becomes more complex when we consider that early research indicated that it is actually younger people that display more fear of hazards than older people (Brenot, Bonnefous and Marris 1998, Savage 1993). This would suggest that, in contrast to the evidence discussed so far, increased fear of risk would increase interest and uptake of pro-environmental behaviours in younger people more than older people. This is also in contrast to more recent research which indicates that older people experience increased stress related to climate change and its affects, due to their perceived increased vulnerability (Filiberto et al. 2010). There is also the third view that age does not affect climate change risk perception at all, as found by Safi, Smith and Liu (2012). This lack of age differences regarding perceptions of climate change is supported in earlier work in both the UK by Whitmarsh (2008) and in the US by Leiserowitz (2006). These contrasting findings require further exploration.

Therefore, the literature discussed here highlights the need for further research to explore the affect of age on perceptual factors, such as perceptions of social responsibility related to extreme flooding. Research needs to discover whether perceptions of social responsibility would contain similar age group differences and contextual reasoning, as is being displayed within the recent risk perception research. Or whether any differences found would be more reflective of the findings from earlier research. The current investigation will explore whether or not there are different

perceptions of social responsibility between different age groups and attempt to provide an insight into why these may be present.

3.9. Gender and Social Responsibility

Research has discovered gender differences in many aspects of modern life which are believed to have evolved from differences in the roles that males and females have played throughout human evolutionary history, creating differences in both the physiology and social goals associated with each gender (see Cartwright 2008). Early research indicated that females (particularly pregnant females) are more vulnerable to the effects of extreme weather events than males (Balbus and Malina 2009, Granger & Hayne, 2001). For example, in heat waves, there are both physical differences, such as having a higher core body temperature and the effects of the menopause, and social differences, both increasing female vulnerability (Greater London Authority 2010). Given this indicated relationship between gender and extreme weather events, it is reasonable to suggest that it would be important to use gender as a research variable when exploring perceptions of social responsibility in relation to flooding.

The use of gender as a research variable is further supported when we consider that gender differences, in particular relating to perceptions, were found by research which suggests that females may be more inclined to feel more vulnerable to dangers in general, due to them possessing a reduced sense of political empowerment than males and thereby having less trust in authorities (Kahan et al. 2007). Recent research has stated that gender and perceptions of threat and coping ability can influence an individual's potential to survive an earthquake (Soffer et al. 2011). This suggests that resilience to other natural disasters, such as flooding, may also be influenced by both gender and perceptual factors.

Females also perceived themselves to be more vulnerable to other risks, such as war, crime, terrorist attacks and the ability to cope with severe genetic illness (Taylor 2005, Ferraro 1996, Bar-Tal, Jacobson and Freund 1995, Arian and Gordon 1993). This is supported by more recent research which found that females are more concerned about the impact of climate change than men (Semenza et al. 2008, Sundblad, Biel and Garling 2008, Leiserowitz 2006). It is acknowledged that the gender differences present within these findings may actually be reflective of gender inequalities in areas that make them more vulnerable, rather than being a direct assessment of the risk itself (Safi, Smith and Liu 2012). Brody, Demetriades and Esplen (2008) had previously

stated that a gender-sensitive response to climate change requires an understanding of the inequalities that exist between men and women, which may be exacerbated by the impacts of climate change. However, it is beyond the scope of this investigation to explore the influences behind a factor which itself is being explored as an influencing factor within the current investigation. In addition, given that these influences do appear to create gender differences, then it is reasonable to firstly investigate this aspect itself, in relation to social responsibility.

This line of reasoning is also supported by the facts regarding the vulnerability of females during extreme events, with recent real-world examples supporting academic findings of increased vulnerability for females. The Women's Environment and Development Organization reported that women and children are 14 times more likely to die than men during disasters (Araujo and Quesada-Aguilar 2007). In addition, the largest numbers of fatalities of the Asian tsunami were women and children (Synthesis Report of the Tsunami Evaluation Coalition, in Mitchell et al. 2008). Therefore, it is of vital importance to explore the influence of gender differences on social responsibility for extreme flooding within this current investigation.

Relevant to the current investigation, there is some evidence to suggest that there are differences in male and female responses to extreme flooding events (Fordham and Ketteridge 1998, Enarson and Morrow 1998). These gender differences have also been found to be present after an extreme flooding event, with females being affected more than males by changes within the community (Fordham 1998). More recent research supports this early finding, indicating that females are more vulnerable to anger, frustration and violence associated with the upheaval during and after an extreme event (Bartlett 2008). This suggests that, given the difference in responses and social reactions to flooding, there may also be gender differences in perceptions of social responsibility, in relation to extreme flooding, which may then affect decision making and behaviour.

These potential gender differences in perceptions of social responsibility related to flooding are supported by evidence which indicates that there are gender differences in the way in which males and females perceive and respond to extreme weather events, with females experiencing higher levels of stress and anxiety than males (Bartlett 2008, Galea, Nandi and Vlahov 2005 and Fordham 1998). One potential explanation for this may come from recent research which found that males display a higher knowledge of the risks they face (Soffer et al. 2011). The current

investigation questions then whether having less knowledge may lead to higher anxiety? Does this anxiety lead to females perceiving themselves to have a higher level of social responsibility as they attempt to alleviate stressors by preparing for an extreme flooding event, or do females perceive themselves to have lower levels of social responsibility as they attempt to diffuse anxiety through denial of risk?

Research has consistently found over time that females are more likely to engage with the issue of climate change and take action to reduce greenhouse gas emissions (Markowitz et al. 2012, Thogersen and Olander 2006, O'Connor, Bord and Fischer 1999). For example, females display more intent to make pro-environmental adjustments to seismic hazards than males (Lindell and Whitney 2000). This is supported by research which indicates that there is a particular type of white male group within the general population, representing about a third of all white males, who are highly sceptical about risks in general and hold extremely individualistic attitudes (Kahan et al. 2007, Palmer 2003, Finucane et al. 2000). This is also supported by recent research which indicates that females rate risks associated with hazards as being higher than the ratings given by males (Hawkes and Rowe 2008). Gender differences in perceptions of risk are still present even after controlling for extraneous variables, such as education level (Kahan et al. 2007). Furthermore, it has been shown that there are even gender differences present among researchers who specialise in the field of risk (Slovic 1999, Barke, Jenkins-Smith and Slovic 1997). Therefore, given that this body of evidence indicates gender differences within perceptions of risk, as well as physical effects of extreme weather, then further research is required to explore gender differences in perceptions of social responsibility and its affect upon community resilience.

3.10. Ethnicity and Social Responsibility

It has been recently stated that research into pro-environmental perceptions and behaviour should further explore increasing racial and ethnic diversity, so that it may be accounted for in future behavioural prediction models (Larson, Whiting and Green 2011). Early research indicated that attitudes towards theoretical dangers are influenced by cultural norms, which help shape which dangers are feared and what risks are taken (Douglas and Wildavsky 1982). This is supported by Kahan, Jenkins-Smith and Braman (2010) who state that these cultural norms achieve this by entering into an individual's cognitive and social risk identification processes. This suggests that perceptions of risk can vary between individuals from different cultures. When exploring specific ethnicities, it has been found that whites of both sexes rated environmental

risks as less serious than did African-Americans (Kahan et al. 2007). This is supported by research which found that members of Black and other non-white ethnic groups had more dread of hazards and perceived greater global environmental risk, the reasoning for which was related to their perceptions about personal exposure to hazards (Whitfield et al. 2009, Brenot Bonnefous and Marris 1998, Savage 1993). Mirroring the explanations suggested for gender differences, it has been suggested that African-Americans may be more inclined to feel vulnerable to dangers in general, due to them possessing a reduced sense of political empowerment than other ethnicities and thereby having less trust in authorities (Whitfield et al. 2009, Kahan et al. 2007). This suggests that cultural differences in perceptions of risk may create differences between individuals of different ethnicities.

As seen with gender differences, research indicates that there is a particular type of white male group within the general population who are highly sceptical about risks in general and hold extremely individualistic attitudes (Conti et al. 2011, Kahan et al. 2007, Palmer 2003, Finucane et al. 2000). Again, as with gender differences, these racial differences are still present even after controlling for education level (Kahan et al. 2007). These potential ethnic differences in perceptions of social responsibility are supported by various fields of research which have found ethnic differences between individual perceptions of a number of different theoretical hazards, for example the danger of guns or abortion, which are viewed more favourably by whites than African-Americans (Kahan et al. 2007, Smith 2000). This is supported by recent research which states that perceptions of risk, and perceptions of who is responsible for managing that risk, are strongly influenced by culturally-based classificatory and normative systems (Arnoldi 2009:40). Renn (2008) also supports the notion of cultural differences in perception of risk, stating that these differences are present in both the manner in which risk is assessed and the underlying assumptions upon which risk assessments are created.

Critical assessment of key research shows that, in contrast to the White male effect results, Olofsson and Rashid (2011) conducted research in Sweden, where it was found that individuals with foreign backgrounds reported higher levels of risk perception than native Swedish people. However, there were no significant gender differences, meaning no White male effect. It was acknowledged that this may be due to greater equality between genders within Sweden than in other countries (Olofsson and Rashid 2011). Therefore, the results of this study are not fully generalisable as a whole, or directly comparable to the study in the US undertaken by Kahan et al.

(2007). However, the study by Kahan et al. (2007) also contained a number of potential influencers. For example, there was a deliberate over-sampling of African-Americans, which may have skewed the responses. In addition, the survey questions were not equally weighted, containing only one abortion item, three environmental items and six items relating to gun risk. Conti et al. (2011) supports the findings by Kahan et al. (2007), but this study also took place in the US and was only conducted in relation to perception of risk of nanotechnology. Given the respective limitations of these opposing pieces of research, and the fact that they were conducted in other countries, it is reasonable to suggest that further research into ethnic differences in perceptions of environmental issues should be conducted within the UK.

Research has indicated that non-minority members of society estimate risks more precisely (Hakes and Viscusi 2004). Despite this research again being conducted in the US, this more general finding does suggest that, in the UK, the White ethnic group may estimate the risk of flooding more precisely than other ethnic groups, potentially leading to greater interest and increased uptake of resilience measures through a better understanding of the risk. This is in contrast to the sceptical white male research previously discussed (Kahan et al. 2007) and requires further investigation. Given these differences in perceptions related to environmental risks, it would be reasonable to suggest that there may also be ethnic differences within perceptions of social responsibility related to community resilience to extreme flooding.

Potential ethnic differences in perceptions of social responsibility related to flooding are supported by many researchers who have found that perceptions of environmental and technological hazards can vary between cultures due to different perceptions (or world views) held by individuals within each culture (Kahan, Jenkins-Smith and Braman 2010, Poortinga et al. 2002, Steg and Sievers 2000, Gyawali 1999, Slovic 1999, Ellis and Thompson 1997). Research has also found that cultural orientation can influence how people react to images of climate change, how much climate change information they absorb and the likelihood of whether or not this information will lead to pro-environmental behaviour (Larson, Whiting and Green 2011, Kahan, Jenkins-Smith and Braman 2010, Myers 1994). More specific ethnic differences related to flooding can be seen in research which suggests that individuals who regard themselves as belonging to the Asian ethnic group may hold different perceptions of a community's response to and recovery from an extreme flooding event (Tapsell 2000, Tapsell et al. 1999).

This is supported by more recent research which found that ethnicity had a significant indirect effect upon pro-environmental behaviour, with ethnic minorities displaying more positive behaviour (Larson, Whiting and Green 2011). However, it should be noted that race and ethnicity began as separate elements, but were eventually merged within the analysis by Larson, Whiting and Green (2011) due to the small sample size. It is acknowledged by Larson, Whiting and Green (2011) that the results may not then be able to explicitly highlight the dynamic properties of ethnicity due to this simplification of the data. Further research is required to explore these ethnic minority findings.

In our modern multicultural societies it is easy to forget that the majority of these different cultures evolved largely in isolation from each other (Cartwright 2008), and even today, many cultures still follow their traditional beliefs and values, even in their new home countries. Given the evidence which indicates that these cultures contain a wide variety of differing beliefs, it is reasonable to suggest that different cultures may adopt different attitudes towards the issue of climate change, creating different perceptions of social responsibility. Therefore, these potential ethnic differences require further exploration.

Having identified experience of flooding, age, gender, and ethnicity as potential influencing factors on perceptions of social responsibility, the current investigation can now incorporate these aspects into the final conceptual model of perceptions of social responsibility (see figure 7).

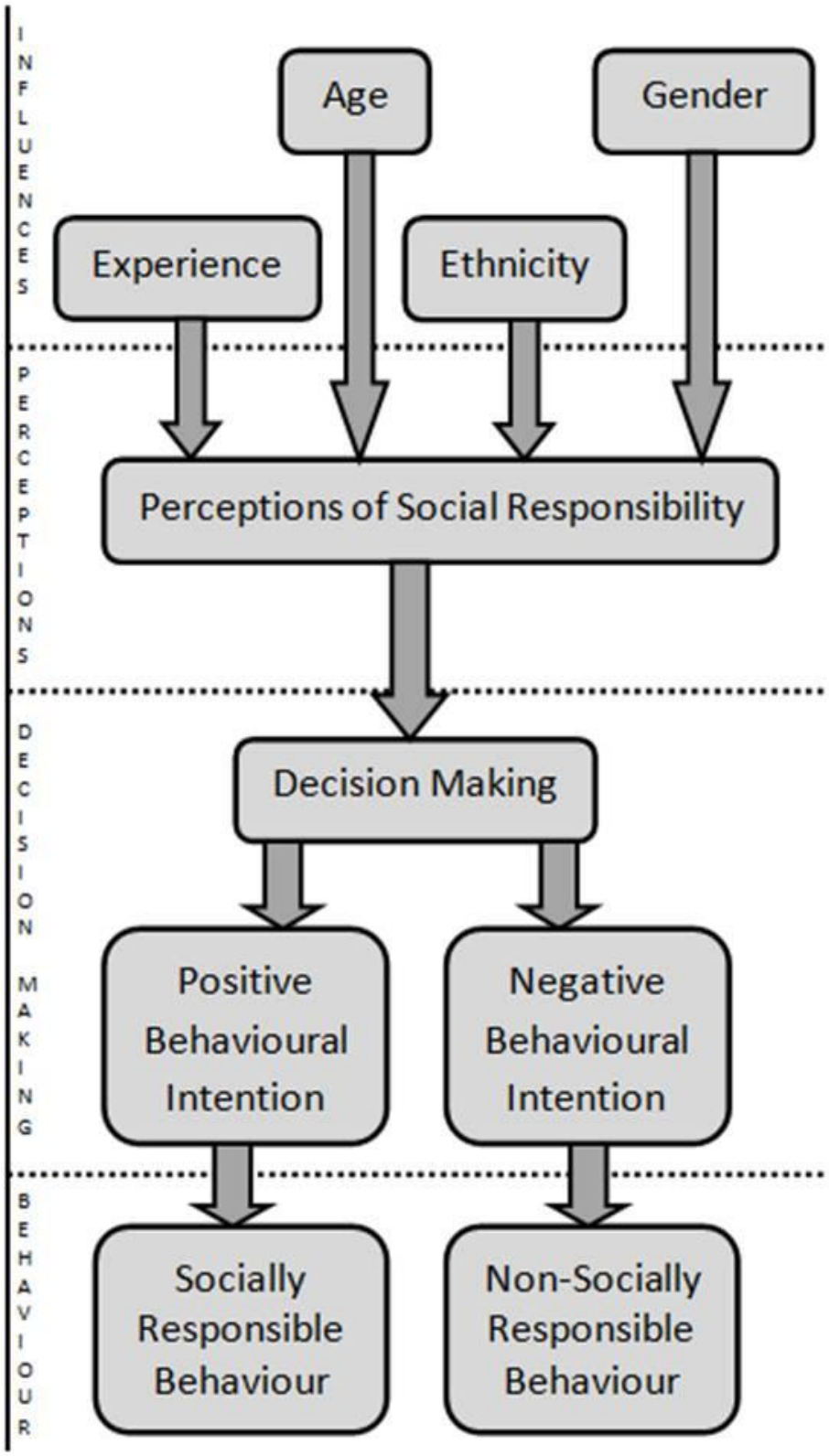

Figure 7: Final Conceptual Model of Perceptions of Social Responsibility

3.11. Summary of Social Responsibility

This chapter established the most appropriate definition of social responsibility for vulnerability and resilience research, highlighting that tackling the physical environmental aspects of climate change is only a small part in becoming a socially responsible business. Furthermore, this chapter highlighted that the majority of social responsibility research has focused on CSR, which fails to adequately integrate the perceptions held by key community groups into resilience promoting measures. In order to counter the failings of CSR, the current investigation created the community social responsibility framework, which can account for the effect of perceptions upon behaviour within and between a number of key community groups. This framework was supported by both theory and real world examples of the way in which perceptions of social responsibility influence decision making and behaviour.

This chapter also highlighted that climate change perceptions in general are not well understood, such as perceptions of risk, indicating that further research is required to explore these perceptions. It was demonstrated that perceptions of social responsibility may differ between community groups and research should therefore explore and compare perceptions in a number of different communities. The importance of social responsibility was indicated by its inclusion within institutional aims and agendas, with further research required to inform policies at both national and international levels, as well as policies aimed at local communities.

This chapter discussed how perceptions of social responsibility may have its own influencing factors, with experience of flooding and the demographics of age, gender and ethnicity proposed as potential factors that the review of literature suggests requires further research. Research is also required to explore these factors within and between community groups, drawing comparisons between communities that have experienced and have not experienced a recent flooding event, particularly as there were competing arguments within the literature regarding the ways in which experience of flooding can influence perceptions and behaviour. The current investigation will now review a number of existing measures of community resilience in order to determine the degree to which these measures support or refute the conclusions drawn so far from the review of literature.

4. REVIEW OF MEASURES OF RESILIENCE AND CASE STUDY AREAS

This chapter critiques three of the major measures of community resilience, which show support for communities being viewed as social units containing the important community groups of householders, SMEs and policy makers. There is also support for the effect that perceptions of social responsibility and demographical characteristic may have upon decision making and behaviour, and thereby on community resilience. However, a number of failings are highlighted within the framework, application and underlying assumptions of these measures, indicating the need for further research to gain a deeper understanding of factors which can affect community resilience, highlighting where contributions to new knowledge can be made to counter these failings and provide new evidence to inform both these and future community resilience measures.

4.1. Review of Measures of Community Resilience

There have been a number of models which have attempted to measure community resilience by trying to identify and measure various factors that they consider to be important aspects of community resilience. Tieney and Bruneau (2007) state that successful resilience relies upon improving the capacity of human systems, as well as physical ones, to mitigate, respond and recover from disasters. This supports the findings of the Pitt review (2008) which, as discussed in previous chapters, called for a greater involvement from individuals in flood resilience. Furthermore, Tieney and Bruneau (2007) also support the notion of the community being at the heart of improving resilience measures, stating 'social units', such as organisations and communities, are one of the four key domains of successful resilience. This supports the earlier discussion regarding the classification of communities and community groups being social units at the meso level. Tieney and Bruneau (2007) identified 4 key attributes of a resilience framework and 4 domains of resilience (see table 1).

Table 1: Tieney and Bruneau's (2007) key attributes and domains of resilience

No.	Key Attributes of Resilience	Explanation
1	Robustness	The ability of systems to withstand disaster forces without significant degradation or loss of performance
2	Redundancy	The extent to which systems are substitutable by other systems
3	Resourcefulness	The ability to diagnose and prioritise problems and initiate solutions by identifying and mobilising material, monetary, informational, technological and human resources
4	Rapidity	The capacity to restore functionality in a timely manner
No.	**Domains of Resilience**	**Explanation**
1	Technical	The physical properties of systems
2	Organisational	The organisations that manage the physical components of the system, including emergency responders
3	Social	Population and community characteristics that render social groups either more vulnerable or more adaptable to hazards
4	Local and Regional Economies	The ability to identify and access a range of options for coping with a disaster

Table 1 indicates that resilience research has highlighted the need to include the characteristics of a population or community within resilience measures, with particular emphasis on the characteristics of key social groups. This supports the earlier discussion of investigating demographics as potential influencing factors on social responsibility and in turn community resilience. However, while it is noted that these characteristics are an important aspect of resilience, it offers very little in the way of explanation of what these characteristics might be. Therefore, the current investigation proposes that further investigation is required into the social domain defined by Tieney and Bruneau (2007) in order to achieve a greater level of understanding of the ways in which characteristics of community groups may affect both the resilience of these individual groups and wider community resilience.

This lack of depth in the social domain supports the identification and exploration of age, gender and ethnicity as potential influencing factors, highlighted earlier by the current investigation. Furthermore, it also indicates that research is required to explore other aspects which may have an effect upon community resilience, but require a greater level of understanding, particularly psychological characteristics, such as how perceptions can affect decision making and behaviour,

which can make a social group more vulnerable or more adaptable to hazards. Tieney and Bruneau (2007) support this pathway of research, suggesting that future research needs to explore factors affecting resilience of households and businesses in order to inform a larger, holistic framework for resilience that would also incorporate organisational and community capacity elements.

The review of literature has demonstrated that, in addition to demographics, social responsibility may also be one of the community characteristics with the potential to affect vulnerability to hazards, as defined by the social domain. The literature also suggested that particular characteristics, such as demographics, may affect other population characteristics, such as social responsibility, which increases the complexity of the relationships between community characteristics and community resilience within the social domain. Further research is required to explore how social responsibility affects community resilience, which would provide a deeper understanding of which characteristics of key social groups are important for successful resilience, which could then inform both the social domain of Tieney and Bruneau's (2007) model of community resilience and future resilience models.

A second measure of community resilience, conceptualised by Paton (2007), also explored resilience to extreme events at the community level, identifying 4 general aspects that made a community resilient to extreme weather events (see table 2).

Table 2: Paton's (2007) 4 general aspects of community resilience to extreme weather events

No.	Aspect
1	Individuals, businesses, societal organisations and communities as a whole must possess the resources to ensure their safety and ability to function during an event (e.g. household emergency plans, business continuity plans)
2	Individuals, businesses and societal organisations must possess the competences to mobilise, organise and use the resources available to confront and adapt to the event (e.g. disaster management procedures, staff training)
3	Planning and development strategies used to facilitate resilience must include mechanisms designed to integrate the resources available at each level to ensure the existence of a coherent societal capacity, and one capable of realising the potential to capitalise on opportunities for change, growth and the enhancement of quality of life
4	Resources need to be available over an extended period of time and remain in line with the changing needs of the community

Table 2 indicates that Paton (2007) has identified that households, businesses and policy makers are the three key community groups that are at the heart of community resilience. This supports the importance of the three key community groups proposed by the current investigation and supported throughout the review of literature. Paton (2007) used these 4 aspects of community resilience as a basis for structural equation modelling to produce a model of Auckland's resilience to a volcanic eruption. Paton's (2007) model was also based upon the assumption that resilience to an extreme weather event could be achieved through a combination of personal, community and institutional factors. Table 3 details Paton's (2007) three factors of resilience.

Table 3: Paton's (2007) 3 factors of community resilience

No.	Factor	Examples
1	Personal	Critical awareness, self efficacy, sense of community, outcome expectancy, action coping and resources available
2	Community	Collective efficacy, participation, commitment, information exchange, social support, decision making and resources available
3	Institutional	Empowerment, trust, resources and mechanisms for community problem solving

Table 3 indicates that Paton (2007) supports the need for people to become more resilient as individuals, as well as a group. This is in line with the discussions of increasing social responsibility throughout the review of literature which have emphasised the importance of individuals playing a larger role in community resilience, by increasing their individual resilience levels. Paton (2007) also supports the need to account for personal factors (related to perceptions), in particular how a sense of community (related to social responsibility) can affect resilience to extreme weather events. Therefore, this supports the need for research to gain a deeper understanding of the way in which social responsibility can effect perceptions, as new knowledge in this area would not only further inform the personal factors aspects of Paton's (2007) model of resilience, but also future models and measures of community resilience. Paton (2007) translated these 3 factors of community resilience into a number of variables and carried out a questionnaire survey within the Auckland community, identifying 7 aspects as having a direct influence on community resilience (see table 4).

Table 4: Paton's (2007) 7 aspects that influence community resilience

No.	Factor Level	Aspect
1	Personal	Action Coping
2	Personal	Positive Outcome Expectancy
3	Personal	Negative Outcome Expectancy
4	Community	Community Participation
5	Community	Ability to Communicate Community Problems
6	Institutional	Empowerment
7	Institutional	Trust

Table 4 indicates that Paton's (2007) research found a number of aspects which he believed were directly related to community resilience and, which the current investigation proposes, shows strong support for conducting further research into the affect of perceptions of social responsibility. The evidence for this comes from the fact that two of the personal indicators found by Paton (2007) to affect community resilience are themselves perceptions, that is perceptions of positive or negative outcomes, indicating the strength that perceptions may have in influencing decision making, behaviour and community resilience. Furthermore, the community participation aspect is representative of social responsibility, as greater participation within the community is often an indicator of a higher level of social responsibility, an assumption supported by the resilience increasing actions taken by socially responsible members of the community detailed in the review of the Pitt (2008). Therefore, there is enough evidence to suggest that perceptions of social responsibility may have an effect upon community resilience, so further research is required in this area to produce new knowledge that would help support or refine both Paton's (2007) findings and future resilience measures.

Paton (2007) attempted to take this information one step further by providing local authorities with a practical measure of community resilience that could be used to evaluate potential resilience measures. In order to achieve this, Paton (2007) created a resilience rating measure, scored on a scale of 1 to 10, by utilising the base line scores from the questionnaire data. However, while Paton's (2007) research highlighted some aspects that were found to be related to community resilience, the practical measure developed from these findings is of little use in providing any meaning or context for the rating itself and thereby for resilience. For example, Paton (2007) found the volcanic eruption scenario to have a score of 5.53, but this score cannot be supported by evidence because it requires the precise event it is measuring to occur before its calibration can be evaluated. This is a common failing within models of community resilience as a

whole. Therefore, the current investigation suggests that research has not yet advanced to the stage where these types of practical community resilience measures can be created with any degree of accuracy or calibration method, other than the event itself. Even if the event itself occurred, different measures of community resilience may even show different results, as they contain different elements within their structural frameworks. Therefore, more knowledge is required about the aspects found to be related to community resilience themselves, which would allow future research to inform local authorities and decision makers with a greater degree of reliability the factors which can affect community resilience to extreme weather events. This would allow communities to incorporate each aspect individually, allowing greater resilience to be achieved through the sum of the parts, rather than trying to measure the whole of community resilience itself.

The conclusions drawn so far from Paton's (2007) work indicate that, while measuring community resilience itself is problematic, research into the identification of aspects related to community resilience is of great importance. Therefore, further research is required in order to determine whether or not the aspects that Paton (2007) found to be directly related to community resilience in Auckland would be similar to those found within communities in the UK. In particular, would perceptions hold the same level of importance within the UK population and to what degree do perceptions of social responsibility influence community resilience? In addition, Paton (2007) explored community resilience in relation to a volcanic eruption, so would the strength of perceptions and community participation elements, representative of perceptions of social responsibility, be found when exploring community resilience to another extreme weather event, such as extreme flooding. Further research is required to be able to draw comparisons between communities in different countries and between different types of extreme weather events.

A third measure of community resilience supports this call for identification of common elements across different types of natural disasters. Cutter et al. (2008) noted the importance of identifying aspects that could affect community resilience, but also, like Paton (2007), attempted to quantify community resilience by using a range of variables that had to date been found by research to have a direct affect upon community resilience. Therefore, Cutter et al.'s (2008) measure of community resilience contains a similar flaw to Paton's (2007), in that it attempts to measure resilience in relation to a range of indicators that, while having been found to affect community resilience in particular types of events or communities, have not been researched in enough

depth, across enough communities and in relation to enough different types of extreme weather events to make their findings robust enough to be able to form the foundations of a model that will ultimately be used to inform future resilience measures. Further problems arise when we consider that Cutter et al.'s (2008) model is based upon an assumed distinction, and thereby relationship, between vulnerability and resilience, when in fact this may be drawing a false dichotomy within this field of research, depending upon the perspective you adopt when conducting your research.

The definition of resilience utilised by this thesis, as defined in chapter 2.6., p.20, is based upon the notion that to truly be resilient a community must not only be able to absorb the effects of the disaster, but must also contain the capacity to evolve through learning and adaptation. However, the majority of research that informs the variable range, upon which Cutter et al. (2008) have based their model, comes from the 'hazard' perspective of resilience, which views resilience merely as the ability of a system to survive and cope with a disaster (Cutter et al. 2008). Therefore, this qualitative difference between research perspectives may have an effect upon which factors are considered to be the most important variables for improving community resilience, as researchers from separate fields may in fact be using the same terminology to study different aspects, deriving similar but ultimately misleading or incompatible results. Table 5 provides a summary of the type of indicators of resilience used by Cutter et al. (2008).

Table 5: Summary of Cutter et al.'s (2008) indicators of resilience

Domain	Indicators
Social	Demographics, social networks, community values-cohesion and faith based organisations
Economic	Employment, property values, wealth generation and municipal finance/revenues
Institutional	Participation in hazard reduction programmes, hazard mitigation plans, emergency services, zoning and building standards, emergency response plans, interoperable communications and continuity of operations plans
Infrastructure	Lifelines and critical infrastructure, transportation networks, residential housing stock and age and commercial and manufacturing establishments
Community Competence	Local understanding of risk, counselling services, absence of psychopathologies (e.g. alcohol, drug, spousal abuse), health and wellness and quality of life

The indicators of resilience shown in table 5 lend further support to the view already highlighted by the current investigation that, in order to fully understand the social domain of resilience, researchers must explore the demographics within the community, such as age, gender and ethnicity. Furthermore, the community values-cohesion indicator suggests that community groups must not only become aware of their own values, but must also become more aware of the values of others, so that cohesion can be better understood and achieved. This supports the need for research to not only explore the perceptions that underpin these values in relation to individuals, but also explore their perceptions of each other. Therefore, the theory that underpins Cutter et al.'s (2008) model of community resilience does support the importance of the aims of the current investigation but, like the previous models, requires greater understanding of these underpinning factors.

Cutter et al.'s (2008) model does attempt to account for different types of extreme weather events by measuring their characteristics, such as frequency, duration, intensity, magnitude and rate of onset of the event. Cutter et al.'s (2008) model also accounts for the existing vulnerability and resilience of communities in any given place that requires community resilience to be measured. However, like Paton's (2007) measure, the model cannot be calibrated until it has been tested against a real extreme weather event, which in turn means that it is relatively unknown whether or not the indicators of resilience on which it is built have a strong enough effect upon community resilience to allow quantification of resilience. Therefore, this again highlights that further research is required into these underpinning factors.

Furthermore, the current investigation proposes that models of these indicators of resilience themselves need to be conceptualised before attempting to take the next step of incorporating them all into a single measure of community resilience. For example, it would be prudent to firstly create a conceptual model of factors which can affect perceptions of social responsibility in relation to community resilience to extreme weather events. This would allow researchers to have a greater degree of confidence when informing local authorities and decision makers about the relationship between perceptions of social responsibility and community resilience, while also highlighting which factors may affect perceptions of social responsibility itself. Therefore, rather than simply stating that a particular factor will have an effect upon community resilience and combining this with numerous other factors, which the current community resilience models have

done, it would allow researchers to also propose ways in which this deeper understanding of individual factors could be utilised to improve community resilience.

Exploring these points in more detail, the inclusion of a number of wide ranging of factors, without fully exploring their interactional elements, may also create further problems for models that attempt to measure community resilience. For example, demographic attributes, an indicator within Cutter et al.'s (2008) social domain, can often confound or bias measurable constructs when the samples (i.e. different communities) do not share similar demographic attributes, or when there is a relationship between the demographic attributes and construct itself (i.e. measurable community resilience) (Byrne and Watkins 2003, Steenkamp and Baumgartner 1998). This suggests that there is limited generalisability for measures of community resilience beyond the original communities upon which they, or their underlying theoretical sources, are founded, due to demographical biases. Furthermore, the current investigation suggests that measures of community resilience may actually be accidentally measuring the same phenomenon twice.

This is because a demographic attribute, such as age, may be found to correlate with community resilience; however it may also be found to correlate with community values, another aspect of the social domain. Therefore, it could be asked whether a co-indicator, such as community values, only correlates with community resilience because of the influence that age has upon it, rather than it being a distinct aspect in its own right. Furthermore, if age is found to influence a number of its co-indicators and then acts as an indicator itself, then has the influence of the age demographic been accounted for more than once? This potentially spurious relationship may confound the overall model of community resilience itself and it should then be asked, what strength weighting adjustments are required in order for future measures of community resilience to incorporate a true representation of indicators of community resilience?

This theoretical reasoning proposed by the current investigation is in part supported by research which has shown demographic attributes to bias behaviours related to community resilience. For example, it was found that increasing age was related to greater pro-environmental behaviour in both seismic hazard adjustments (Lindell and Whitney 2000) and preparations for El Nino (Siegel et al. 2003). This suggests that age was related to socially responsible behaviour, which the discussion throughout this research has indicated may itself have an effect upon community resilience. Therefore, age would be considered to be influencing both its co-indicator (social

responsibility) and community resilience itself. This line of reasoning becomes even more important when we consider that age is only one example of a number of potentially confounding demographic attributes. Research has found that earning a higher income, being married and length of time at current address are all factors which have been found to have an effect upon the amount of preparation that an individual engages in prior to an extreme weather event (Sattler, Kaiser and Hittner 2000, Lindell and Perry 2000, Dooley et al. 1992). Gender differences have also been discovered, with females more likely to take action to reduce greenhouse gas emissions (Markowitz et al. 2012, Thogersen and Olander 2006, O'Connor, Bord and Fischer 1999) and displaying more intent to make pro-environmental adjustments to seismic hazards (Lindell and Whitney 2000) than males. Therefore, this adds greater importance to the need for further exploration of the relationship between demographic attributes and other potential indicators of community resilience.

The current investigation suggests that this is one of the most important tasks for researchers, because even if a true representation of indicators of community resilience was found, then while it may be interesting to be able to measure community resilience and give it a score out of 10, the important question is not what is our community resilience score, but what can we do to improve our community resilience. It is noted that policy makers are often overly concerned with obtaining a 'score; or 'rating' with which they can compare themselves to other communities and use to justify investment priorities. However, community leaders also do not wish to wait for an extreme weather event to occur to see whether or not their community resilience score was accurate or not, or whether the factors underpinning the various models represented a true definition of community resilience. A deeper understanding of these factors is required, with conceptual models indicating how these factors may affect community resilience, which would allow future research to bring together better researched indicators in order to create an improved measure of community resilience itself. This would allow improvements in our understanding of community resilience, potentially increasing the resilience of each key community group and thereby delivering a step change in overall community resilience.

4.1.1. Summary of Review of Measures of Community Resilience

In summary, the measures of community resilience discussed in this chapter support the notion of viewing communities as social units, with householders, SMEs and policy makers supported as the three key community groups. There is also support for the effect that perceptions of social

responsibility may have upon decision making and behaviour, as well as further highlighting the influence of demographic characteristics. These measures and the literature discussed throughout the current investigation indicate that community resilience to extreme events is the result of the complex interaction between a range of factors. However, each model is based upon different factors and each gives greater weighting to some than others, as well as being based upon qualitatively different assumptions arising from the different perspectives between fields of research.

The lack of cohesion within these models is brought about by a lack of depth in the knowledge that research currently has about these individual factors and how they affect community resilience. Research has not yet fully considered the ways in which these individual indicators of resilience can be converted into measurable elements of resilience, yet has already attempted to combine all of these aspects together in various ways to produce measures of overall community resilience. This had lead to a number of issues that further research needs to address in order to inform both these and future measures of community resilience. In order to gain a deeper understanding of the way in which perceptions of social responsibility may affect community resilience to extreme flooding, and in turn may be affected by other factors, appropriate case study communities must be used as a basis for research. The following section will now discuss the rationale behind the communities used in the current investigation, including firstly establishing what is meant by 'extreme' within this investigation.

4.2. Defining 'Extreme' within the Context of the Current Investigation

Extreme weather is a broad concept, with many conceptualisations of what is considered to be 'extreme', arising from the many different perspectives from which the field is studied (Morss et al. 2011, Beniston and Stephenson 2004, Meehl et al. 2000). It is acknowledged that there is still no agreement regarding a singular definition of what is extreme (Morss et al. 2011, Beniston and Stephenson 2004). Simply measuring direct economic impacts or counting affected households is not an adequate measure of the human, social and environmental aspects when defining what is considered to be extreme (Morss et al. 2011). It has been stated that it may not be possible to completely define human climate thresholds (Meze-Haisken 2008) due to the unique specificity of each individual region, population segment or pre-existing circumstances at any given location (Gosling et al. 2009, Kovats and Hajat 2008). Therefore, it is important that each individual piece

of research establishes what ‘extreme’ means within the context of their research, so that it may be compared to other research that uses similar or different definitions of ‘extreme weather’.

It is important to note that the most frequently discussed associations with extreme weather, such as loss of life, injuries and damage to property, often underestimate or neglect other important aspects (Morss et al. 2011). This is because the extent of other effects, such as the disruption to daily lives caused by road closures due to flooding, are difficult to quantify (Morss et al. 2011, Battisti and Naylor 2009, Mirza 2003, Easterling et al. 2000). In addition, there are associated human health issues with even the most minor of disruptions, such as stress and misery, which are also difficult to quantify (Few 2007, Haines and Patz 2004). Given the evidence discussed here, it could be argued that any type of disruption caused by weather patterns that are not in line with normal patterns within any given geographical area could be considered to be extreme, especially given the psychological impact.

From a climatological perspective, research has defined extreme weather as being conditions that exceed a particular threshold (Tebaldi et al. 2006, Alexander et al. 2006, Beniston and Stephenson 2004, Easterling et al. 2000). This particular threshold can be general in nature, for example temperature below freezing, or specific for particular locations, where unusual weather patterns occur (Tebaldi et al. 2006, Alexander et al. 2006, Beniston and Stephenson 2004). This suggests that for location-specific research, such as exploring extreme weather within a community, then if the weather conditions within those communities are outside of their normal weather patterns, then they could be considered from a climatological perspective to have experienced extreme weather. However, it is also important to note that the setting of thresholds is also a complex issue, as there are many nonlinear interactions that can lead to varying degrees of extreme weather impacts (Eakin and Luers 2006, Kunkel, Pielke and Changnon 1999).

Given that there is great variety in the usual weather patterns for different locations, internationally, by region and at the community level, then it is reasonable to suggest that what may not be considered extreme for one location, will represent extreme weather in another location. For example, usual weather patterns in the northern part of Norway would represent extreme weather patterns in Egypt, with the reverse also being true, and with both examples representing what would be considered extreme weather for the UK. This is because the threshold for a heat wave in a cooler climate would be lower than for a warmer climate, with the

same also being true of colder conditions in a warmer climate (Gosling et al. 2009, Kovats and Hajat 2008, Haines and Patz 2004). This demonstrates how people become acclimatised to both weather conditions and their daily interactions that they live within these normal conditions. It is important to understand this contextual relativity to usual weather patterns, in order to determine when extreme weather is occurring within any given location. This is supported by Stephenson (2008: 12) who states that 'the context of extremeness is relative and so strongly depends on context'. In addition, the words extreme, rare, high-impact and severe are used interchangeably, making precise definitions of extreme weather difficult (Stephenson 2008).

Research has also defined extreme weather from a societal perspective as being weather events that cause damage to life or infrastructure (Changnon 2009, McBean 2004). This societal definition of extreme assumes that people and their daily lives and interactions (society) will be affected by weather patterns. This is because weather patterns can jointly interfere with natural and built environments and social systems (Kates et al. 2006, Wisner et al. 2004, Mirza 2003). This could range from the loss of life, to having flood water inside homes and shops, or having public transport and road links cut off. As each of these aspects is outside the normal functioning of that location, with a direct effect upon the people there, then this exceeds a 'societal' threshold from the impact of weather patterns, making it extreme. Again, it is important to understand the contextual relativity of disruptions, in order to determine when extreme weather is occurring within any given location. This social aspect is of even greater importance to this investigation than the physical aspects, as the aim of this investigation is to explore psychological perceptions, rather than physical ailments or damage.

It is apparent that there is an overlap in the understanding of climatological and societal definitions of extreme. The key characteristic is that in order to determine if weather is extreme, it should be compared to normal standards for each location. That is why societal impacts are often used as indicators by climate scientists to aid in the selection of climatological measures of extreme weather (Morss et al. 2011, Meehl and Tabaldi 2004, Meehl et al. 2000, Easterling et al. 2000).

Stephenson (2008: 14) defines extreme floods as being intense precipitation over a short period (flash floods) or persistent/recurrent precipitation over many days. This intense precipitation aspect within a given location, which is greater than normal precipitation levels, leads to extreme

flooding. This is supported by the Intergovernmental Panel on Climate Change, whose Fourth Assessment Report (AR4) focused on six types of extreme events, with numer 3 being heavy precipitation events (Solomon et al. 2007; Parry et al. 2007) which is also referred to for extreme flooding events (Mastrandreas et al. 2009). This link between extreme precipitation and extreme flooding is important, as flooding that follows extreme precipitation is often extreme in nature, for the location in which the extreme precipitation takes place.

It was noted by Fielding (2011) that there will be greater urban flooding, where unabsorbed run-off from heavy rainfall will exceed the capacity of urban sewerage and drainage systems to cope, resulting in a fourfold increase in the number of people at high risk. This suggests that the most appropriate communities to research within the UK would be urban communities which have experienced a period of higher than normal precipitation levels that resulted in higher than normal levels of flooding.

Therefore, given the research discussed, the community locations chosen by this research have had to meet a number of conditions to ensure that that they have experienced weather that is extreme for their location. This holistic approach reflects the common key characteristic of relativity and acknowledges the potential disruptive aspects associated with social and psychological impacts, rather than simply focusing on physical or economical measures of extreme. The three conditions are:

1. Communities must be urban-based and have experienced a period of higher than normal period of precipitation which resulted in flooding within the community
2. It must be acknowledged within the local area of each community that an extreme flood has taken place in that location, as this common perception would be indicative that the community groups psychologically perceive themselves to have experienced an extreme flood and can relate to the purpose of the research
3. The flood-experienced communities will have experienced disruption to their daily lives, caused by levels of precipitation and flooding

It is acknowledged that by limiting the chosen communities to those who fit within these three guidelines, and this investigations conceptualisation of extreme, may limit the generalisability of the results. It is also acknowledged that only exploring flooding within these communities limits

the generalisability of the results to one type of extreme weather event. However, the investigation is ensuring that the respondents will believe that they have experienced an extreme flooding event. Therefore, the validity of the results should not be compromised, as perceptions will be in line with the questions being asked within the questionnaires and interviews.

4.3. Case Study Areas

The current investigation was conducted in the two cities in the UK with the largest population sizes, Birmingham and London. It is important to note that this research is not suggesting that either of these areas are more susceptible to flooding than other similar areas of the UK. In fact, it is hoped that the findings of this research can be generalised to other communities within the UK. What this chapter will highlight is that these urban areas do contain a number of characteristics that make them appropriate as case study areas for the current investigation. Four communities in two separate cities were chosen because the discussion of literature and review of measures of community resilience highlighted the need for separate communities to be compared to each other in order to be able to compare the differences between communities in different locations who face different levels of risk, as well as between communities who had experienced flooding and those who had not. In addition, these communities met the three conditions of extreme, as defined by this investigation.

4.4. Birmingham: Research Rationale

Birmingham is the second largest city in the UK with over 1 million people, containing the headquarters of a large number of major businesses and the busiest train station in the UK, making it a city of great national strategic and economic importance. Birmingham City Council is 'one of many authorities who are a signatory of The Nottingham Declaration on Climate Change and have made a public commitment to tackle the causes and effects of climate change' (Kotecha, Thornes and Chapman 2008:6). Birmingham is a city that is used to dealing with major emergencies and has previously faced major power cuts, civil unrest, major flooding, industrial and transport accidents, a tornado, severe snow storms and a recent swine flu epidemic (Birmingham Prepared 2009). In 2006 Birmingham was voted by *Readers Digest* as being the most prepared city in the UK for a major disaster (Jones 2006). In order for Birmingham to continue to be prepared they have established a local, multi-agency group that brings together the city council, emergency planners and other response partners, known as the Birmingham Resilience Team (BRT). This integration of many agencies within the policy level decision making and

implementation of measures that the BRT aims to achieve is an important first step in preparing Birmingham against extreme weather events. Birmingham has worked closely with its communities affected by flooding to create local flood warning plans and the BRT has provided the means to create multi-agency plans, invest in response agencies and run events to train agency members, allowing them to respond more effectively to incidents (Birmingham Prepared 2009).

The reason for the current structure and objectives of the BRT is simple, in the past Birmingham has successfully dealt with major emergencies by ensuring that emergency planners and responders work together and they wish to continue this success in the future. However, the current investigation proposes that, while Birmingham may be the most prepared city in the UK, this does not necessarily make it resilient. This is because the three main areas that the *Readers Digest* used to measure preparedness were emergency readiness, medical response and crisis communication. However, the medical response only measures how responders, such as the ambulance service, are at doing their job, something that is not appropriate or sufficient to measure how resilient Birmingham is to an extreme event. It is also questionable whether the areas used by *Readers Digest* even measure preparedness itself. The three areas that were used to measure preparedness are also focused largely on policy makers and emergency services providing top-down information and do not take into account the resilience levels that many sources throughout the review of literature have indicated that small businesses and householders can provide to their communities (e.g. Pitt 2008, Smit and Wandel 2006). Therefore, while it may give some indication of preparedness, it does not give an indication of Birmingham's resilience to extreme events, as preparing responders is only one aspect of building resilience within only one community group.

The BRT itself combines many policy level decision makers and emergency responders in its multi-agency group, but does not include heads of local businesses or the general public, and while the opinions of these other community groups may be sought to inform preparedness measures, it could be argued that it does not achieve the integration of these key community groups that is necessary to achieve greater resilience. This approach is similar to the way in which a business seeks advice from the public and incorporates their feedback into existing measures, maintaining good public relations between Birmingham's policy makers and the general public. However, as highlighted in the literature review, increasing community resilience requires greater integration

between key community groups built upon a social responsibility framework, not a public relations process (see chapter 3, page 44, figure 4).

The top-down approach, highlighted by the review of literature to be insufficient for increasing community resilience (e.g. Dufty 2008), is reflected in some of the current aims of the BRT directed at training and creating joint plans at the policy makers and responders level. However, to its credit, the BRT have recently stated that it aims to develop better ways to include the general public in the resilience process (Birmingham Prepared 2009). One of the most important objectives recognised by the BRT is the need for integration between key community groups in order to increase community resilience, highlighting that voluntary organisations, businesses and individuals also have a role to play in community resilience (Birmingham Prepared 2009). This is in line with the increased emphasis being placed upon individuals and community groups to increase their individual levels of community resilience, within the review of institutional policies and agendas (see chapter 3.5., p.55). The Birmingham Communities and Neighbourhoods Resilience Group was formed to bring together community leaders, voluntary organisations and the emergency services into a common forum (Birmingham Prepared 2009). However, more in-depth information is required to inform resilience measures to ensure that this greater involvement is more reflective of the social responsibility framework than the public relations process.

The BRT also have procedures in place to monitor flooding in Birmingham and respond efficiently when necessary, making them well prepared to deal with a flooding event. However, as previously discussed, this preparation is only one step in building resilience (Maguire and Hagan 2007). The BRT recognise that extreme weather events are becoming more commonplace, noting that every summer for the last few years Birmingham has suffered one of these extreme events, including severe flooding (Birmingham Prepared 2009). The BRT also provide general information to the public about how to prepare for flooding, detailing precautions they could take before a flood and procedures to follow should a flood occur (Birmingham Prepared 2009). This information is still being provided in a top-down manner though, with policy makers dictating to the public. Again, the review of literature has highlighted that this approach is ineffective at communicating risk (Dufty 2008) and as such is often ignored by those it is designed to help (Lorenzoni and Langford 2001). The information needs to be more salient to the needs of individual communities within Birmingham, as the review of literature also highlighted that this has been shown to increase engagement with the issue (Lorenzoni and Pidgeon 2006). Therefore,

research which explores ways to build upon the preparations that are already in place and increase resilience to extreme flooding must be conducted within Birmingham communities.

4.5. Birmingham: Review of Historical Flooding and Flood Risk

The River Tame, River Rea and River Cole are the three key rivers within the Birmingham area. Birmingham is around 500ft above sea level. However, flooding still occurs, particularly in the area around the course of the River. Flood warnings for the River Rea are based upon readings from the river gauges at Longbridge. This means that this part of Birmingham is open to potential system failures or warnings coming too late due to excessive rainfall in a very short period of time, a characteristic of extreme flooding events. It is to the credit of the BRT that they recognise that the risk of flooding can only be reduced, rather than eliminated, highlighting that even those areas that currently have flood defences can still be at risk of flooding (Birmingham Prepared 2009). The Environment Agency provides an 'Indicative Flood Plain Map' on their website (Environment Agency 2009a). However, this map only covers certain rivers within the Birmingham area and does not account for areas that may be vulnerable to water run-off from flooding in other areas due to the lie of the land, another characteristic of extreme flooding events. This is because these maps use broad-scale modelling techniques which show the extent of the flooding assuming there were no flood defences, man-made structures or channel improvements. This means that the centre lines of some of Birmingham's rivers are misaligned and residual risk is not accounted for. The Environment Agency provide the council with maps indicating areas susceptible to surface water flooding, however the other key community groups are often not given access to these new maps and are not made aware of the failings of the indicative flood plain maps. This indicates that Birmingham, like many other areas of the UK with nearby rivers, contains the potential for extreme flooding.

Further support for using Birmingham as a case study area comes from the fact that large portions of the River Tame have been heavily modified, with the route being altered by brick walls and concrete, in order to accommodate human activity. This is common practice in urbanised areas and the majority of the modifications have been made in the upper catchment of Birmingham. The River Tame has flooded on many occasions, with large flooding events taking place in June 1955, August 1987, December 1992, September 1994, January 1999 and November 2000 (Environment Agency 2009b). It is obvious then that these flooding events are becoming more frequent and more severe, as highlighted by extensive flooding of the River Tame in June 2007

which significantly affected many areas of Birmingham (Environment Agency 2009b), with around 300 homes in the Witton area of Birmingham being affected (Dayani 2007). The urbanised development of Birmingham means that rainfall runs off the hard surfaces and into the river, making water levels rise very quickly.

There have been further physical measures taken to try and reduce the risk of flooding, with localised flood defences put in a number of locations throughout the Birmingham area (Environment Agency 2009b). However, the environment agency has noted that many of the existing structures are nearing the end of their design life and could potentially fail and cause widespread flooding (Environment Agency 2009b). The increased occurrence and severity of flooding in the area also provides Birmingham with the opportunity though to not only create new physical measures to increase their resilience to flooding, but also to incorporate non-physical measures into their plans, as the previous floods are still fresh in the minds of the local communities. The non-physical measure become even more important when you take into account that there are around 250 properties within flood risk zones that the environment agency are not going to provide new physical resilience measures for due to economic cost (Environment Agency 2009a). This suggests it is an appropriate time to explore non-physical aspects of community resilience within Birmingham communities.

Further potential case study communities emerge when we examine the River Rea, which is present in a number of urban areas throughout Birmingham, such as Digbeth (near the Bull Ring Shopping Centre). The River Rea is prone to flash flooding, caused mainly by a great number of modifications to its route over the years and the large degree of urban areas it passes through. In September 2008 there was also flooding from the River Rea and its tributaries in the Selly Park area. This highlights two Birmingham communities which may benefit from community resilience research.

4.6. Birmingham: Case Study Communities

The review of the historical flooding of Birmingham's rivers has identified a number of communities which may benefit from research designed to increase their resilience to flooding events. Three of these communities within the Birmingham area were chosen as case study areas. These communities were Witton, Selly Park and Digbeth. Witton and Selly Park were chosen because they are urbanised areas that lie close to water sources and contain the key community

groups of householders and SMEs. Furthermore, both Witton and Selly Park have experienced severe flooding in summer 2007. These communities were also highlighted by the BRT, with whom the researcher worked closely in the initial stages of the research, as being the most relevant areas for studying flooding, further validating their value as case study areas for the current investigation. Digbeth was then chosen as a control group area as it had not experienced severe flooding in recent years, but theoretically still contains the potential to do so as it is also an urbanised area that is close to the River Rea. The following section discusses how each of the two chosen flood-experience communities, Selly Park and Witton, meet the three conditions of extreme defined by this investigation (chapter 4.2., p.87).

It is acknowledged that some of the information regarding appropriate community choices for Birmingham was provided in formal meetings with the Birmingham Resilience Team, based upon their knowledge and experience of rainfall and flooding within Birmingham communities. This information was supported by the information gained informally during the pilot study process, which took place at the Water for Life Event in Selly Park and was attended by a number of local authorities and environmental agencies. This type of information gathering for community choice could be considered a limitation of this research. However, it should also be noted that the Birmingham Resilience Team are the foremost agency and authority within the Birmingham area, regarding extreme weather events. Therefore, this investigation considers them to be a highly valuable and reliable information source.

In general, it is predicted that Birmingham's' climate will shift towards ever more extremes in the future, with a greater number and magnitude of significant weather events (Be Birmingham 2011). Historically, Birmingham has been particularly susceptible to flooding (Be Birmingham 2011). Birmingham's Local Climate Impacts Profile (Kotecha, Thornes and Chapman 2008) found that the number of significant weather events in Birmingham increased between 1998 and 2008. It is acknowledged that this data could be considered subjective as analyses are partly based on reported events within the media. However, heavy rain and flooding were found to cause the most problems for Birmingham (Kotecha, Thornes and Chapman 2008). This supports the definition of extreme used within the chosen communities (chapter 4.2., p.87).

Figure 8 provides the Environment Agency flood map for Selly Park and figure 9 provides the Environment Agency floodmap for Witton. Each map is presented at a scale of 1:40,000 and depicts the risk of flooding (dark grey areas) from rivers and sea (black areas).

Figure 8: EA Flood Map of Witton
(Environment Agency 2012)

These images have been removed

Figure 9: EA Flood Map of Selly Park
(Environment Agency 2012)

4.7. Witton and Selly Park: Context of Extreme within the Community

Condition 1: The first condition of using urban-based communities that have experienced a higher than normal period of rainfall, which resulted in flooding within the community, has been met because Selly Park and Witton both experienced extreme precipitation in 2007 which lead to flooding. Evidence for this is found in Birmingham's Local Climate Impact Profile (LCLIP) (Kotecha, Thornes and Chapman 2008) which identifies heavy rain as taking place in January and February 2007, combined with melting snow and ice in February 2007, in the whole of the West Midlands, including Birmingham as items 50 and 52 in their list of Birmingham's most 75 severe weather events of the last 10 years. Items 56, 57, 58, 60 and 62 on the list all identify further heavy rain and flooding within Birmingham throughout June, July, September and November 2007 (Kotecha, Thornes and Chapman 2008). This indicates is that Birmingham was experiencing higher than normal periods of precipitation in 2007 which lead to a number of localised flooding events, which were severe enough to be recognised within the LCIP report.

The LCLIP (Kotecha, Thornes and Chapman 2008) report is in line with the Pitt review (2008) which identified that extreme precipitation and extreme flooding took place around the UK in 2007. Therefore, given this evidence, it is reasonable to suggest that the Birmingham communities of Witton and Selly Park had experienced extreme precipitation in 2007, which lead to higher than normal levels of flooding within the community. This is in line with the definition of extreme flooding, relative to normal weather patterns, discussed previously (chapter 4.2., p.87), meeting the first condition.

However, it should also be noted that there was further flooding in summer 2008. Evidence for this is found in Birmingham's LCLIP (Kotecha, Thornes and Chapman 2008) which identifies heavy rain as taking place in January and February 2008, combined with melting snow and ice, in the whole of the West Midlands, including Birmingham, as items 66 and 67 on the list. Item 72 on the list identifies further flooding within Birmingham (Kotecha, Thornes and Chapman 2008). What this does indicate is that Birmingham was experiencing higher than normal periods of precipitation again in 2008 which lead to a number of localised flooding events, which were severe enough to be recognised within the LCIP report.

Again, the LCLIP (Kotecha, Thornes and Chapman 2008) report is in line with the Pitt review (2008). Therefore, given this evidence, it is reasonable to suggest that the Birmingham communities of Selly Park and Witton, which were previously flooded in 2007, again experienced higher than normal levels of flooding within the community. This is again in line with the definition of extreme flooding, relative to normal weather patterns, discussed previously (chapter 4.2., p.87).

It should be noted that the LCLIP (Kotecha, Thornes and Chapman 2008) list only goes up until May 2008. However, it is recognised that the summer 2008 floods were as large a scale event as the summer 2007 floods (Birmingham City Council 2010). Further highlighting this point, the Birmingham LCLIP (Kotecha, Thornes and Chapman 2008) categorises the January 2008 flooding as a -5 (extreme event) and the March 2008 flooding as a -4 (severe event).

The Birmingham City Council (2010) produced a flood risk management and response report, in which they specifically name Selly Park as a flood-affected community. There was flooding along the Cecil Road, Kitchener Road, Fashoda Road and Dogpool Lane areas of Selly Park, due to the

River Rea bursting its banks, as the result of extreme precipitation in Birmingham (Birmingham City Council 2008). In addition, there was also further flooding in Selly Park along a route which authorities believe to be the original path of the river, prior to it being modified by development (Birmingham City Council 2010). This provides community specific evidence of extreme rainfall leading to unusually high levels of flooding within Selly Park, which identifies it as an extreme flood-affected community in line with the understanding of extreme flooding used within this investigation (chapter 4.2., p.87). Specific community based evidence for Witton is discussed later under condition 3.

Condition 2: The second condition of the local area acknowledging that an extreme flood has taken places was met because the extreme precipitation and resultant flooding in 2007 is described as being extreme in meeting with the Birmingham Resilience Team. The BRT highlighted Selly Park and Witton as communities which had experienced unusually high levels of flooding in summer 2007. The Birmingham LCLIP (Kotecha, Thornes and Chapman 2008) categorises the June 2007 flooding as a -6 rating, which indicates a catastrophic flooding event, the most severe rating they use. Therefore, the extreme nature of the flooding in Birmingham in summer 2007 is acknowledged as being amongst the most severe ever recorded for the region (Kotecha, Thornes and Chapman 2008). This is further indication of the extreme nature of the precipitation and flooding that was experienced by many Birmingham communities, including Selly Park and Witton. This is also in line with the definition of extreme flooding, relative to normal weather patterns, discussed previously (chapter 4.2., p.87).

The LCLIP (Kotecha, Thornes and Chapman 2008) data was gathered from local newspaper archives, BBC West Midlands and the Birmingham Mail and Post. Interviews were also conducted with Council directorates, external companies and public services (Kotecha, Thornes and Chapman 2008). Additional information was also obtained from numerous public services, including the West Midlands Business Council and the Birmingham Chamber of Commerce (Kotecha, Thornes and Chapman 2008). The summer 2007 flooding was a particular focus of the investigation (Kotecha, Thornes and Chapman 2008). Given that the nature of the investigation was to identify the most extreme weather events, then it is recognised that all these sources and agencies understood that the summer 2007 floods were severe for many Birmingham communities, particularly with the extra focus it was given. The gathering of the media data also

indicates that businesses and the general public were also made aware that the floods they were experiencing within their communities were of an extreme nature.

The Birmingham Post (2008:1) reported that 70 residents from Witton were invited to meet the Lord Mayor of Birmingham and the deputy council leader because they were 'heroes of last summer's extreme flooding'. The terminology used within this report indicates that Birmingham communities were aware that they had experienced an extreme flood. The report states that Witton was 'one of the hardest-hit parts of the city' (Birmingham Post 2008). This meets the second condition of ensuring that community members acknowledged that they had experienced an extreme flood.

Condition 3: The third condition of the community experiencing disruption to their daily lives due to levels of precipitation and flooding was met because the LCIP (Kotecha, Thornes and Chapman 2008) lists an enormous amount of disruptions, both physical and social, within Birmingham during the summer 2007 floods. The LCIP (Kotecha, Thornes and Chapman 2008) notes the following disruptions within Birmingham, listed in Table 6.

Table 6: List of Disruption in Flood-Affected Birmingham Communities (from Kotecha, Thornes and Chapman 2008)

No.	Disruption
1	Several roads affected. A45 and smaller roads shut and Environment Agency stretched. Drivers and homeowners affected by downpour. Drivers caught in traffic jams.
2	Emergency crews stretched to the limit.
3	Public transport affected. Rail commuters stranded as services disrupted or cancelled. Virgin trains not stopping at Birmingham New Street or Birmingham International. Arriva Trains services terminating at Wolverhampton instead. Central Trains suspended services.
4	100 people trapped in factory after River Tame burst. Water rose up to 6 feet deep around plant.
5	200 houses flooded in Aston. 90 people still inside property, preferring to sit it out rather than move.
6	Fire crews on standby with boats.
7	Streets of houses in Witton flooded. Many people still living in temporary accommodation a month later.
8	Many risking health by living with stagnant, insect and rat-infested water in basements in Witton.
9	Residents in Witton claim the Environment Agency failed to raise flood warning and lorries continued to drive up narrow streets creating waves, which added to the chaos.
10	Flood warnings issued for the River Cole from Shard End to Coleshill.
11	Eid Mela postponed due to condition of Cannon Hill Park.
12	Residents receive food goodie bags from various local businesses delivered by the Birmingham Mail.
13	Cadbury's give hundreds of chocolate bars to children.
14	Land Rover donates vehicles in the flooding emergency.
15	Birmingham-based Severn Trent faced £18.2M loss as 140,000 households lost their water supplies.
16	40 ambulance workers honoured for work.
17	200 people evacuated. 60 people left homes in Sparkhill, where 35 people spent night at rest centre.
18	More than 200 sandbags used, sent by Birmingham City Council.
19	Troubled Waters - An Inside Out Floods Special programme made in Birmingham.
20	11 year old boy fell into fast moving water.

This list in table 6 gives an indication of the scale of flooding that took place in Birmingham communities in 2007. Witton is highlighted as being one of the worst affected communities, with multiple issues related to the extreme flooding they experienced (Kotecha, Thornes and Chapman 2008). The LCLIP (Kotecha, Thornes and Chapman 2008) states that the extreme nature of the rainfall caused such extreme flooding that there was not enough time to issue a flood warning to residents. This was then exacerbated as the disruption lead to vehicles causing waves that lead to

even more floodwater entering properties (Kotecha, Thornes and Chapman 2008). Birmingham City Council (2010) support these findings, stating that the flooding in Witton was caused by extreme precipitation, with 3 inches of rain falling in 6 hours. This lead to urban water run-off into the River Tame, which already takes the drainage from across the region, causing flood defences to be exceeded (Birmingham City Council 2010).

Although Selly Park (along with a number of other known flood-affected communities) was not specifically named within the LCLIP (Kotecha, Thornes and Chapman 2008) list, many of the other disruptions listed will have impacted upon this heavy precipitation and flood-affected community. This information was confirmed from information gathered from meeting with the Birmingham Resilience Team. This is in addition to the evidence presented by the Birmingham City Council (2010) in condition 1, which specifically named Selly Park as a flood-affected community.

It was reported that around 300 homes within the Brookvale Road area of Witton were affected by extreme flooding (Dayani 2007). In the first year following the 2007 extreme flood there was £300,000 worth of investment in flood defences in Witton (Birmingham Mail 2008). There were estimated to be around 70 flood-affected properties in Selly Park, the largest flooding event in the area since 1927 (Clayton 2008). This represents a 1 in 100 year flood event for the area, which is often a figure used to represent definitions of 'extreme', with scores in the 1% to 10% percentile for a particular location in a particular reference period (Trenberth et al. (2007). These figures further highlight the context of the extreme nature of the flooding for both communities, and further meets condition 3 of the definition of extreme used by this investigation (chapter 4.2., p.87). The wider figures indicate that there was a total of 8,450 households and 1,453 businesses affected in the West Midlands region (BBC News 2008). Part of the reason for the lack of focus on Birmingham was blamed on the amount of simultaneous extreme floods taking place across many areas of the UK (Birmingham City Council 2010).

From the information gathered and the evidence presented here, maps were able to be produced by the researcher, depicting the extent of the flooding within Selly Park (figure 10) and Witton (figure 11). Areas inside hashed lines represent flood affected areas and the case study areas for data collection. Photographic evidence of extreme flooding in Witton is available from Barry (2007). Photographic evidence of extreme flooding in Selly Park is available from Clayton (2008).

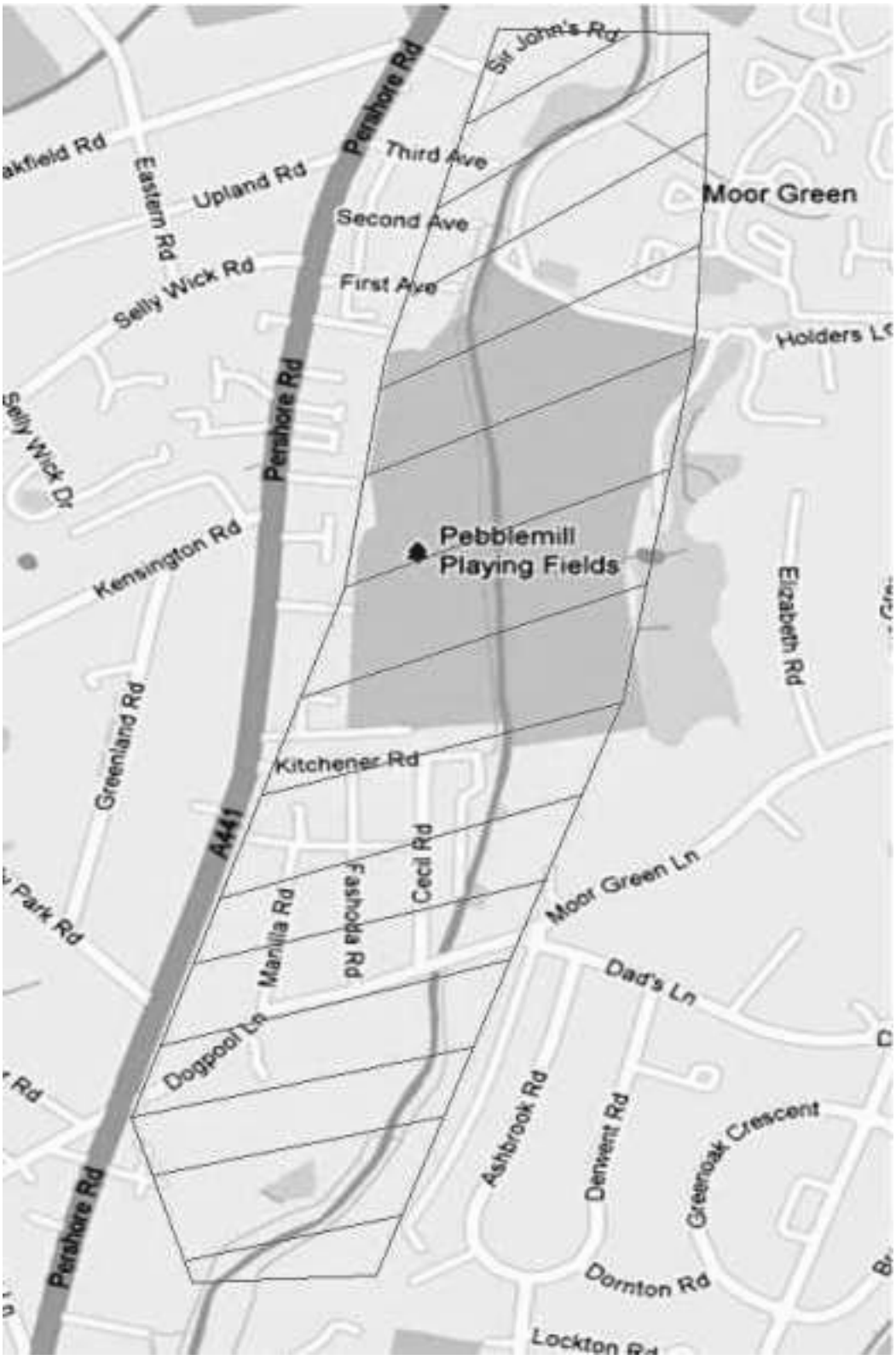

Figure 10: Flood-affected Area of Selly Park
(Also represents case study area for data collection)

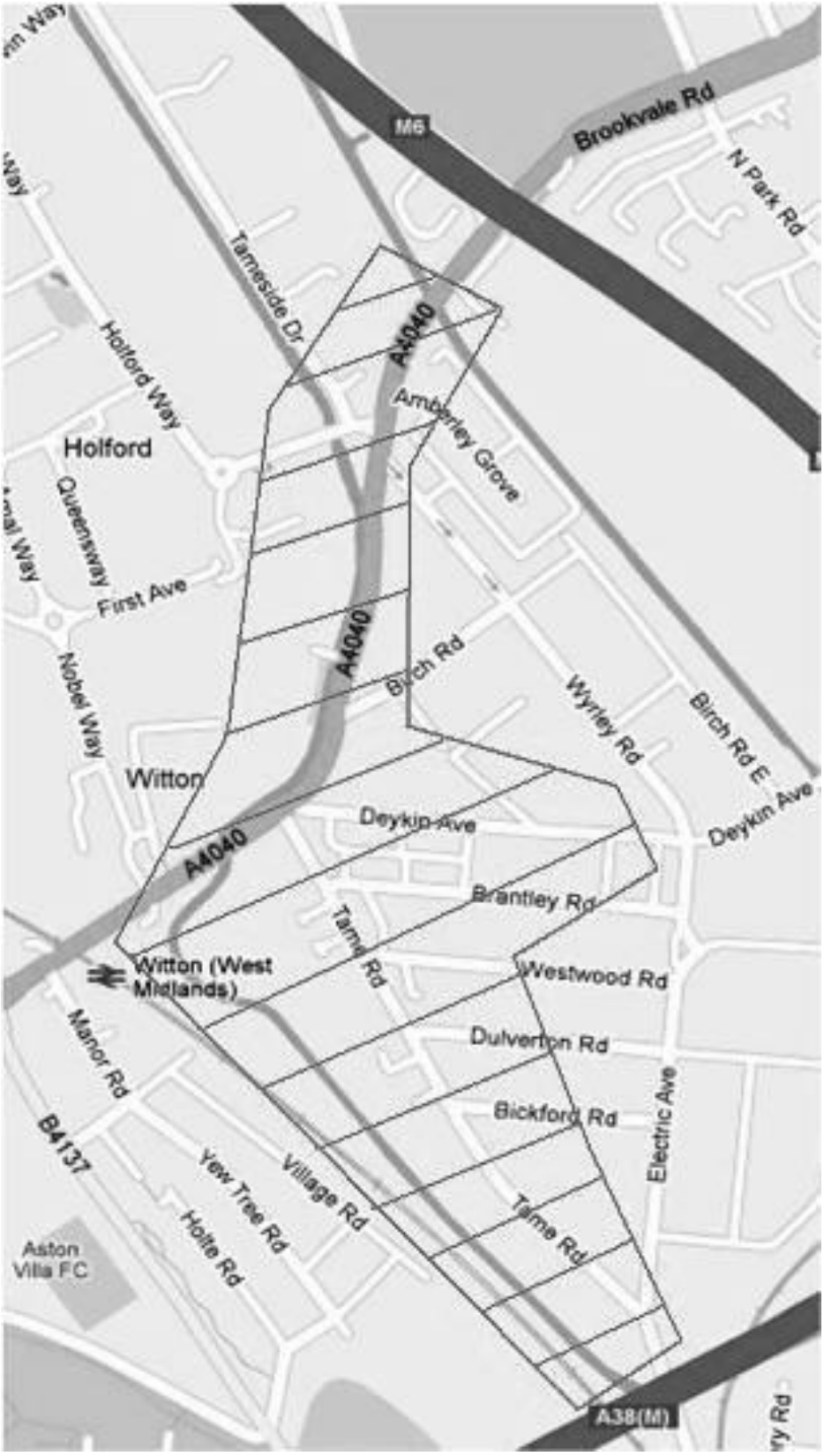

Figure 11: Flood-affected Area of Witton
(Also represents case study area for data collection)

Figures 10 and 11 indicate the extent of the flood waters present within Witton and Selly Park in summer 2007. This also indicates the areas in which the researcher focused on data gathering. The flood-affected areas of both communities are in line with the areas indicated previously on their respective Environment Agency flood maps as containing the potential to flood (figures 8 and 9).

It should be noted that the control group community of Digbeth was not flooded during the summer 2007 floods and has not been known to the BRT to have experienced a recent flooding event within the last 25 years. Figure 12 presents the case study area used for data collection in Digbeth.

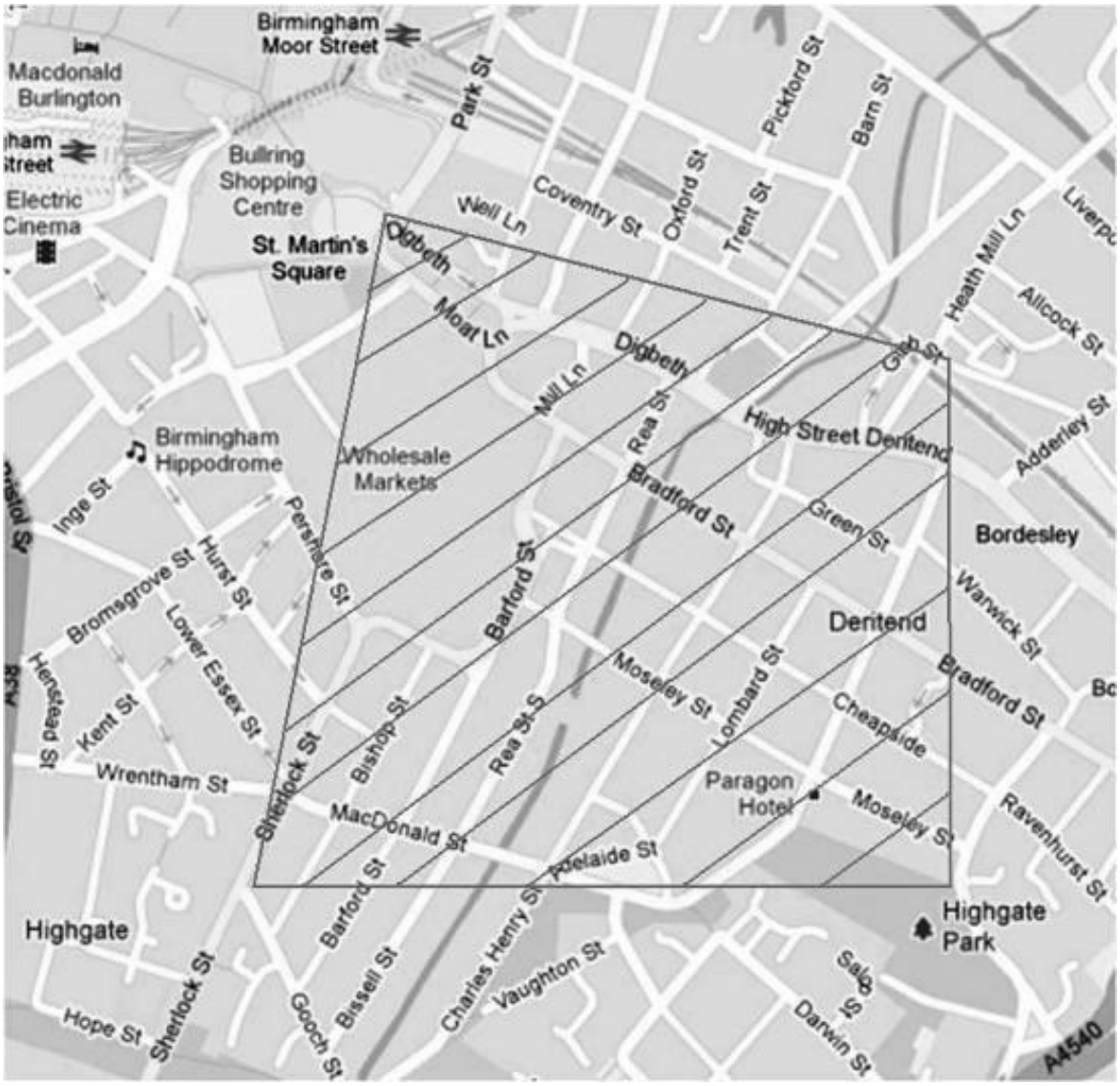

Figure 12: Case Study Area for Data Collection in Digbeth

It is acknowledged that, given the extent of flooding experienced in Birmingham in 2007, some residents and businesses may have been indirectly affected by the flooding. However, this investigation does not consider this to be of an extent where members of the Digbeth community would have considered themselves to have been flooded, particularly as there was no floodwater present within the community. This investigation will now explore the comparison community of Thornton Heath, located within SE London.

4.8. SE London: Research Rationale

The Draft Climate Change Adaptation Strategy published by the GLA identifies flooding as one of the major risks facing London (GLA 2010). The risk of flooding originates from five main sources, these being from 'the sea (tidal flooding), the Thames and its tributaries (fluvial flooding), heavy rainfall overcoming the drainage system (surface water flooding), from the sewers (sewer flooding) and from rising groundwater (groundwater flooding)' (Greater London Authority 2010:36). Furthermore, as nearly 15% of London is built upon flood plains, flooding can occur from a number of sources at the same time (Greater London Authority 2010:36). Although tidal risk is currently rated as being low, largely due to the Thames barrier, there is still a medium risk of river flooding and a high risk of surface water flooding (Greater London Authority 2010:7). London's vulnerability rating to flooding is high due to 'a large number of flood-vulnerable communities and assets at risk. Warning times for fluvial and surface water flooding are short and public awareness and capacity to act are low' (Greater London Authority 2010:8). Therefore, the importance of preparing for extreme flooding is highlighted within the strategy published by the GLA, as well as by the Environment Agency, who produced the London Catchment Abstraction Management Strategy (Environment Agency 2005). The GLA also carried out its own Regional Flood Risk Appraisal which further identifies the need for improving resilience extreme flooding (Greater London Authority 2009). This highlights just how important it is to explore ways to increase London's resilience to extreme flooding.

Moving towards the community level, each London borough is required to produce Strategic Flood Risk Assessments and Local Authorities are charged with producing Surface Water Management Plans (Greater London Authority 2010). Despite these undertakings, the GLA states that there are still a number of gaps in preparing for flooding which still need to be addressed, including better integration between flood risk plans across boroughs, as well as between emergency planners and borough spatial planners (Greater London Authority 2010). Furthermore,

there is a lack of community flood plans in high risk areas and a very low level of individual resilience to flooding within communities in general, including a very low number of people signing up to receive flood warnings (Greater London Authority 2010). This indicates that, while plans are being proposed to address these concerns, there is still a vast improvement needed in order for London to become more resilient to extreme flooding, particularly at the community and individual level.

4.9. SE London: Review of Historical Flooding and Flood Risk

The Draft Climate Change Adaptation Strategy states that 'without the protection afforded by the tidal flood defences, much of London would flood twice a day, every day on each high tide' (Greater London Authoity 2010:37). In 1953 an extreme flood in the Thames estuary and East coast region caused 1200 breaches of flood defences and flood penetration, flooding 24,000 houses, causing 32,000 people to require evacuation and killing over 300 people (Greater London Authority 2010, Tunstall, Johnson and Penning-Roswell 2004). Severe flooding, such as that seen in the 2007 summer floods throughout the UK, is on the increase and a tidal surge within the same area nowadays as the 1953 flood would cause damages of £80-100 billion to homes, businesses and economic activity, affecting 1.25 million people living within the tidal surge area (Parker 2002). These dangers become more important when we consider that peak flows in the Thames tributaries expected to increase by 40% by the end of the century (Greater London Authority 2010:50). In response to extreme flooding, the Thames Barrier was built and has been operational since 1982, closing its gate over 100 times to protect London from flooding (Greater London Authority 2010:38). Figure 13 displays a graph representing these closures due to both tidal and fluvial flooding between 1982/1983 and 2008/2009 (Greater London Authority 2010:38).

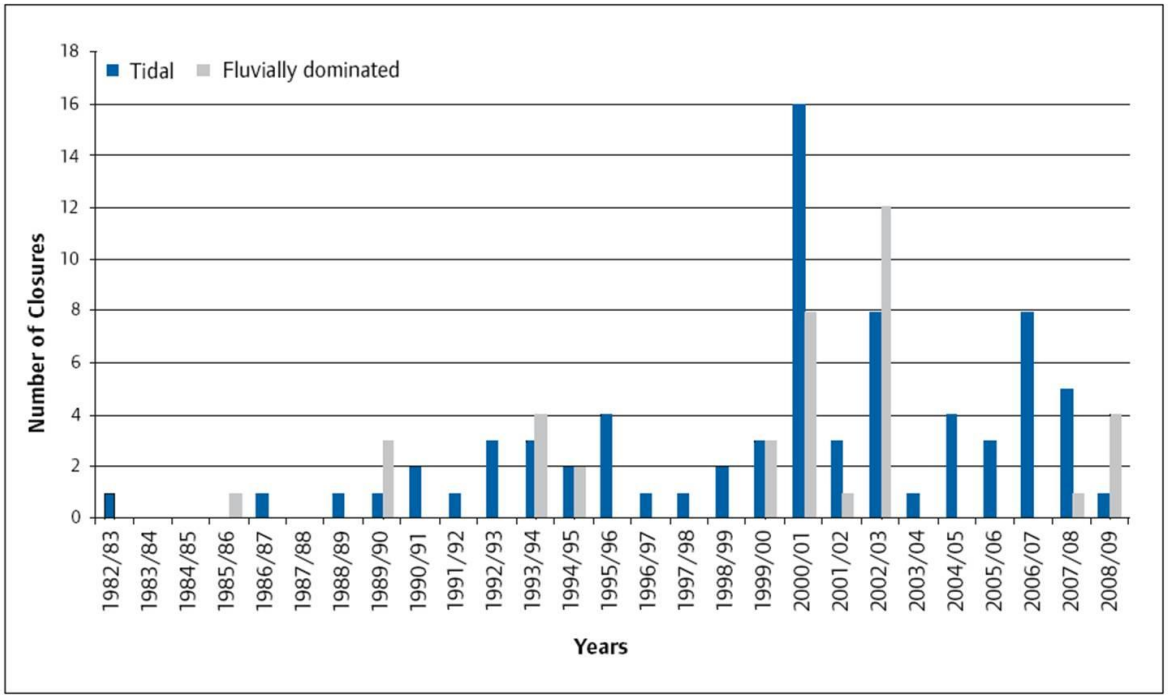

Figure 13: Thames Barrier Closures between 1982/1983 and 2008/2009 (Greater London Authority 2010:38)

The graph in figure 13 shows that the Thames Barrier has increasingly been required to close since it was built. To date, the Thames Barrier has closed a total of 80 times in the 2000's, compared to only 35 times during the 1990's and a mere 4 times during the 1980's (Environment Agency 2010b). The Thames Barrier had to close 5 times in the first week of 2010 alone (Environment Agency 2010b). This indicates that that the risk of flooding is becoming a more frequent problem in London. This is supported by the Environment Agency who state that, in the future, the Thames Barrier will have to be closed more often in order to counter the effects of climate change which would otherwise cause flood defences to be overtopped, with these more frequent closures increasing the risk of the barrier failing (Environment Agency 2010b). In addition, the Thames Barrier has a limited design life to 2030, as well as a limited threshold for the maximum level of flooding it can protect against (Environment Agency 2010b). Therefore, non-physical measures for increasing London's community's resilience to flooding must be found.

By 2016 Greater London is predicted to have a population increase from 7.5 million to 8.1 million, and an increase in household numbers from 3.1 million to 3.6 million and development plans will also create 120,000 new houses and 180,000 new jobs from new businesses (Lonsdale et al. 2008a, Lonsdale et al. 2008b, Parker 2002). This approximated expansion, driven by an ever increasing population, is reflected in all major locations throughout the UK. These planned

expansions provide an example of the dangerous relationship that exists between people, their built environment and flooding. While expansions in particular locations may help to accommodate the increasing population and decrease overcrowding, distinctly a people problem, it also increases a community's vulnerability to flooding, as there is more damage potential contained within smaller and smaller areas.

In London, much of the land is already developed, or protected, forcing planning authorities to build close to, or actually within, tidal flood risk zones (Lonsdale et al. 2008a). The summer floods of 2007 saw widespread flash flooding occur in Southeast England as surface water flooding from urban drainage flows and ditches could not handle the prolonged rainfall, with river flooding occurring a few days later along the Thames and its tributaries (Stuart-Menteth 2007). During these floods, all 19,000 homes that were flooded from rivers were located within a floodplain (Stuart-Menteth 2007). The response to these floods, critiqued by both the Environment Agency (2009b) and the Pitt (2008) review, criticised authorities for building on flood plains. However, this development of floodplains is a common practice to counter the scarcity of suitable land within the UK.

Between 1987 and 2000 the damage potential of businesses within the Thames estuary area has tripled and for households has more than doubled (Penning-Roswell et al. 2002). The far-reaching nature of the modern business environment may also mean that the impact of an extreme flooding event, particularly in London, would have an impact on a global scale (Dawson et al. 2005). As the population continues to grow denser on floodplains across the UK then the vulnerability to extreme events rises and the consequences of such events grow more severe. However, as the Pitt (2008) review highlights; it is not practical or feasible to put a complete stop to all building work along the Thames and within floodplains. The consequences of an extreme flooding event in London though are rated as being high and are set to increase even further as the population increases (Greater London authority 2010).

A baseline assessment of London's communities indicated that public awareness of flood risk is low, people do not know how to prepare for a flood, they do not know how to respond if a flood occurred and the majority of people at risk of flooding do not sign up to receive flood warnings (Greater London Authority 2010:46). This suggests that there is a low level of social responsibility being displayed by people in London. Therefore, research should explore these perceptions of

social responsibility in order to determine the effect that it is having upon community resilience to flooding.

4.10. SE London: Case Study Community

The current investigation has chosen the London Borough of Croydon as a case study area, with Thornton Heath chosen as a specific community in which to conduct this investigation. Croydon is the 4th highest ranked borough out of 4,215 settlement areas with around 21,100 properties predicted to be at risk from surface water flooding (DEFRA 2009). There are a number of water sources within Croydon, in particular tributaries of the River Ravensbourne located in the North East of the borough, such as St James Stream and the Chaffinch Brook (Croydon SFRA 2009). The source of the River Wandle is located in the West, at Waddon Ponds, along with the River Graveney, a tributary of the River Wandle (Croydon SFRA 2009). The Caterham Bourne also flows through the South of Croydon, from the North West, where it joins with the River Wandle (Croydon SFRA 2009). This indicates that Croydon has a number of potential sources of flooding all across the borough.

The risk of fluvial flooding within Croydon largely comes from the River Wandle, River Graveney and the Caterham Bourne, with it being noted that there are very few flood defences present within the borough (Croydon SFRA 2009). Due to the urbanisation of the Croydon area, during periods of heavy rainfall associated with extreme flooding events, the River Ravensbourne and the River Graveney catchment areas become vulnerable to flooding (Croydon SFRA 2009). It is also noted that there are a number of areas within Croydon which are at risk of sewer flooding from the Thames water and there have been a number of incidences of surface water flooding, in particular within the communities of Thornton Heath, Upper Norwood and Broad Green (Croydon SFRA 2009). The majority of flooding within London during the 2007 summer floods was from surface water flooding (Environment Agency 2010a). This makes it one of the most important types of flooding that London must become more resilient to. Thornton Heath contains the water source of Norbury Brook, whose river level is monitored by the Environment Agency who record and report both the current river level (see figure 14) and the river level for the last 48 hours (see figure 15), both of which display the highest recent and highest ever recorded river levels.

Figure 14: Current River Level (in metres) for Norbury Brook in Thornton Heath as of 25/01/2011
(Environment Agency 2011)

These images have been removed

Figure 15: Last 48 Hours River Level for Norbury Book in Thornton Heath as of 25/01/2011
(Environment Agency 2011)

As figures 14 and 15 indicate, in 2007 the community of Thornton Heath was flooded, which is why the highest recent river levels and the highest ever recorded are the same. This highlights the scale of flooding that Thornton Heath experienced was extreme for the community. This flooding also caused disruptions to two of the four rail lines within South Croydon, due to landslips

(Bannerman 2007). This recent experience of flooding in 2007 within the Thornton Heath community will allow direct comparison with the Birmingham communities of Witton and Selly Park. Figure 16 presents the Environment Agency flood map for Thornton Heath. The map is presented at a scale of 1:40,000 and depicts the risk of flooding (dark grey areas) from rivers and sea (black areas).

Figure 16: EA Flood Map of Thornton Heath
(Environment Agency 2012)

It is acknowledged that some of the information regarding appropriate community choices for SE London was provided in formal meetings with the other member of the Community Resilience to Extreme Weather (CREW) project, based upon their knowledge and experience of rainfall and flooding within SE London communities. The CREW project used SE London as its case study area. Again, this type of information gathering for community choice could be considered a limitation of this research. However, as many of the researchers on the project live and work in SE London, including regularly working with households, businesses and policy makers within SE London communities, then this investigation considers them to be a highly valuable and reliable information source. In addition, the CREW project worked closely with the London Climate Change Partnership, the Environment Agency and many other agencies associated with extreme

weather in London when conceptualising, gathering and presenting their research. The CREW project is specifically named within the Croydon Climate Change Adaptation Action Plan as an example of what is being done to tackle the impact of climate change in the borough (Strategic Partnership Croydon 2011). The following section discusses further evidence on how Thornton Heath meets the three conditions of extreme defined by this investigation (chapter 4.2., p.87).

4.11. Thornton Heath: Context of Extreme within the Community

Condition 1: The first condition of using an urban-based community that has experienced a higher than normal period of rainfall which resulted in flooding within the community has been met because Thornton Heath experienced extreme precipitation in 2007. Evidence for this initially comes from the Environment Agency river level gauge at Norbury Brook in Thornton Heath. This gauge indicates that the highest recent and highest ever recorded flood levels of 2.53m are the same flood event, occurring in summer 2007 (Environment Agency 2011). This indicates that the flooding within Thornton Heath in 2007 was the most extreme flooding that has ever been recorded within the community.

The London climate impacts profile indicates that heavy rain was the most frequently occurring weather type, related to 52 of the 145 reported media incidents (Standley et al. 2009). The northern areas of Croydon, specifically Thornton Heath, have been identified as the most susceptible to groundwater flooding, as demonstrated by the summer 2007 floods located there (Wilson 2009). In addition, this was combined with a large amount of sewer flooding in Thornton Heath, due to the long lengths of culverted sewer in the borough (Wilson 2009). Furthermore, Thornton Heath receives greater amounts of water run-off due to the local topography of steep slopes in Coulsdon, Kenley and Upper Norwood, which channel water into the area (Croydon Council 2010). All these elements combined with the heavy precipitation in 2007 to create the highest level of flooding ever experienced in Thornton Heath. Figure 17 shows pluvial flooding hotspots (dark grey areas) in Croydon, centred around Thornton Heath (Croydon Council 2010).

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Figure 17: Pluvial Flood Map of Croydon
(Croydon Council 2010)

Figure 17 clearly shows Thornton Heath contains a pluvial flooding hotspot within Croydon, based upon the flooding records of the summer 2007 floods (Croydon Council 2010). This again demonstrates the extent of the flooding that took place in Thornton Heath, providing evidence in line with the definition of extreme flooding, relative to normal weather patterns, discussed

previously (chapter 4.2., p.87). This meets condition 1, as heavy precipitation and flooding of an extreme nature, relative to the context of the community of Thornton Heath, has been established.

Condition 2: The second condition of the local area acknowledging that an extreme flood has taken places was met because the extreme precipitation and resultant flooding in 2007 is described as being extreme by the extensive amount of literature available. Thornton Heath is noted as having experienced its worst ever flooding in a number of reports, including Croydon Strategic Flood Risk Assessment and the Croydon Surface Water Management Plan (Croydon Council 2010, Wilson 2009). This is in addition to the statistical data provided by the river gauge at Norbury Brook (Environment Agency 2011). Therefore, the extreme nature of the Thornton Heath floods have been recognised at the policy level, which then communicates this information to the rest of the community.

The public and businesses are also directly aware of the extreme nature of the summer 2007 floods, as national and local media reported on the extreme levels of rainfall and its resultant flooding. In Thornton Heath, the local media reported the closure of Thornton Heath train station due to the heavy rain closing all lines (Croydon Guardian 2007). The London climate impacts profile (Standley et al. 2009) found that the media had reduced the amount of stories related to the flooding towards the end of July, because the story had already become widely familiar to the public. Given, that Thornton Heath experienced its highest ever flood level, then this suggests that the community had also become aware that they had experienced extreme flooding for their location, both from personal experienced and media reporting. This represents a significant example of the extent of the flooding experienced in Thornton Heath and indicates that community members understood that extreme flooding had taken place, meeting condition 2.

Condition 3: The third condition of the community experiencing disruption to their daily lives due to levels of precipitation and flooding as met because there is evidence of the disruption, such as the closure of Thornton Heath train station (Croydon Guardian 2007). This is in addition to other local disruptions, such as closed tram links, road lane restrictions due to surface water flooding and a landslide which blocked off the railway lines due to the heavy rain (Drain London 2011). It was reported that there were around 320 directly flood-affected properties in Croydon, in addition to 26 flooded schools (Croydon Council 2010). However, it was noted that the flooding in

Croydon is also likely to have been under-reported due to the media focus upon other areas, with the actual figure of flooded properties likely to be much greater (Croydon Council 2010). It is acknowledged that this lack of information on precise physical impacts could be considered a limitation of the research. However, the evidence presented in this section indicates that Thornton Heath meets all three conditions of the definition of extreme flooding used in this investigation.

From the information gathered as part of the CREW project and the evidence presented here, maps were able to be produced by the researcher, depicting the extent of the flooding within Thornton Heath (figure 18). The area inside the hashed lines represent the flood affected area and the case study area for data collection.

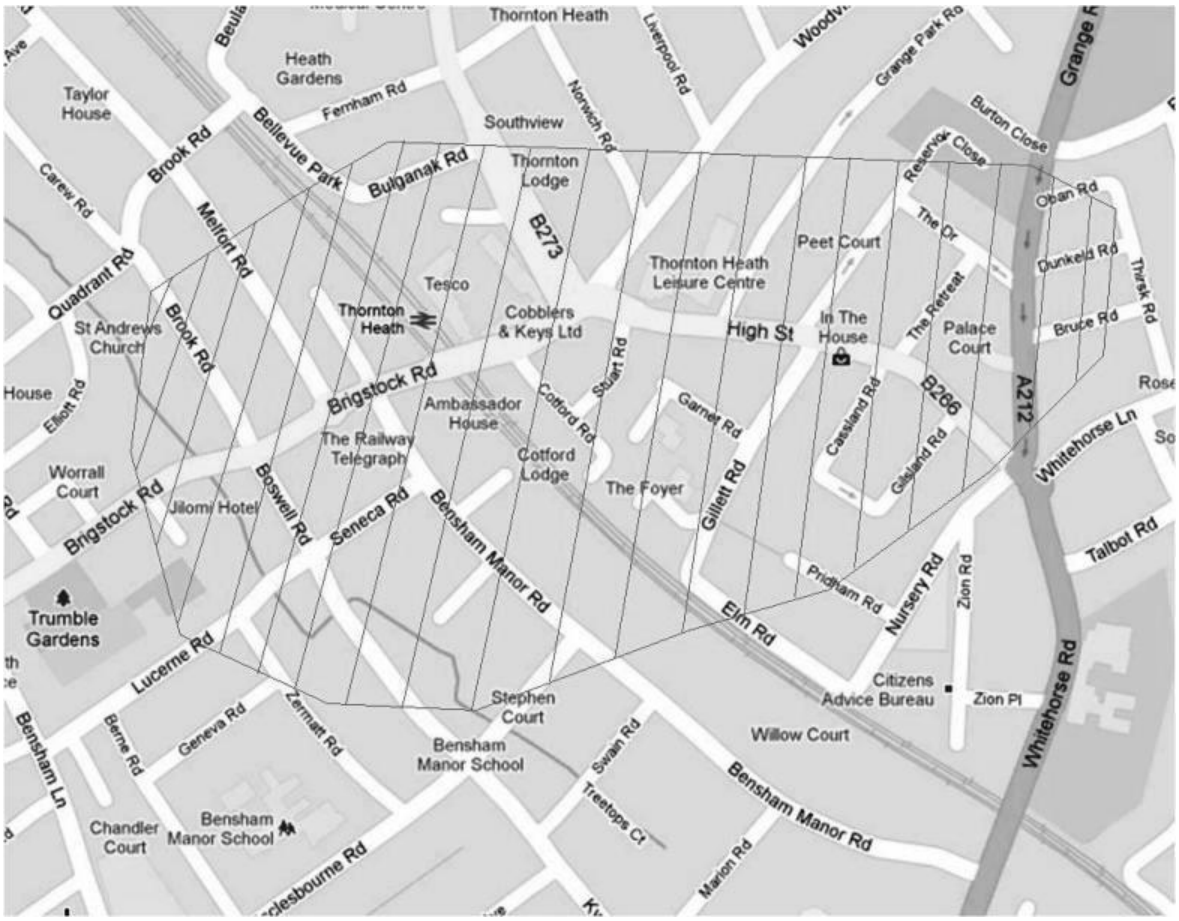

Figure 18: Flood-affected Area of Thornton Heath
(Also represents case study area for data collection)

The flood-affected area of Thornton Heath shown in figure 18 is in line with areas indicated previously on the Environment Agency flood map as containing the potential to flood and the

2007 pluvial flood map (figures 16 and 17). Having established the definition of extreme used within the study, and how the case study communities meet the conditions of this definition, this investigation will now summarise the review of literature and identify key research needs.

4.12. Identified Research Needs

The review of literature highlighted a number of gaps in knowledge and competing arguments where significant contributions to new knowledge can be made. These gaps in knowledge are expressed as 8 key research needs which the current investigation will address, listed here in table 7:

Table 7: Identified Key Research Needs

No.	Research Needs To...
1	gain a better understanding of ways to improve non-technical flood resilience measures, in particular perceptual factors
2	explore the perceptions within UK communities, in order to allow comparison with other countries
3	explore perceptions related to extreme flooding, in order to allow comparison with other extreme weather events
4	further explore perceptions at the community level, as well as comparing perceptions between different communities
5	further explore perceptions within and between the three key community groups of householders, SMEs and policy makers in a number of different communities
6	provide a greater depth of knowledge regarding the effects of social responsibility, which can be used to inform academic research, measures of community resilience and institutional policies and agendas
7	explore factors which may influence perceptions of social responsibility, in particular age, gender, ethnicity and experience of flooding
8	provide common definitions and frameworks so that social responsibility research can be both understood and be comparable across a number of academic disciplines and within institutional policies and agendas

The current investigation will now identify the overall aim and 2 main research objectives which together will address the above research needs, as well as providing further in-depth information to a number of specific areas of research.

4.12.1. Aim

The aim of the research is to explore perceptions of social responsibility, in relation to extreme flooding, within the community.

4.12.2. Objectives

The research had two main objectives designed to meet the overall aim of the investigation. The first objective was to:

1) Establish and empirically investigate a theoretical framework for community level social responsibility research and create and empirically investigate a conceptual model of community group perceptions of social responsibility.

Chapter 3 highlighted that many conceptualisations and definitions of social responsibility exist, with many of these definitions arising from current understanding of CSR. The business-centred focus of existing conceptualisations and definitions limited the application of social responsibility, making CSR frameworks unsuitable for exploration of social responsibility in relation to human behaviour, rather than business practices. Therefore, the current investigation argued that, due to the importance of social responsibility highlighted throughout the previous chapters, a defining framework was needed to aid research which explores social responsibility in relation to vulnerability and resilience issues. Establishing this theoretical framework for social responsibility research in the community was part of the first objective for the current investigation. The current investigation achieved this part of the objective by creating the community social responsibility framework, which presented a new conceptualisation of how research should understand and explore social responsibility within the community (see chapter 3, page 47, figure 5). This new framework is more representative of the interdependencies associated with social responsibility, which evidence from academic research suggest exist within the community, as well as providing a framework for understanding the way in which policies and agendas perceive and attempt to incorporate social responsibility.

Having provided a framework for researching social responsibility in the community, part of the first objective was also to create a conceptual model of perceptions of social responsibility. This conceptual model would indicate the way in which research suggests that perceptions of social responsibility may influence decision making and behaviour, while also accounting for a number of factors which research has highlighted may influence perceptions of social responsibility. The current investigation achieved this part of the objective by building a conceptual model of perceptions of social responsibility which began with a basic perceptual framework (see chapter 2, page 30, figure 3) which was built upon throughout each chapter, incorporating the new evidence within its structure (see updated basic conceptual model in chapter 3, page 54, figure 6). The final conceptual model was presented in chapter 3 (page 75, figure 7).

Both the community social responsibility framework and the conceptual model of perceptions of social responsibility represent new interpretations of existing research which have been brought together by the current investigation from a number of academic disciplines and fields of research. They both address a number of identified research needs, while also providing a platform to explore many of the other research needs. In order to increase the depth of the current investigation, the first objective was also to further explore the validity of the proposed framework for community social responsibility research and the conceptual model of perceptions of social responsibility.

This will be achieved by conducting an empirical investigation of social responsibility that adheres to the recommendations within the community social responsibility framework. This means conducting an exploration of perceptions of social responsibility within each of the key community groups, as well as exploring the perceptions that they hold of each other. The evidence emerging from this research will be discussed in relation to its usefulness in understanding and exploring social responsibility in this manner. This will also be achieved by empirically investigating the validity of the content and proposed interactions within the conceptual model of perceptions of social responsibility. This will be done by exploring the effect that each of the factors which have been highlighted as potentially influencing perceptions of social responsibility (age, gender, ethnicity, experience of flooding) have upon self-rated perceptions of social responsibility within each of the key community groups.

The second objective was to:

2) Explore factors which were considered to be related to perceptions of social responsibility, these being age, gender, ethnicity and experience of flooding.

In addition to providing evidence towards meeting the first objective, exploration of the factors which are considered to influence perceptions of social responsibility have been identified as key areas of research in their own right. The second objective of the current investigation is to explore age, gender, ethnicity and experience of flooding, all in relation to perceptions of social responsibility. This objective will be achieved by investigating whether or not the age, gender or ethnicity of participants is related to self-rated perceptions of social responsibility. It will also be achieved by investigating and comparing perceptions of social responsibility in communities which have experienced recent flooding and those which have not.

In summary, the two objectives of the current investigation will provide new knowledge to a number of areas of research through investigation of the newly created community social responsibility framework and the conceptual model of perceptions of social responsibility. New knowledge will also be created by addressing a number of gaps in existing knowledge which the review of literature highlighted as being key research needs. Furthermore, the methodological approach adopted by the current investigation will also provide new knowledge through the application of research techniques which have not been used before to explore perceptions of social responsibility in relation to extreme flooding events.

5. RESEARCH METHODS

This chapter will provide an explanation of the research methods designed to address the research needs and meet the empirical objectives outlined in the previous chapter. Firstly though, this chapter discusses the initial pilot study used to gather early information to help inform and shape the main study. It is important to understand the pilot study and initial research that took place prior to the main research to avoid confusion, as the research methods for each are different.

5.1. Pilot Study and Initial Research and Analyses

A pilot study was carried out in the Birmingham community of Selly Park in order to investigate perceptions related to flooding within the community, as well as to determine ethnicity distribution within the local area and make contacts within the community in order to facilitate the main research process. A short questionnaire (see appendix 1) identified what participants perceived their level of risk to flooding to be, whether they had actually experienced a flood and then explored interrelationships within the community by asking who they would seek help and advice from in the event of an extreme flood.

The pilot study used an opportunity sample of 58 participants who were attending the Water for Life event at Birmingham Nature Centre. This event took place in Selly Park, one of the chosen communities for this investigation. The participants were split into three groups, based on whether they were at low, average or high risk of flooding. It was the low and high groups that were of particular interest in this study. Of the 43 participants in the low group who stated that they were at a low or very low risk of flooding, 9 had experienced flooding and 34 had not experienced flooding. Of the 9 participants in the high group who stated that they were at a high risk of flooding, 8 had experienced flooding and 1 had not experienced flooding. This suggested that perceptions of flooding may have been influencing the current decision over whether they were at risk of flooding or not. This is because 79% of those who believed they were at low risk of flooding had not experienced a flood and 88% of those who believed they were at high risk of flooding had experienced a flood. Therefore, the effect of experience of flooding upon perceptions was highlighted as requiring further research.

Overall only one third of the participants, 33%, had actually experienced flooding. In the event of a flood, 27.5% of participants would seek help and advice from the council, 23.7% from the

emergency service and 16.2% from the environment agency, with 13.7% being unsure as to whom to go to. The majority of participants, 70.6%, have taken no measures to protect their homes from flood damage. This lack of individual resilience measures suggests a generally low level of social responsibility within the community, with much of the responsibility being passed on to the policy makers community group. This highlighted the importance of further research to explore perceptions of social responsibility.

From the low group, 79% of participants had not experienced flooding. In the event of a flood 20.9% would seek help and advice from the council, 24.1% from the emergency services and 17.7% from the environment agency, with 14.5% unsure whom to go to. The majority of this group, 69.7%, have taken no measures to protect their homes from flood damage. The findings of the low group were in line with the findings of the overall participant group, although this may be biased due to the low group representing the majority of overall participants. Therefore, this group again displayed a low level of social responsibility.

From the high group 88% of participants had actually experienced flooding. In the event of a flood the majority of people, 54.5%, would seek help and advice from the council. Despite experiencing flooding the majority of this group, 55.5%, have taken no measures to protect their homes from flood damage. The findings of the high group are generally not in line with the findings of the overall participant group, although this may be biased due to the high group representing a small percentage of the overall participants. However, it does again indicate a severe lack of social responsibility because, despite perceiving themselves to be at high risk of flooding and the majority of participants having actually experienced a flood, over half of the participants had taken no measure to increase their resilience to flooding. Therefore, this further supports perceptions of social responsibility as being an important research area.

These initial findings were explored further in a role playing session conducted in conjunction with the other members of the CREW project team. During the CREW assembly in July 2009, during the early phase of the research, there was an opportunity for the researcher to facilitate a break out session containing assembly delegates from both the business sector and policy makers within Southeast London. The delegates took part in a short, focused role play session which explored perceptions of social responsibility regarding a hypothetical extreme flooding event. The delegates assumed the roles of householders, SME's or policy makers, presenting a chance for the

researcher to explore gaps and inconsistencies within perceptions of each key community group prior to conducting the main research. Each person portrayed what they believe to be the mindset and behaviour of their assumed community group member would be. Once in their groups, a flooding event was revealed in three stages (see table 8).

Table 8: Three stages of extreme flooding event in role playing session

Stage	Scenario
1	It's Friday lunchtime. A flood warning has been issued that heavy rainfall may lead to serious flooding by around 3am that night.
2	It's 3am. The flood has happened. The ground floor of the homes is flooded to a depth of 50cm (householders). The ground floor of the restaurant is flooded to 50cm depth (SME's). The borough is seriously flooded (policy makers).
3	It's 5 days after the major flood incident. The heavy rain has ended and the flood has gone.

At each stage listed in table 8, the participants were asked to discuss what actions they would take, and what actions they expected the two other groups to take. This explored the perceptions of the behaviour of the key community group they were representing and perceptions of the behaviour of the other two key community groups. Analysis of the findings from this role playing session revealed that householders and SME's perceived policy makers to have the greatest responsibility when a flooding event occurs, expecting them to provide information. However, there were also issues of trust, with many expressing that they do not fully trust the information they are given. Furthermore, similar to the examples discussed previously in the literature review, the expectations of social responsibility worked both ways, with policy makers expressing that they expected householders and SME's to take action for themselves, perceiving them to be largely responsible for their own safety. The policy makers highlighted that toolkits and community plans were not enough to improve resilience and expressed a desire to create step changes in behaviour within the community which increased community resilience to flooding. These findings supported the aims and objectives of this thesis by highlighting the importance of providing a better understanding of perceptions of social responsibility and the ways in which it can affect community resilience.

5.2. Participants

A total of 481 participants took part in the research. The participants were categorised as being either householders, SMEs or policy makers. The householder and SME participants were community specific, but the policy makers were representative of the Birmingham and SE London areas as a whole. The term 'householder' refers to an individual who resides within the case study area. The term 'SME' refers to either the owner, manager or a person of senior standing within a small or medium local business with a staff range of between 5 and 250 employees. The term 'policy maker' refers to an individual who is in a position within the local authority or other organisation that is able to have an influence upon the decision making process, including category 1 responders listed within the local flood resilience plans of each community. It is acknowledged that this definition of policy makers can also include policy implementers, but only if they are able to have a say in the decision making process as well, making the term policy maker the more appropriate term to use in this investigation.

Table 9: Participant Data Overview

Communities		**No. of Participants**
All Communities		481
Witton	Householders	81
	SMEs	23
Selly Park	Householders	94
	SMEs	28
Digbeth	Householders	49
	SMEs	27
Birmingham	Policy Makers	41
Thornton Heath	Householders	89
	SMEs	23
SE London	Policy Makers	26

5.2.1 Birmingham Participants

The Birmingham questionnaire aspect of this study used 343 participants, consisting of 224 householders (94 from Selly Park, 81 from Witton and 49 from Digbeth), 78 SMEs (28 from Selly Park, 23 from Witton and 27 from Digbeth) and 41 policy makers.

The gender distribution of participants was as follows: Witton householders (M=32, F=49), Witton SMEs (M=17, F=6), Selly Park householders (M=38, F=56), Selly Park SMEs (M=18, F=10), Digbeth householders (M=33, F=16), Digbeth SMEs (M=22, F=5) and policy makers (M=30, F=11). This indicates that the generalisability of the results is not limited by gender as there is near equal representation throughout.

Table 10: Gender Distribution for Birmingham

Communities		Gender	
		Male	Female
Witton	Householders	32	49
	SMEs	17	6
Selly Park	Householders	38	56
	SMEs	18	10
Digbeth	Householders	33	16
	SMEs	22	5
Birmingham	Policy Makers	30	11

The distribution of ethnicity amongst the participants was 275 White (80.1%), 48 Asian (14%), 9 Black (2.6%), 4 Chinese (1.2%), 2 Mixed:White/Asian (0.6%) and 5 Other Ethnicity (1.5%). This indicates that the generalisability of the results may be limited to a White British population. However, if these communities are representative of the ethnic distribution of communities within the UK, then the results will be more widely applicable. The participants are largely representative of Birmingham as a whole, with 2001 UK Census indicating that 70.4% of the population was White, 19.5% British Asian, 6.1% Black or Black British, 0.52% Chinese, 2.9% of mixed race and 0.63% of other ethnic heritage (ONS 2001). Furthermore, there are sufficient numbers of both White British and Asian ethnic groups in order to compare the results of each.

Table 11: Ethnicity Distribution for Birmingham

Location	White	Black	Asian	Chinese	White/ Asian	Other
Birmingham	275	9	48	4	2	5

The Birmingham cognitive mapping aspect of this study used 112 participants who had already completed the questionnaire phase. These participants consisted of 51 householders (11 from

Witton, 14 from Selly Park and 26 from Digbeth), 29 SMEs (5 from Witton, 6 from Selly Park and 18 from Digbeth) and 32 policy makers.

5.2.2. SE London Participants

The SE London questionnaire aspect of this study used 138 participants from Thornton Heath, consisting of 89 householders, 23 SMEs and 26 policy makers.

The gender distribution of participants (M = Male, F = Female) was as follows: Householders (M = 61, F = 28), SMEs (M = 19, F = 4) and policy makers (M = 15, F = 11). This indicates that the generalisability of the results may be slightly more representative for males in the householder and SME groups, but is not limited by gender in the policy maker group as there is near equal representation.

Table 12: Gender Distribution for SE London

Communities		**Gender**	
		Male	**Female**
Thornton Heath	Householders	61	28
	SMEs	19	4
SE London	Policy Makers	15	11

The distribution of ethnicity amongst the participants was 83 White (80.1%), 24 Black (14%), 23 Asian (2.6%), 1 Chinese (1.2%), 4 Mixed:White/Black (0.6%) and 3 Other Ethnicity (1.5%). This indicates that the overall generalisability of the results may be limited to a White population, but the Black and Asian ethnic groups contain sufficient percentages to conduct further analysis. Again, as with Birmingham, if these communities are representative of the ethnic distribution of similar communities within the UK, then the results will be more widely applicable.

Table 13: Ethnicity Distribution for SE London

Location	**White**	**Black**	**Asian**	**Chinese**	**White/ Black**	**Other**
SE London	83	24	23	1	4	3

The SE London cognitive mapping aspect of this study used 62 participants who had already completed the questionnaire phase. These participants consisted of 29 householders, 12 SMEs and 21 policy makers.

5.3. Research Design

The same design and materials were used in both the Birmingham and London research areas in order to allow direct comparisons to be drawn between the results from the two areas. The methods used for data collection are defined as a quasi-experiment because the researcher has attempted to control extraneous variables, in line with the characteristics of a true experiment, but these variables are mainly the intrinsic properties of the participants themselves, in line with the characteristics of correlational research. Therefore, the majority of the data was collected as part of correlational research because age, gender, ethnicity and perceptions of social responsibility are all intrinsic properties of the participants. The statistical control used to refine the correlational approach and act as a substitute for experimental control comes from assigning participants to one of three community groups and only drawing participants from different communities within the same geographic area. This limits the most amount of confounding variables as possible, as the participants share many characteristics, such as geographic area, community resources, local businesses and authorities. As participants come from the same community areas then there are partial controls over socio-economic status and education level within each community group, as the participants live in the same housing areas and share the same local schools.

5.4. Research Methods: Overview and Justification

The philosophical framework within which this investigation is situated is based upon the understanding that communities are more vulnerable to EWE's and that our perceptions can affect our decision making and behaviour, in relation to EWE's. These understandings have arisen from the empirical research discussed throughout the literature review. Although the understanding of the way in which perceptions can affect behaviour is a general understanding, this too was supported with empirical evidence, as discussed throughout chapter 3. There is often an overlap within the epistemology of investigations, as every analysis of a case rests, explicitly or implicitly, on some general laws, and every general law supposes that the investigation of particular cases would show that law at work (Flick 2009, Becker 1996).

The current investigation is also empirical in nature, adopting the epistemological standpoint that statistics and interviews can generate knowledge. This investigation is based on exploring a specific type of EWE, and determining how it relates back to other type-specific empirical findings and the more general findings of EWE's as a whole. The research is concerned with interactions,

the way some variables (age, gender and ethnicity) may condition the relations between other variables (perception of social responsibility), attempting to understand the complex picture of the circumstances attending someone's participation in resilient behaviour. The point is not to prove, beyond doubt, the existence of particular relationships, but to describe a system of relationships between these variables, to show how these aspects may mutually influence or support each other. The ontological standpoint is that this new knowledge can be made more objective by basing it upon previous research, but employing measures to ensure the information gained is generalisable. The ontological standpoint of this research also believes that perceptions exist, which can influence decision making and eventually behaviour. In addition, further factors exist which can influence perceptions. These aspects can be studied and the relationships between these concepts explored.

I used a mixed methodological approach, as the key aim of exploring perceptions does not lend itself readily to either an exclusively nomothetic or ideographic approach (it is also possible for these two approaches to complement each other). In addition, it is also desirable to attempt to replicate some of the findings of previous research, particularly given that this is of a multi-disciplinary nature, in order to support or refute the strength and accuracy of these previous findings. The mixed methods used in this investigation consisted of two main research methods, these being analysis of questionnaire responses and cognitive mapping analysis of qualitative transcripts.

Therefore, the questionnaires provided quantitative data regarding perceptions of social responsibility and the cognitive mapping analysis provided qualitative data. This design allowed the questionnaire responses to provide an overview of perceptions of social responsibility within and between community groups and the responses to the semi-structured long answer questions provided more specific details about the relationships between community groups and place the broader perceptions in context. The cognitive mapping analysis highlighted and further explored the relationships between key aspects related to social responsibility. Description and justification regarding the specifics of each research method will now be explored. The strengths, weaknesses and limitations of each method are also discussed.

5.5. Questionnaires

The study used participant information sheets and consent forms for the questionnaires (see appendix 2) and interviews (see appendix 3) to provide details about why the research was being conducted, what was expected of the participants, provide contact details of the researchers and inform participants of their rights regarding participation and data use.

5.5.1. Self-Assessment Questionnaire: Definition and Justification

The self-assessment questionnaire is a commonly used tool of research, consisting of a set of questions with a choice of answers, devised for the purposes of a survey or statistical study (Coolican 2009). This investigation study used four versions of a Perceptions of Social Responsibility Questionnaire, one containing questions about the self (see appendix 4), one relating to householders (see appendix 5), one to SMEs (see appendix 6) and one to policy makers (see appendix 7). These questionnaires are based upon a modified version of Berkowitz and Lutterman's (1968) Social Responsibility Scale (see appendix 8) which has provided a valid and reliable basis for researching social responsibility since its creation. Modified versions of the original questionnaire-style scale have been used in research informing social responsibility scales (Reed et al. 2005), exploring ethics and social responsibility in relation to grocery shopping (Megicks, Memery and Williams 2005), testing attitudes in relation to social involvement models (Frieden and Downs 1986) and exploring psychosocial factors that influence volunteer work (Chacon et al. 1998).

One of the main reasons that Berkowitz and Lutterman's (1968) Social Responsibility Scale was chosen as a basis for the current investigation questionnaires was because it was attitudinal in nature. This is important because it is believed that a community's vulnerability to natural hazards can often be measured by the attitudes of its members (King and MacGregor 2000). The main function of a scale is to discover an individual's attitude in relation to the particular topic being researched (King and MacGregor 2000). Therefore, basing the questionnaires upon an existing validated attitudinal scale designed to explore social responsibility was deemed to be the most appropriate and beneficial way to explore the current investigation topics. Furthermore, it is noted that attitudinal scales allow comparison of attitude scores within and between individuals and communities. This characteristic of the attitudinal scale also meets all the aims and requirements of the current investigation.

In the same way that Berkowitz and Lutterman (1968) described participation of individuals in society as leading to greater adoption of that society's attitudes and values, so too can it be reasonably expected that a householders, SME manager's or policy maker's role within a community be likely to lead to adoption of community norms. This is achieved through both laws and social rewards for meeting the expectations of those roles within the community; however it is unknown exactly what perceptions and behaviours these expectations create within the mindset of each community group for any given aspect of the community, for example during an extreme flood within the community. The original Social Responsibility Scale measured an individual's acceptance of the traditional values of their society. The aims of this project though are to reflect the perceptions of a community group in relation to a particular aspect and as such the original questionnaire was extended and the attitudinal statements were modified to meet the aims of the research (see table 14 for a comparison of original and modified self-rated perception statements).

Table 14: Comparison of original and modified statements for social responsibility questionnaires

No.	Original Statements	Modified Statements (self)
1	It is no use worrying about current events or public affairs; I can't do anything about them anyway.	It is no use worrying about extreme flooding within the community as I can't do anything about it anyway.
2	Every person should give some of his time for the good of his town or country.	Every person should give some of their time for the good of their local community.
3	Our country would be a lot better off if we didn't have so many elections and people didn't have to vote so often.	Our country would be a lot better off if we didn't have so many rules.
4	Letting your friends down is not so bad because you can't do good all the time for everybody.	Letting your neighbours down is not so bad because you can't do good all the time for everybody.
5	It is the duty of each person to do his job the very best he can.	It is the duty of each member of a community to do the very best they can to increase their protection against extreme floods.
6	People would be a lot better off if they could live far away from other people and never have to do anything for them.	People would be a lot better off if they could live far away from other people and have less interaction with each other.
7	At school I usually volunteered for special projects.	I would like to take part in a community volunteering project.
8	I feel very bad when I have failed to finish a job I promised I would do.	I feel very bad when I have failed to finish a job I promised I would do.
9	-	I feel it is important to always tell the truth to others.
10	-	I feel it is important to get on well with your neighbours.
11	-	I do not feel that climate change is an important issue that will affect me.
12	-	I feel that it is important that people should always obey the law.

All four versions of the modified Social Responsibility Questionnaires used 12 modified attitudinal statements, with the terminology regarding the 'self' in the self-rated perception questionnaire being directed towards householders, SMEs or policy makers in their respective questionnaires. The statements were scored using a 4 point Likert (1932) scale ranging from Strongly Agree (4) to Strongly Disagree (1), with a number of statements being reverse scored to counter acquiescence (see appendix 9 for the scoring matrix used). This gave each questionnaire a potential score range of between 12 (representing very low social responsibility) and 48 (representing very high social responsibility). These attitudinal questions provide information about how each community group views their own social responsibility and how socially responsible they perceive the other two community groups to be. Please note that because the questions are attitudinal, then simply

examining the scores of individual questions could display too much bias, or not tell us very much when analysed individually. The original questionnaire aggregated the scores and therefore the social responsibility questionnaire used by the current investigation also adopts this format.

5.5.2. Explanation and Justification of Scale Response Format

It is also appropriate to provide reasons for the chosen format of the Likert (1932) scale used within the current investigation. Decades of research has failed to determine the optimal number of response categories for Likert rating scales (Preston and Colman 2000). What was concluded by a number of early researchers though is that the number of scales may be content specific and related to the measurement conditions (Friedman, Wilamowsky and Friedman 1981, Cox 1980, Wildt and Mazis 1978). This is still a view supported by modern researchers (Weisberg 2005). This indicates that the number of items used on a Likert (1932) scale is a decision that must be made by the researcher, based on the subject matter under investigation and type of questions used.

The current investigation decided to adopt a 4 point Likert (1932) scale for a number of reasons. Firstly, because the 4 point scale is an ipsative measure, it is able to overcome the problem of social desirability. This is because participants cannot simply hide behind a neutral response in order to disguise their true feelings and attempt to produce responses that are pleasing for the researcher or in line with social norms (Garland, 1991). Secondly, a scale with an equal number of positive and negative statements can overcome the problem of acquiescence bias. This is because when the questions consist of both positive and negative attitudes, then the positive acquiescence responses would be countered, or balanced, by the negative ones (Weisberg 2005). Thirdly, obviously having no central point also removes the problem of central tendency bias. The removal of the central choice is further supported by research which found that the use of the mid-point category decreases as the total number of responses increases (Matell and Jacoby 1972). Therefore, it was concluded that the mid-point category should only be used in scales with a high number of total responses and be removed for those with fewer total responses (Matell and Jacoby 1972).

Given that the scale used by the current investigation has a low number of total responses then this research suggests it is reasonable to remove the mid-point category. This view is also supported by researchers who have stated that the inclusion of a middle category often makes participants less discriminating in their responses, and its removal makes participants more

thoughtful and leads to more precise responses (Busch 1993, Garland 1991, Reid 1990). Therefore, the engagement with and accuracy of the scale used by the current investigation may be improved through the use of a 4 point scale. Further support for the use of the 4 point scale can also be found when we consider that the questionnaires will be distributed to participants from a wide range of ethnic groups. Research has also found that a mid-point category can lead to its overuse, particularly by participants from ethnic groups where indirect responses are valued within their culture (Busch 1993).

The questionnaires will also be distributed to a wide age range of participants. Research has indicated that the use of a mid-point category is related to age, with younger participants being more likely to complete the questionnaire if there are fewer responses (Bourke and Frampton 1992). This suggests that a 4 point scale would be appropriate because it is a shorter number of possible responses, which means that the questionnaires are more accessible to younger participants who feel more comfortable with fewer responses. This reduces the possibility of only getting responses from older participants, which would bias the data set and limit the generalisability of the results to older age groups. In summary, previous research has identified a number of reasons why it would be appropriate to adopt the 4 point Likert (1932) scale format for the questionnaires within the current investigation.

5.5.3. Strengths and Weaknesses of Questionnaires

This section details the main strengths and weaknesses of questionnaires, in relation to the current investigation. It gives details on how the strengths are enhanced and what steps have been taken to limit the weaknesses.

The main strengths of using questionnaires in this study are that they are good for measuring attitudes and they allow large amount of data can be gathered in an inexpensive manner. They can provide information about an individual's inner opinions, meanings and perceptions. The questionnaires are also able to be distributed and collected in a number of ways, both manually and electronically. The questionnaires also provide common basis for interpreting the findings, as all participants are answering the same questions. Anonymity is also able to be provided through the use of questionnaires, an important aspect of increasing honesty within the responses. The close-ended questions can provide specific, detailed information for the researcher to meet the specific aims of the project, which is then directly comparable to the same questions answered by

other participants. The data is readily available for ease of analysis and questionnaires are useful for exploration, as well as confirmation.

Questionnaires also have a number of weaknesses that have to be considered. Firstly, the questionnaires have to be kept short in order to increase response rates, especially in the current study where three questionnaires are administered together. The researcher accounted for this weakness by ensuring that the quality of the information gathered was as high as it could be in the space allowed. Secondly, another weakness is that participants may only answer in a socially desirable manner. This weakness was accounted for by ensuring that anonymity for all participants was maintained throughout the entire data collection process. Social desirability was also accounted for through the use of a 4 point Likert (1932) scale. Thirdly, participants may choose to be selective about which questions they answer and may not complete the full questionnaire. The researcher accounted for this weakness by distributing a large number of questionnaires in order to get a high enough response rate that partially completed questionnaires were able to be left out of the analysis, without greatly limiting the overall amount of data available for the final analysis. These measures also accounted for the perceived weakness of potentially low response rates.

A fourth perceived weakness of questionnaires is that participants may lack self-awareness when completing them, i.e. they may not have sufficient knowledge or understanding of themselves in order to complete the questionnaires. This has been limited because the questions are attitudinal, rather than knowledge based, and they are exploring individual perceptions at the time, with a response scale format which encourages deeper thought regarding each question. In addition, the questionnaire data will be used in conjunction with a qualitative method which is able to explore hidden meanings, further overcoming this weakness. The main strengths and weaknesses of the questionnaires used in this investigation are summarised in table 15.

Table 15: Questionnaire Strengths and Weaknesses

Perceptions of Social Responsibility Questionnaire	
Strengths	**Weaknesses**
Questionnaire is based upon a validated and reliable scale for researching social responsibility (Berkowitz and Lutterman's (1968) social responsibility Scale)	Questionnaires have to be kept short, in order to increase response rate
Questionnaire is adaptable, as modified versions of the original scale have been used in similar social responsibility research	Cannot completely remove all social desirability (response format and anonymity limit this though)
Questionnaire is attitudinal in nature, meeting the aims of the research	Participants may not complete all questions (countered by ensuring large amounts of questionnaires distributed)
The chosen scale limits social desirability as participants can't hide behind neutral responses	Does not provide qualitative 'why' information for explaining the results (in this investigation used in conjunction with a qualitative method)
The chosen scale limits acquiescence bias	Open-ended questions and probing unavailable (in this investigation used in conjunction with a qualitative method)
The chosen scale overcomes central tendency bias	Participants may lack self-awareness when responding i.e. they may not know the answer (limited because questions are attitudinal, rather than knowledge based and in this investigation used in conjunction with a qualitative method which explores hidden meanings)
Questionnaire allows a large amount of data to be gathered in an inexpensive format	
Questionnaire is easily distributed and collected	
Questionnaire provides a common basis for the research, with the results being directly comparable with each other	

5.6. Cognitive Mapping Analysis

In order to provide a context for the perceptions of social responsibility highlighted by the questionnaires, cognitive mapping analysis was carried out on qualitative data transcripts. The information for the cognitive mapping analysis transcripts were gathered in two ways. The majority of the transcripts were gained by including semi-structured, long answer questions in with the questionnaires (see appendix 10). The long answer questions were designed to expand upon the topics covered in the questionnaires, allowing explanation and reasoning to be

discovered. This method of gaining information from the transcripts allows anonymity to remain intact even from the researcher, increasing the honesty and validity of the information.

Participants also had the option of taking part in an interview based around the same set of semi-structured questions. This method of gaining information allows additional questioning to take place and is a common method used to explore perception of risk (Hawkes and Rowe 2008). The long answer questions within the questionnaire packs originally being included for those participants who were not willing or not able to take part in a face-to-face, email or telephone interview, but proved to be by far the most popular method chosen by the respondents. Two participants chose to take part in face-to-face interviews, one chose to take part in a telephone interview and one chose to take part in an interview via email. The rest of the 170 participants who provided transcripts for the cognitive mapping analysis responded by completing the long answer questions. All the transcripts were pooled together and analysed using cognitive mapping.

5.6.1. Cognitive Mapping: Definition and Justification

Lasut (2005) states that individuals store their own perception of reality within metal maps (also known as mental models). It is possible to access these cognitive mental maps by following a number of steps, known as cognitive mapping. The stored cognitive perceptions can be decoded, analysed and structured under explanatory headings, and then represented in visual maps.

The following step-by-step guide to cognitive mapping, as understood and conducted within this thesis, has been compiled based upon commonly understood cognitive mapping procedures, particularly the often-cited implementation of cognitive mapping advice given by Ackermann, Eden and Cropper (1992), regarded as the tutorial basis for the current cognitive mapping technique. Ackermann, Eden and Cropper (1992) provide advice in the form of guidelines, each supported by an example, in addition to highlighting common errors to be avoided.

Cognitive mapping is conducted in a number of steps, listed here in table 16.

Table 16: Steps for Conducting Cognitive Mapping Analysis

Step	Details
1	Transcribe your interview data into written format
2	Read through all data, noting down initial thoughts or potential indicators of common elements
3	Go through all data again, this time carefully highlighting words, phrases or meanings under different headings - this stage is known as identifying codes - which can be literal meanings (such as identifying a specific ethnicity) or point to hidden themes (such as implying ethnic-based differences)
4	Once these codes have been found and the headings produced, go through all the data again to confirm and find further codes, altering your initial headings and codes if necessary
5	It is also important to note whether there are any patterns within the data which are only present, or only emerge from, one sub-set of participants (for example only from householders, or only from participants who had experienced a flood)
6	Under each heading, the codes are brought together visually in a map to try and understand their narrative, i.e. explain why they belong under a particular heading and what the codes say or imply when brought together (note: some codes may be indicative of more than one theme - highlighting how issues are often interlinked)
7	You will have discovered a number of themes. Some of these themes may be related to the same wider issues and can then be categorised in this manner
8	The themes are representative of how an individual or group views the subject matter upon which the initial interviews were based
9	These are often displayed in map form

In this research, cognitive mapping was used as a tool to record and interpret information in the form of transcripts, achieved by recording phrases (known as codes) used by the participants under particular headings. During the cognitive mapping analysis process, these headings become concepts which are presented in a visual format, displaying their relevant connections and interactions and revealing patterns of reasoning (Eden and Ackermann 1998). These concepts are

called themes and related themes are grouped together into categories of themes. Therefore, this investigation followed the correct procedural method for conducting cognitive mapping analysis.

Previous research has utilised cognitive mapping to explore perceptions and decision making processes at both a micro level for individual problem solving (Eden 1991) and at a macro level for corporate strategy development (Eden and Ackermann 1998). For example, in group situations, stakeholders and decision-makers are encouraged to make explicit their own perceptions, which allows the group to reach a shared understanding of the problem or situation and to take common decisions. Cognitive maps are a widely used, validated research tool for exploring representations of knowledge of particular subjects, problem solving, decision making and representing attitudes (González, Morón and Novak 2001). Previous research has used cognitive maps in this way for document analysis as it allows identification of key issues, checking for possible loops, exploration of structure and testing of coherency (Cropper, Eden and Ackermann 1990). Cognitive mapping has also previously been used to investigate issues related to risk (Harris, Daniels and Briner 2002).

Lasut (2005) used cognitive mapping techniques to create NetSyMod (Network Analysis - Creative System Modelling), a tool designed to support decision making processes, created with the aid of stakeholders and experts. This highlights similarities to the current investigation, where the perceptions of key community stakeholders are important for the aims of the research, further justifying cognitive mapping as an appropriate research method. The validity, reliability and justification of cognitive mapping is also supported by its successful use in investigating sustainability in tourism, where the focus was on environmental, economic and socio-cultural aspects (Copland, Garnham and Cavana 2004). In addition, cognitive mapping has also been useful for exploring other water-based research, where it was used to propose a Water Community Decision Support System (WCDSS) which aimed to involved community members in water-management (Giordano et al. 2004).

Özesmi (1999) successfully applied cognitive mapping to understand perceptions of conservation strategies between villagers, vacation home-owners, NGO officials and Government officials, comparing cognitive maps between the different groups. This is directly comparable to, and further justifies, the use of cognitive mapping in this investigation, where the cognitive maps of householders, SMEs and policy makers will be compared. The success achieved by cognitive

mapping for Özesmi (1999) was so great that the technique was repeated for future studies exploring different conservation areas (Özesmi & Özesmi, 2003), the benefits of which were later explained in a manual (Özesmi & Özesmi, 2004).

Therefore, cognitive mapping is an appropriate technique for this investigation, based upon its validity, reliability and successful use in similar studies. However, its strengths and weaknesses must also be further understood.

5.6.2. Strengths and Weaknesses of Cognitive Mapping

Cognitive mapping produces a representation of how an individual views a particular problem topic, in this instance their own or others social responsibility. It is also able to note opposite poles of information to help explain the meaning of particular concepts and aid identification of possible options and outcomes within pairs of concepts, highlighting conflicts between different individuals (Eden and Ackermann 1998). Furthermore, the grouping of cognitive maps also allows individuals to see where their view stands in relation to others, increasing deeper understanding of the topic and highlighting gaps or potential alternatives to existing measures (Eden and Ackermann 1998). For example, cognitive maps of the resilience of individual community groups could be merged to create a collective map of community resilience. These qualities make it a useful tool for exploring perceptions of social responsibility both within individual community groups and between community groups. This represents a significant contribution to new knowledge as cognitive mapping has not been applied to the social responsibility research area before in this manner.

Qualitative approaches in general are considered to be complex and nuanced (Holloway and Todres 2003). However, Ryan and Bernard (2000) state that various forms of thematic coding can be found within all the major analytic traditions. When considering the strengths and weaknesses of cognitive mapping analysis, the researcher must understand the conventions upon which the technique is based. Cognitive mapping could be considered to be a more advanced version of thematic analysis, as it follows the conventions of this and similar techniques, such as template analysis where a list of codes form the template for a number of themes (King 2004). It's important to maintain the bigger picture when dividing the codes into different themes. The researcher achieved this by identifying within each theme where the narrative was associated with related themes. This method is supported by Dey (1993) who states that the codes must be

meaningful to their original theme, but also retain their meaning when considered in relation to other themes. It is important then to further clarify how themes are formed.

During cognitive mapping analysis the researcher captures important aspects of the data within themes, having familiarised themselves completely with the depth and breadth of the content of the data. The themes are based upon analysis of transcripts from which codes are identified. The themes revealed are not always distinct elements from each other, as codes can often overlap multiple themes on pathways to a number of separate endings or conclusions within the narrative. These codes represent a continuous or related narrative present within the transcripts which can often identify itself as a patterned response within or across a number of transcripts. Themes are the meaning of the codes within the data set. The identification process for codes is often based upon their prevalence or repetition within the data set, as well as the strength of the meaning that they convey.

The success in identifying codes and organising themes is also largely based upon the interpretative and analytical skills of the researcher. This is because there is no definition of what a code must look like or how often it must be present within a data set in order to be considered to be representative of a theme. Therefore, one of the major strengths of cognitive mapping analysis is the flexibility that the researcher has in its application. It is recognised though that the reliance upon the analytical skills of the researcher could be considered to be an inherent weakness within cognitive mapping analysis and other similar interpretative-based techniques. However, with respect to the current investigation, the researcher has seven years experience of successfully employing a wide range of qualitative research methods, including specialisations in thematic analysis and cognitive mapping analysis. Therefore, the skills and experience of the researcher greatly reduce this potential weakness within the methods.

A related aspect which could also be considered to be a weakness of the cognitive mapping approach is the effect of context upon the information gathered, that is its subjectivity. The judgement of similarities may be influenced by contextual variables, meaning that different cognitive maps may be formed in different situations. The researcher has attempted to address this weakness by ensuring that only one researcher conducts the cognitive mapping analysis. This means that all the information in the entire data set was analysed under the same conditions by the same person, which limits contextual interpretative variables. In addition, phrases were used

to identify, represent and provide a context for codes containing words which may have more than one meaning. The strengths of cognitive mapping analysis far outweigh the weaknesses discussed (see table 17). Cognitive mapping analysis is able to analyse vast quantities of complex data, while still being able to present the results in a form that is accessible to both academics and educated members of the general public. It can highlight both similarities and differences, in addition to being able to provide unanticipated insights. One of the most important strengths of cognitive mapping analysis for the current investigation though is its ability to allow both social and psychological interpretations of the data. This is particularly important where the subject matter being researched is multidisciplinary in nature, containing perceptual and behavioural psychological elements in conjunction with social demographics data.

Table 17: Cognitive Mapping Analysis Strengths and Weaknesses

Cognitive Mapping Analysis	
Strengths	**Weaknesses**
Cognitive mapping is a widely used, validated research tool	Cognitive mapping requires interpretative and analytical skills to be possessed by the researcher (overcome by seven years experience by the researcher)
Cognitive mapping provides in-depth information	Cognitive mapping initial data gathering process can be time-consuming
Cognitive mapping is adaptable to all levels of problem solving (micro, meso, macro)	Cognitive mapping results may not be comparable if the data is analysed by more than one person (overcome by having a single researcher do all the analyses under the same conditions)
Cognitive mapping provides context for quantitative questionnaire data	It is possible that a single researcher may miss hidden themes (a problem for all interpretative-based techniques)
Cognitive mapping can reveal hidden meanings, understandings and explanations	
Cognitive maps can be grouped (for example, maps of community members pooled together to produce one overall community map)	
Cognitive mapping analysis is flexible enough to be used by a wide variety of academic disciplines and research areas	
Cognitive mapping is able to analyse vast quantities of complex data	
Cognitive mapping results are accessible to academics and educated members of the public (rather than simply being numerical)	

5.7. The Role of the Researcher

When conducting any type of research it is important to note the potential influences that the researcher may have upon the data collection and analysis. In qualitative research involving interactions with participants, a degree of bias is inevitable, but it must be recognised and limited where possible. Research bias is an aspect that effects qualitative research more than quantitative research, but can be limited in both, with researcher experience and judgement reducing these inherent biases.

Care was taken to ensure that the questionnaires and interviews limited aspects which may influence a respondent's answers, including testing the use of similar questions within the pilot study and keeping the phrasing of questions as neutral as possible. General questions were asked before the specific questions, all questions were unaided and some questionnaire responses were reverse scored, all to counter biases and influences. Anonymity limited biased responses being given by reducing the effect of social desirability and the sample groups consisted of an opportunity sample of people from a broad range of demographic backgrounds. The questionnaires were scored mathematically, negating interpretative bias.

Interviews are another area where the researcher may potentially influence the data gathering process. This is because the researcher may influence a respondents answers by the way in which they phrase the questions or non-verbal influences. However, as detailed in chapter 5.6., p.137, only two participants chose to take part in face-to-face interviews, one chose to take part in a telephone interview and one chose to take part in an interview via email. These interviews were conducted with the researcher having neutral dress, tone and body language. The rest of the 170 participants who provided transcripts for the cognitive mapping analysis responded by completing the long answer questions. This method of gaining information from the transcripts allowed anonymity to remain intact even from the researcher, increasing the honesty and validity of the information. It also greatly limited the potential influence that the researcher may have had upon the data gathering process, increasing the reliability of the information within the interview transcripts.

The need for interpretative and analytical skills of the researcher in identifying codes and organising themes has already been previously discussed within the strengths and weaknesses of cognitive mapping in chapter 5.6.2., p.140. It was noted that this reliance upon the researcher in

analysing interview transcripts is an inherent weakness within all studies of this type. The researcher might potentially influence the results by missing key information or giving extra weighting to less important information. However, it was also noted that this potential influence is limited by having a single researcher conduct all the analysis, which ensures that same set of standards are applied to each transcript and that the researcher is able to view the wider picture by having access to all the information available. In addition, the researcher has seven years experience conducting this type of analysis. Therefore, the skills and experience of the researcher greatly reduce this potential influence that the researcher has within this method. It is noted that this influence can never be 100% removed because this type of qualitative analysis is subjective and reliant upon researcher interpretation, but the standard expected measures have been taken to limit negative influences.

Finally, reporting bias has been reduced within this dissertation as all results have been presented as found, with no omissions and all concerns and limitations considered.

5.8. Procedure

All aspects of the study were conducted by a single researcher. There was a period of initial brainstorming that took place with many agencies, including the Birmingham Resilience Team and the Community Resilience to Extreme Weather Project. Initial ideas were also formed around the findings from the pilot studies. Firstly, questionnaire packs were made by the researcher for each of the community groups, containing a written brief and consent form, a self-perceptions of social responsibility questionnaire two more questionnaires asking about perceptions they held of the other two community groups and finally an interview sheet which contained long answer questions for participants who did not wish to take part in a face-to-face, telephone or email interview. Stamped addressed envelopes were also included with these questionnaire packs so that participants could return them to the researcher free of charge.

The questionnaire packs were then delivered by hand by the researcher to addresses of householders and SMEs within the boundaries of each selected community and to policy makers connected to these communities. This took place over several days for each community, with firstly Selly Park, then Witton, then Digbeth and finally Thornton Heath being completed, with 300 questionnaires distributed within each community. In addition to postal questionnaires, a number of policy makers were also contacted by email, with identical questionnaire packs as those

delivered by hand, which were then either returned by email or printed off, completed and posted back to the researcher. Once the responses had been returned the questionnaire data was recorded into Predictive Analytical Software (PASW) statistical package and the completed long answer responses were transcribed into a word document. Those participants who had indicated that they wished to take part in either a face-to-face, telephone or email interview were then contacted to arrange this and the interviews conducted.

Once returned, the questionnaire responses were analysed using PASW statistical package, in accordance with the procedures laid out by Kinnear and Gray (2010) in their guide to using PASW 17. This book details the correct procedures to carry out, based on the type and amount of data gathered. The individual bits of data were entered into PASW 17 by the researcher. Two-way Analysis of Variance (ANOVA) tests were considered the most appropriate to use because the data met the basic assumptions of using this test. This allowed reliable comparison of the means of more than two samples at a time. When only two samples were being compared it was also appropriate to conduct *t*-tests to compare the means, as these would give the same results as conducting an ANOVA. Therefore, the tests conducted are the standard analysis tests conducted on this type of quantitative data. Individual justification of why each individual test was appropriate for each group of data and how the basic assumptions of each test were met is provided along with each test conducted within the quantitative results section in chapter 6.

The interview transcripts were analysed using cognitive mapping analysis, aided by Decision Explorer software in creating the visual cognitive maps. This analysis was conducted in accordance with the information and guidelines detailed in chapter 5.6.1., p.137. Firstly the researcher read through all data a number of times, noting down initial thoughts or potential indicators of common elements and highlighting words, phrases or meanings under different headings to identify and confirm codes and patterns. The researcher grouped the codes into themes and the codes were brought together visually in a map within Decision Explorer to try and understand their narrative. This was done manually by the researcher.

It is acknowledged that this sampling approach contained a number of limitations. Many of these limitations, and their associated mitigations, have already been discussed within the sections containing strengths and weaknesses of questionnaires and cognitive mapping, and the role of the researcher (sections 5.5. to 5.7., p.130-143). In addition, the *target population* for flooded

communities was householders, SMEs and policy makers who had directly experienced flooding. However, the *survey population* for flooded communities, which takes into account practical considerations of the sampling approach, differed slightly. This is because the responses from flooded communities (the *survey population*) may not necessarily be from individuals whose homes or businesses had been flooded. This could be considered a potential limitation of the sampling approach. However, floods affect communities in many ways, and an individual is considered by this investigation to have experienced a flood within their community, regardless of whether they were directly affected by the flood water within their own homes or businesses (their street, transport links, shops they use or friends and relatives may be flooded, see chapter 4.7., p.98, and chapter 4.11., p.114, for further discussion of communities acknowledging they have experienced an extreme flood).

There is a direct contrast between participants who live or work within a community which has experienced a flood and those who don't. This is in line with the spatial view of community adopted by this investigation (chapter 2.6., p.20). Therefore, the sampling approach is used in conjunction with the spatial view of community to designate a target area for delivering the questionnaire packs. This limitation was also mitigated to a degree by delivering the questionnaire packs to homes and businesses in and around the worst affected areas of the community, ensuring that as many of the *target population* were contained within the *survey population* as practically possible (see chapter 4.7., p.98, and chapter 4.11., p.114, for further details on chosen communities and case study area maps).

5.9. Ethical Considerations

Ethical approval for the study was granted by Coventry University's ethical approval board. Please see appendix 11 for the low risk ethics approval form for the pilot study and please see appendix 12 for the medium/high ethics approval form for the main research. Participants received a standardised written brief and consent form prior to both the questionnaire and interview aspects of the study which contained instructions on how to complete the questionnaire, or what the interview would involve, and requested that they sign in the appropriate section to give their consent for the information to be used for the purposes of this study. Although age, gender and ethnicity information was taken and the consent form signed, this information cannot be traced back to any individual questionnaire or interview response. This is because when the responses were received, the researcher recorded the questionnaire information into the PASW statistical

package, or typed up a transcript of the interview responses, and then confidentially destroyed the original sheets of paper (or emails) the information was recorded on by shredding (or deleting) them.

This means that after consent had been granted, all the data was made completely anonymous. Participants were informed in the written brief that they could withdraw from the study at any point up until they returned their completed responses to the researcher, after which point it would not be possible to identify and remove their data. The interview recordings were transcribed and then the original recording was deleted in order to preserve anonymity from voice recognition. The email responses were also returned to a private email address that was only accessible by the researcher, ensuring that no data could be leaked in this manner. Participants were not made aware of their individual scores from the questionnaires, so no individual comparisons could be made by unqualified persons outside of the study. These procedures meant that ethical integrity was maintained throughout the study.

6. QUANTITATIVE RESULTS

This chapter presents analysis of the findings of both the questionnaires and cognitive mapping interviews from both Birmingham and SE London. The questionnaires were analysed using PASW statistical package and the interview transcripts were analysed using cognitive mapping. Before the analysis takes place it is important to establish what is meant by acceptable indicators of normal distribution for the histograms used throughout the quantitative analysis. Figure 19 provides an example of a normally distributed bell curve with standard deviation percentages.

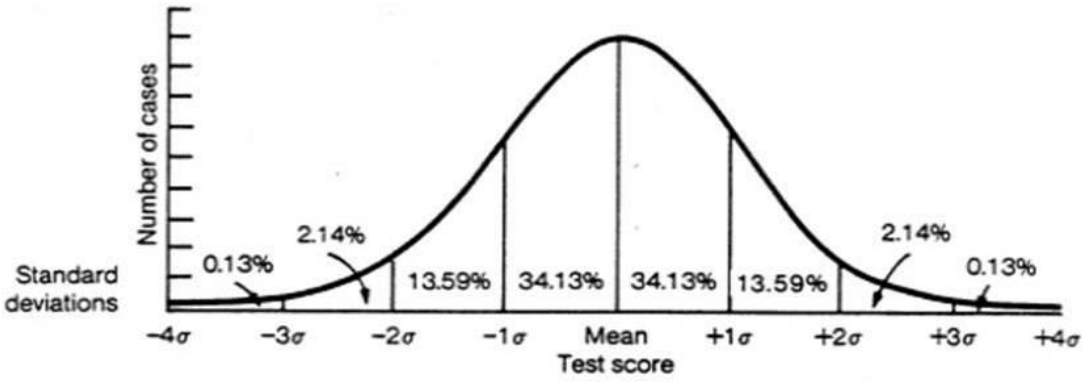

Figure 19: Example of normal distribution bell curve (Assessment Psychology 2010)

Figure 19 is representative of a normally distributed bell curve, in this instance for mean scores on an IQ test. It is very rare that the results of any analyses will result in a perfectly symmetrical, normally distributed bell curve. However, as long as the distribution histogram of the data under analysis does not deviate considerably from the above bell curve pattern, then the data is considered to be normally distributed. The most common indication that a data set is not normally distributed is that the data either has a positive or negative skew. On a positive skew the right tail is much longer than the left tail and the majority of the scores are located on the left of the histogram (Coolican 2004). On a negative skew the left tail is much longer than the right tail and the majority of the scores are located on the right of the histogram (Coolican 2004).

A third indication that the data set is not normally distributed is when the distribution histogram depicts a bimodal curve, which is a curve with two peaks (Coolican 2004). If these deviations from the normal distribution bell curve exist then they will be immediately obvious from examination of the distribution histogram for the data under analysis. Therefore, examinations of distribution histograms are referred to at appropriate points throughout the analysis. In addition to the visual

checking of histograms, data sets are assumed to have a normal distribution if the mean and median scores are almost equal. This is because near equal mean and median scores are an indication that the data is continuous and symmetrically distributed around a central point, with few outliers. The checks described here are considered to be sufficiently robust to judge whether a data set is normally distributed. It should also be noted that the term 'significance' used throughout the quantitative analysis refers to statistical significance, as opposed to simply being a major finding. In the current investigation, normality checks are referred to and presented in the appendices.

Throughout the analysis, two-tailed tests of significance were used because there are no hypotheses predicting the direction of any proposed effects. For example, there are no prior hypotheses regarding the sign (+ or -) of any potential correlations. The tests are looking for the possibility of a relationship in either direction, for example increasing age may increase social responsibility, but it may also lower it.

6.1. Birmingham Questionnaire Analysis

Initial analyses of the quantitative data revealed that there were very few extreme scores (outliers) within the data set. These outliers are highlighted and removed, where appropriate, within the analysis of their individual data sets. The mean self-rated reported social responsibility scores, as well as the mean reported social responsibility scores for all three community groups, were found to be normally distributed (see appendix 13 for distribution histograms). Therefore, these factors within the data set meet the normal distribution requirements of parametric testing, allowing its use where appropriate.

6.1.1. Birmingham: Social Responsibility

Table 18 shows the mean and median levels of social responsibility self-rated by each of the community groups in each location, as well as the standard deviation, variance and range.

Table 18: Self-rated social responsibility scores for Birmingham community groups

				Self-rated Social Responsibility				
				Mean	Median	Standard Deviation	Variance	Range
Location	Witton	Type	Householder	35.25	36.00	4.33	18.79	19.00
			SME	36.87	36.00	2.90	8.39	10.00
	Selly Park	Type	Householder	35.17	35.00	3.60	12.96	18.00
			SME	36.86	36.50	3.24	10.50	11.00
	Digbeth	Type	Householder	29.92	30.00	4.54	20.62	16.00
			SME	30.33	31.00	3.65	13.31	15.00
			Policy Makers	37.88.	38.00.	2.38.	5.66.	9.00.

Table 18 indicates that SMEs in all 3 communities view themselves as having slightly higher levels of social responsibility (Mean= 36.87, 36.86, 30.33) than the householders within the same communities (Mean= 35.25, 35.17, 29.92). Furthermore, these self-rated perceptions of social responsibility are more stable for SMEs, who show less deviation (SD= 2.90, 3.24, 3.65) and variation (Var= 8.39, 10.50, 13.31) in their perceptions than householders (SD= 4.33, 3.60, 4.54/Var= 18.79, 12.96, 20.62). However, policy makers as a whole have higher self-rated levels of social responsibility (Mean= 37.88) than the other two community groups. This indicates that policy makers believe they are more socially responsible than householders and SMEs.

It is immediately noticeable that the self-rated levels of social responsibility reported by householders and SMEs within the control group of Digbeth (H Mean= 29.92, SME Mean = 30.33), which has not experienced recent flooding, are far lower than those reported by these groups within the two communities which had experienced recent flooding (Witton H Mean = 35.25, SME Mean= 36.87/Selly Park H Mean= 35.17, SME Mean= 36.86). This indicates that participants who have experienced flooding believe they are more socially responsible than those who have not experienced recent flooding.

Table 19 shows the differences between the mean and median levels of self-rated social responsibility for each community group, and the levels applied to them by the other groups.

Table 19: Self-rated and attributed social responsibility scores for Birmingham community groups

				Self-rated		Householder		SME		Policy Maker	
				Mean	Median	Mean	Median	Mean	Median	Mean	Median
Location	Witton	Type	Household	35.25	36.00	-.	-.	28.10	27.00	29.36	30.00
			SME	36.87	36.00	25.13	24.00	-.	-.	28.70	29.00
	Selly Park	Type	Household	35.17	35.00	-.	-.	28.66	28.00	28.51	28.00
			SME	36.86	36.50	26.50	25.00	-.	-.	28.00	27.00
	Digbeth	Type	Household	29.92	30.00	-.	-.	26.76	26.00	27.88	28.00
			SME	30.33	31.00	27.07	27.00	-.	-.	28.41	28.00
			Policy Makers	37.88.	38.00.	33.22.	33.00.	29.95.	30.00.	-.	-.

Table 19 indicates that all three community groups believe they are more socially responsible than the other two groups perceive them to be.

Householders believe they possess a greater level of social responsibility (Witton Mean= 35.25, Selly Park Mean= 35.17, Digbeth Mean= 29.92) than the levels of social responsibility that SMEs (Witton Mean= 25.13, Selly Park Mean= 26.50, Digbeth Mean= 27.07) and policy makers (Mean= 33.22) perceive them to have.

SMEs in all three communities believe they possess a greater level of social responsibility (Witton Mean= 36.87, Selly Park Mean= 36.86, Digbeth Mean= 30.33) than the householders (Witton Mean= 28.10, Selly Park Mean= 28.66, Digbeth Mean= 26.76) and policy makers (Mean= 29.95) perceive them to have.

Policy makers believe they possess a greater level of social responsibility (Mean= 37.88) than the level of social responsibility that householders (Witton Mean= 29.36, Selly Park Mean= 28.51, Digbeth Mean= 27.88) and SMEs (Witton Mean= 28.70, Selly Park Mean= 28.00, Digbeth Mean= 28.41) perceive them to have.

This indicates that not only does each community group believe they are the most socially responsible group, but they also perceive themselves to be more socially responsible than the other two groups believe them to be. This indicates that there is a discrepancy between self-rated perceptions of social responsibility and the perceptions attributed by the other groups. It is noted that these discrepancies are smaller within the control group community.

Householders and SMEs in the control group community of Digbeth attributed policy makers with similar levels of social responsibility (H Mean= 27.88, SME Mean= 28.41) as the Witton (H Mean= 29.36, SME Mean= 28.70) and Selly Park (H Mean= 28.51, SME Mean= 28.00) communities. This indicates that policy makers are perceived as possessing a particular level of social responsibility, regardless of whether the community has experienced recent flooding or not. SMEs within the control community of Digbeth perceived householders to have slightly higher levels of social responsibility (Mean= 27.07) than the SMEs from Witton (Mean= 25.13) and Selly Park (Mean= 26.50). However, householders within the control group community of Digbeth perceived SMEs to possess slightly lower levels of social responsibility (Mean= 26.76) than the householders from Witton (Mean= 28.10) and Selly Park (Mean= 28.66) communities.

In order to determine whether or not the differences in self-rated levels of social responsibility between householders and SMEs at each location were significant or not, a two-way ANOVA was conducted. The two-way ANOVA was chosen as the most appropriate test because, although there are two independent variables (location and community group), there is only one dependent variable (self-rated social responsibility score) and different participants are used in each community location and community group. However, before the two-way ANOVA was conducted the data was checked for extreme cases (significant outliers). Appendix 14 shows the clustered boxplot of self-rated social responsibility scores sorted by location and community group. The clustered boxplot shows that three of the householders from Witton (20, 31 and 37) and one of the householders from Selly Park (198) were highlighted as being extreme cases. These cases were removed from the analysis in order to make the distribution more symmetrical prior to conducting the two-way ANOVA. Table 20 shows the results of the two-way ANOVA with the univariate data set.

Table 20: Two-way ANOVA results for self-rated social responsibility in Witton, Selly Park and Digbeth

Two-Way ANOVA with Univariate Data Set

Dependent Variable: Self-rated Social Responsibility

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	1935.299[a]	5	387.060	28.005	.000	.324
Intercept	262117.607	1	262117.607	18964.966	.000	.985
Location	1757.615	2	878.808	63.584	.000	.303
Type	63.734	1	63.734	4.611	.033	.016
Location * Type	13.265	2	6.632	.480	.619	.003
Error	4035.775	292	13.821			
Total	357018.000	298				
Corrected Total	5971.074	297				

a. R Squared = .324 (Adjusted R Squared = .313)

The two-way ANOVA results (exploring self-rated social responsibility scores) shown in table 20 indicate that there is a significant difference between the mean levels of social responsibility reported by householders (Witton= 35.25, Selly Park= 35.17, Digbeth= 29.92) and SMEs (Witton= 36.87, Selly Park= 36.86, Digbeth= 30.33) for the community group Type factor at the .05 significance level $F(1, 292) = 4.611$; $p = .033$; partial eta squared = .02 (which is a 'small' effect). A detailed explanation and categorisation of the effect size ranges can be found in Kinnear and Gray (2010:281). This indicates that householders mean self-rated social responsibility scores and SMEs self-rated social responsibility scores are significantly different from each other. Furthermore, there is a significant difference between the levels of social responsibility reported in each Location $F(2, 292) = 63.584$; $p < 0.01$; eta squared = .30 (which is a large effect). However, there is no significant difference between the two-way interaction of Type x Location $F(2, 292) = .480$; $p = .619$. This indicates that SMEs are reporting significantly higher levels of social responsibility than householders. In addition, there is a significant difference between the levels of social responsibility reported at each community, indicating that the social responsibility scores reported by the communities which have experienced flooding are significantly higher than those reported in the control group community.

6.1.2. Birmingham: Age

Appendix 15 shows a scatterplot which explores the relationship between age and self-rated social responsibility. The line of best fit produced by the PASW statistical analysis in the scatterplot is rising to the right, which suggests some degree of positive linear relationship between age and self-rated social responsibility. In this study, age is considered to be scale level data as it is ordered, has a constant scale and has a natural 0. Level of social responsibility is also considered to be scale level data as it also has a natural 0 within its score range, has a continuous scale and is ordered from low to high levels of social responsibility. Therefore, the most appropriate test to discover if there is a significant association between age and self-rated levels of social responsibility is Pearsons Correlation. The linear association suggested by the scatterplot also supports the use of Pearsons Correlation, as it is a measure of a supposed linear relationship between two variables, both measured at the continuous or scale level. The Pearsons Correlation shows that $r(343) = .381$; $p < .01$ ($p < 0.0005$). This means that the Pearsons Correlation indicates that there is a significant positive correlation ($p = .381$) between age and self-rated level of social responsibility at the 0.01 level (2-tailed). This indicates that older participants were reporting higher levels of social responsibility than younger participants.

It should also be noted that, given the large sample size of the householder groups in Witton, Selly Park and Digbeth, then it was reasonable to test these householder community groups individually for potential age-related differences in social responsibility. In line with the previous results, the Pearsons Correlation results indicate that there are significant age differences within the householder community groups for Witton ($r(81) = .480$; $p < .01$), Selly Park ($r(94) = .577$; $p < .01$) and Digbeth ($r(49) = .640$; $p < .01$).

6.1.3. Birmingham: Gender

Table 21 shows the differences between the self-rated levels of social responsibility of males and females.

Table 21 Self-rated perceptions of social responsibility by gender for all three Birmingham community groups

		Self-rated Social Responsibility				
		Mean	Median	Standard Deviation	Variance	Range
Gender	Male	34.23	35.00	4.90	24.04	20.00
	Female	35.13	35.00	4.02	16.17	19.00

Table 21 indicates that females (Mean= 35.15) believe that they are slightly more socially responsible than males (Mean= 34.23). It is noted that males are less stable than females in their views as they display greater variance (M= 24.04, F= 16.17) and deviation (M= 4.90, F= 4.02) in their responses.

Gender is considered to be nominal level data because it is a qualitative attribute which is not ranked. The data is assumed to have a normal distribution because the mean and median scores are almost equal, suggesting that the data is continuous and symmetrically distributed around a central point, with few outliers. This is confirmed when we look at the histograms of male and female scores (see appendix 16) which do not show any major positive or negative skews and contain only a single maximum peak. In addition, although males are slightly higher, both genders have a similar level of variance. Therefore, it is appropriate to use an independent samples *t*-test in order to determine whether or not the difference between their self-rated levels of social responsibility are significant. Table 22 shows the results of the independent samples *t*-test.

Table 22: Independent samples *t*-test results for gender and self-rated social responsibility within all three Birmingham community groups

Independent Samples T-Test

		Levene's Test for Equality of Variances		*t*-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Self-rated Social Responsibility	Equal variances assumed	7.379	.007	-1.827	341	.069	-.89914	.49219	-1.86725	.06897
	Equal variances not assumed			-1.866	340.880	.063	-.89914	.48187	-1.84696	.04868

Levene's statistic has a *p*-value for F < .05 and therefore F is significant and homogeneity of variance cannot be assumed and we must accept the report of the *t*-test in the lower row. The *t*-test revealed that *t* (*df* = 341) is -1.866. The *p*-value is .063 (2-tailed), which indicates that there is no significant difference between the self-rated social responsibility levels of males and females because $p > 0.05$. This finding indicates that there are no gender differences in perceived levels of social responsibility.

When exploring the results from the control group community, Digbeth, in isolation from the others, table 23 shows that there are still no significant gender differences.

Table 23: Independent samples *t*-test results for gender and self-rated social responsibility in Digbeth

Independent Samples T-Test

		Levene's Test for Equality of Variances		*t*-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Self-rated Social Responsibility	Equal variances assumed	1.127	.292	-1.507	74	.136	-1.61991	1.07466	-3.76121	.52139
	Equal variances not assumed			-1.432	32.908	.161	-1.61991	1.13099	-3.92118	.68135

Levene's statistic has a *p*-value for F > .05 and therefore F is not significant and homogeneity of variance can be assumed and we can accept the report of the *t*-test in the upper row. The *t*-test revealed that *t* (*df* = 74) is -1.507. The *p*-value is .136 (2-tailed), which indicates that there is no significant difference between the self-rated social responsibility levels of males and females because $p > 0.05$.

Similar to the age differences testing, given the large sample size of the householder groups in Witton, Selly Park and Digbeth, then it was reasonable to test these householder community groups individually for potential gender differences. However, the *t*-test results indicate that there are no gender differences within the householder community groups for Witton (*t* (*df* = 79) is -1.969, *p* = .052), Selly Park (*t* (*df* = 92) is 1.804, *p* = .75) or Digbeth (*t* (*df* = 47) is -1.096, *p* = .279).

6.1.4. Birmingham: Ethnicity

Table 24 shows the differences between the self-rated social responsibility scores for each ethnic group.

Table 24: Self-rated social responsibility scores for each ethnic group within all three Birmingham community groups

		Self-rated Social Responsibility				
		Mean	Median	Standard Deviation	Variance	Range
Ethnicity	White	34.56	35.00	4.36	18.97	20.00
	Black	34.22	36.00	6.80	46.19	19.00
	Asian	34.87	36.50	5.19	26.92	20.00
	Chinese	36.50	36.00	4.80	23.00	10.00
	White/Black	.	.	.	.	.
	White/Asian	32.50	32.50	.71	.50	1.00
	Other	36.20	38.00	5.63	31.70	13.00

Each of the ethnicity data sets are assumed to have a normal distribution because the mean and median scores are almost equal, suggesting that the data is continuous and symmetrically distributed around a central point, with few outliers.

The low number of participants in some of the ethnicity categories may have an effect upon the normal distribution histograms. However, when we look at the histograms (see appendix 17) for the two largest ethnic groups, White and Asian (which together account for 94.1% of the total participants), we can see that their data is normally distributed.

Therefore, as the histograms indicate that the data sets are normally distributed (as they do not show any major positive or negative skews and contain only a single maximum peak) an independent samples *t*-test will be conducted to see if there are significant differences between the self-rated levels of social responsibility of the White and Asian ethnic groups.

Table 25: Independent samples *t*-test results for ethnicity and self-rated social responsibility within all three Birmingham community groups

Independent Samples T-Test

		Levene's Test for Equality of Variances		*t*-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Self-rated Social Responsibility	Equal variances assumed	4.361	.038	-.444	321	.658	-.31136	.70190	-1.69227	1.06954
	Equal variances not assumed			-.392	59.119	.696	-.31136	.79361	-1.89931	1.27658

Levene's statistic has a *p*-value for F < .05 and therefore F is significant and homogeneity of variance cannot be assumed and we must accept the report of the *t*-test in the lower row. The *t*-test revealed that *t* (*df* = 59.11) is -.392. The *p*-value is .696 (2-tailed), which indicates that there are no significant differences between the self-rated social responsibility levels of the White and Asian ethnic groups because *p* > .05. However, when exploring differences between ethnic groups by location a different result emerges. Table 26 shows the independent samples *t*-test results only for those communities which had experienced recent flooding, Witton and Selly Park.

Table 26 Independent samples *t*-test results for ethnicity and self-rated social responsibility for Witton and Selly Park

Independent Samples T-Test

		Levene's Test for Equality of Variances		*t*-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Self-rated Social Responsibility	Equal variances assumed	2.223	.138	-3.414	207	.001	-2.85537	.83635	-4.50423	-1.20651
	Equal variances not assumed			-4.202	28.131	.000	-2.85537	.67957	-4.24712	-1.46362

Levene's statistic has a *p*-value for F > .05 and therefore F is not significant and homogeneity of variance can be assumed and we can accept the report of the *t*-test in the upper row. The *t*-test revealed that *t* (*df* = 207) is -3.414. The *p*-value is .001 (2-tailed), which indicates that there is a significant difference between the self-rated social responsibility levels of the White and Asian ethnic groups because $p < .05$. Therefore, these findings indicate that, although there may not be differences in self-rated social responsibility scores between White and Asian ethnic groups across all communities and community groups, there are significant differences between the scores when exploring those communities which have experienced recent flooding. Table 27 indicates the direction of this significant difference.

Table 27: Self-rated social responsibility scores for White and Asian ethnic groups from Witton and Selly Park

		Self-rated Social Responsibility				
		Mean	Median	Range	Standard Deviation	Variance
Ethnicity	White	35.34	35.50	19.00	3.71	13.75
	Asian	38.19	38.00	11.00	2.86	8.16

Table 27 shows that, in those community groups which have experienced recent flooding, the Asian ethnic group report significantly higher levels of social responsibility than the White ethnic group. However, these ethnic differences disappear when the policy maker and control group community results are introduced into the data set. It should also be noted that it was not possible to test the householders group individually for ethnic differences due to the reduction in numbers of participants within each ethnic group that would occur if the SME data was removed from the analysis.

6.1.5. Birmingham: Between Factors Analysis

So far, significant relationships have been found between the age and ethnicity variables and the self-rated perceptions of social responsibility, for Witton and Selly Park householders and SMEs. In order to determine which of these variables has the most influence upon self-rated social responsibility scores, a stepwise multiple regression was conducted. The results confirm that self-rated social responsibility scores correlate significantly with both age and Asian ethnicity group at the 0.01 level of significance ($p < 0.0005$) and also correlate with the White ethnicity group at the 0.05 significance level ($p = 0.016$). The results show that *R* is .46 for the regression of self-rated social responsibility upon the factor of age. The adjusted R square is .21 (21%), which represents a medium effect size (effect sizes defined by Kinnear and Gray 2010:449). Please see appendix 18 for Birmingham PASW regression outputs.

The results also show that *R* is .51 for the regression of self-rated social responsibility upon the factors of age and Asian ethnicity. The adjusted R square is .26 (26%), which represents a large effect size. This shows that adding the Asian ethnicity group variable to the age variable improves the predictive power of the regression equation. This indicates that age is the greatest predictor of self-rated social responsibility score, as it accounts for 21% of the proportion of variance

accounted for by the regression. It also indicates that the Asian ethnic group is more stable in their perceptions than the White ethnic group. This is because belonging to the Asian ethnic group is considered to be a greater predictor of self-rated social responsibility scores than belonging to the White ethnic group.

Previous results had also indicated that there was a significant difference between the self-rated social responsibility scores of those communities which had experienced recent flooding and those who had not. Therefore, further regression analysis was conducted in order to explore this relationship for the householders and SME community groups of Witton, Selly Park and Digbeth. The results indicate that self-rated social responsibility scores correlate significantly with flood experienced participants at the 0.01 level of significance ($p < 0.0005$). The results show that *R* is .52 for the regression of self-rated social responsibility upon the flooded factor. The adjusted R square is .27 (27%), which represents a large effect size. This shows that experience of flooding is actually the greatest predictor of self-rated social responsibility score, as it accounts for 27% of the proportion of variance accounted for by the regression.

The results also show that when we add in the previous greatest predictor, age, to the equation then the *R* is .67 for the regression of self-rated social responsibility upon the factors of age and flood experience. The adjusted R square is .44 (44%), which represents a large effect size. This shows that adding the age variable to the flood experience variable improves the predictive power of the regression equation. However, flood experience remains a greater predictor of self-rated social responsibility scores than age. When we add in the Asian ethnic group variable, the *R* becomes .69 for the regression of self-rated social responsibility upon the factors of age, Asian ethnic group and flood experience. The adjusted R square is .47 (47%), which represents a large effect size. These results indicate that flood experience is the greatest predictor of self-rated social responsibility score, followed by the age variable and then the Asian ethnic group variable.

It is acknowledged that the between factors analysis was only conducted on a small scale within this research, which limits the extent to which the research can comment on this aspect beyond these initial indications.

6.2. Summary of Birmingham Questionnaire Results

It was discovered that SMEs believe they are more socially responsible than householders and policy makers believe they are more socially responsible than the other two groups. The levels of social responsibility reported by participants within the community which had not experienced recent flooding were far lower than those reported by participants within communities which had experienced recent flooding. Each community group believes they are the most socially responsible group and they also perceive themselves to be more socially responsible than the other two groups believe them to be.

Policy makers are perceived as possessing a particular level of social responsibility, regardless of whether the community has experienced recent flooding or not. SMEs in the control group community perceived householders to have a slightly higher level of social responsibility. In contrast, householders in the control group community perceived SMEs to have slightly lower levels of social responsibility. SMEs are reporting significantly higher levels of social responsibility than householders. In addition, there is a significant difference between the levels of social responsibility reported at each community, indicating that the social responsibility scores reported by the communities which have experienced flooding are significantly higher than those reported in the control group community. Older participants were reporting higher levels of social responsibility than younger participants.

There are no gender differences in perceived levels of social responsibility. In those community groups which have experienced recent flooding, the Asian ethnic group report significantly higher levels of social responsibility than the White ethnic group. These ethnic differences disappear when the policy maker and control group community results are introduced into the data set. The regression analysis results indicated that, in line with the previous findings, when exploring the data between communities which have and have not experienced flooding, then flood experience is the greatest predictor of self-rated social responsibility score. This is closely followed by the age variable and then the Asian ethnicity variable. These findings are also supported by the results of the regression analysis when exploring the data from flood-experienced communities only. These communities had previously indicated significant age and ethnic differences in social responsibility scores. The regression analysis indicated that (with the experience of flooding variable not applicable) the greatest predictor of social responsibility scores was the age variable, followed by the Asian ethnicity variable.

6.3. SE London Questionnaire Analysis

Initial analyses of the SE London quantitative data revealed that there were no extreme scores within the data set. Furthermore, the self-rated social responsibility scores, as well as the reported social responsibility scores for all three community groups, were found to be normally distributed (see appendix 19 for distribution histograms). Therefore, these factors within the data set meet the normal distribution requirements of parametric testing, allowing its use where appropriate.

6.3.1. SE London: Social Responsibility

Table 28 shows the mean and median levels of social responsibility self-rated by each of the community groups, as well as the standard deviation, variance and range.

Table 28: Self-rated social responsibility scores for householders, SMEs and policy makers in SE London

		Self-rated Social Responsibility					
		Count	Mean	Median	Standard Deviation	Variance	Range
Type	Householder	89	32.03	32.00	3.38	11.44	16.00
	SME	23	33.39	33.00	3.04	9.25	11.00
	Policy Maker	26	37.50	38.00	2.66	7.06	10.00

Table 28 indicates that policy makers (Mean = 37.50) believe they are more socially responsible than both SMEs (Mean = 33.9) and householders (Mean = 32.03). Furthermore, these self-rated perceptions of social responsibility are more stable for policy makers, who show less deviation (SD = 2.66) and variation (Var = 7.06) in their perceptions than both householders (SD = 3.38/Var = 11.44) and SMEs (SD = 3.04/Var = 9.25). This mirrors the results found in the previous analysis of the Birmingham community groups.

Table 29 shows the differences between the mean and median levels of self-rated social responsibility for each community group, and the levels applied to them by the other groups.

Table 29: Social responsibility scores for all three SE London community groups

		Self-rated		House		SME		Policy Maker	
		Mean	Median	Mean	Median	Mean	Median	Mean	Median
Type	Householder	32.03	32.00	-.	-.	26.67	26.00	29.71	29.00
	SME	33.39	33.00	26.48	26.00	-.	-.	30.04	30.00
	Policy Maker	37.50	38.00	29.65	30.00	30.04	31.00	-.	-.

Table 29 indicates that all three SE London community groups believe they are more socially responsible than the other two groups perceive them to be. Householders believe they possess a greater level of social responsibility (Mean= 32.03) than the levels of social responsibility that SMEs (Mean= 26.48) and policy makers (Mean= 29.65) perceive them to have. SMEs believe they possess a greater level of social responsibility (Mean= 33.39) than the householders (Mean= 26.67) and policy makers (Mean= 30.04) perceive them to have. Policy makers believe they possess a greater level of social responsibility (Mean= 37.50) than the level of social responsibility that householders (Mean= 29.71) and SMEs (Mean= 30.04) perceive them to have.

This indicates that not only does each community group believe they are the most socially responsible group, but they also perceive themselves to be more socially responsible than the other two groups believe them to be. This indicates that there is a discrepancy between self-rated perceptions of social responsibility and the perceptions attributed by the other groups. This also mirrors the results found in the previous analysis of the Birmingham community groups.

6.3.2. SE London: Age

Appendix 20 shows a scatterplot which explores the relationship between age and self-rated social responsibility. The line of best fit produced by the PASW statistical analysis in the scatterplot is rising to the right, which suggests some degree of positive linear relationship between age and self-rated social responsibility. As highlighted earlier, age is considered to be scale level data as it is ordered, has a constant scale and has a natural 0. Level of social responsibility is also considered to be scale level data as it also has a natural 0 within its score range, has a continuous scale and is ordered from low to high levels of social responsibility. Therefore, the most appropriate test to discover if there is a significant association between age and self-rated levels of social responsibility is Pearsons Correlation. The linear association

suggested by the scatterplot also supports the use of Pearsons Correlation, as it is a measure of a supposed linear relationship between two variables, both measured at the continuous or scale level. The results of the Pearsons Correlation test show that $r(138) = .587$; $p < .01$ ($p < 0.0005$). This means that the Pearsons Correlation indicates that there is a significant positive correlation ($p = .587$) between age and self-rated level of social responsibility at the 0.01 level (2-tailed). This indicates that older participants were reporting higher levels of social responsibility than younger participants. This result mirrors the results found in the previous analysis of the Birmingham community groups.

Similar to the Birmingham data analysis, given the large sample size of the householder group in Thornton Heath, then it was reasonable to test the householder community group individually for potential age-related differences in social responsibility. In line with the previous findings, the Pearsons Correlation results indicate that there are significant age differences within the householder community group for Thornton Heath ($r(89) = .642$; $p < .01$).

6.3.3. SE London: Gender

Table 30 shows the differences between the self-rated levels of social responsibility of males and females.

Table 30: Self-rated perceptions of social responsibility by gender for all three SE London community groups

		Self-rated Social Responsibility					
		Count	Mean	Median	Standard Deviation	Variance	Range
Gender	Male	95	33.05	33.00	4.10	16.80	18.00
	Female	43	33.81	33.00	3.06	9.35	12.00

Table 30 indicates that females (Mean= 33.81) believe that they are slightly more socially responsible than males (Mean= 33.05), but this difference appears to be negligible as the median scores for both genders are the same (33). It is noted that males are less stable than females in their views as they display greater variance (M= 16.80, F= 9.35), deviation (M= 4.10, F= 3.06) and range (M= 18, F= 12) in their responses.

Gender is considered to be nominal level data because it is a qualitative attribute which is not ranked. The data is assumed to have a normal distribution because the mean and median scores are almost equal, suggesting that the data is continuous and symmetrically distributed around a central point, with few outliers. This is confirmed when we look at the histograms of male and female scores (see appendix 21) which do not show any major positive or negative skews and contain only a single maximum peak.

The shorter bell curve for the females is caused by the lower number of females taking part in the SE London community study (Male= 95, Female= 43). In addition, although males are slightly higher, both genders have a similar level of variance. Therefore, it is appropriate to use an independent samples *t*-test in order to determine whether or not the slight difference between their self-rated levels of social responsibility are significant. Table 31 shows the results of the independent samples *t*-test.

Table 31: Independent samples *t*-test results for gender and self-rated social responsibility within all three SE London community groups

Independent Samples T-Test

		Levene's Test for Equality of Variances		*t*-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Self-rated Social Responsibility	Equal variances assumed	4.076	.045	-1.088	136	.279	-.76132	.69975	-2.14513	.62248
	Equal variances not assumed			-1.213	106.603	.228	-.76132	.62780	-2.00591	.48326

Levene's statistic has a *p*-value for F < .05 and therefore F is significant and homogeneity of variance cannot be assumed and we must accept the report of the *t*-test in the lower row. The *t*-test revealed that *t* (*df* = 106.603) is -1.213. The *p*-value is .228 (2-tailed), which indicates that there is no significant difference between the self-rated social responsibility levels of males and females because $p > 0.05$. This finding indicates that, as suggested by the equal median scores,

there are no gender differences in perceived levels of social responsibility. This mirrors the results found in the previous analysis of the Birmingham community groups.

As with Birmingham, given the large sample size of the householder group in Thornton Heath, then it was reasonable to test the householder community group individually for potential gender differences. However, matching the Birmingham results, the *t*-test results indicated that there are no gender differences within the householder community groups for Thornton Heath (*t* (*df* = 70.828) is -1.144, *p* = .256).

6.3.4. SE London: Ethnicity

Table 32 shows the differences between the self-rated social responsibility scores for each ethnic group.

Table 32: Self-rated social responsibility scores for each ethnic group in SE London

		Self-rated Social Responsibility					
		Count	Mean	Median	Standard Deviation	Variance	Range
Ethnicity	White	83	33.55	33.00	3.81	14.52	18.00
	Black	24	31.25	31.50	3.53	12.46	13.00
	Asian	23	35.13	35.00	3.39	11.48	11.00
	Chinese	1	34.00	34.00	.	.	.00
	White/Black	4	30.00	30.00	1.83	3.33	4.00
	White/Asian	0	.	.	.	.	.
	Other	3	32.33	33.00	3.06	9.33	6.00

Each of the ethnicity data sets are assumed to have a normal distribution because the mean and median scores are almost equal, suggesting that the data is continuous and symmetrically distributed around a central point, with few outliers.

The low number of participants in some of the ethnicity categories may have an effect upon the normal distribution histograms. However, when we look at the histograms (see appendix 22) for the three largest ethnic groups, White, Black and Asian (which accounts for 94.2% of the total

participants), we can see that their data is normally distributed (as they do not show any major positive or negative skews and contain only a single maximum peak).

Therefore, as the histograms indicate that the data sets are considered to be normally distributed, independent samples *t*-tests will be conducted to see if there are significant differences between the self-rated levels of social responsibility of each of the White, Black and Asian ethnic groups.

Table 33: Independent samples *t*-test results for White and Black ethnic groups in SE London

Independent Samples T-Test

		Levene's Test for Equality of Variances		*t*-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Self-rated Social Responsibility	Equal variances assumed	.504	.479	2.651	105	.009	2.30422	.86925	.58066	4.02778
	Equal variances not assumed			2.766	39.846	.009	2.30422	.83303	.62039	3.98804

Levene's statistic has a *p*-value for F > .05 and therefore F is not significant and homogeneity of variance can be assumed and we can accept the report of the *t*-test in the upper row. The *t*-test revealed that *t* (*df* = 105) is 2.651. The *p*-value is .009 (2-tailed), which indicates that there is a significant difference between the self-rated social responsibility levels of the White and Black ethnic groups because $p < .05$.

Table 34: Independent samples *t*-test results for White and Asian ethnic groups in SE London

Independent Samples T-Test

		Levene's Test for Equality of Variances		*t*-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Self-rated Social Responsibility	Equal variances assumed	.493	.484	-1.796	104	.075	-1.57622	.87778	-3.31688	.16444
	Equal variances not assumed			-1.920	38.838	.062	-1.57622	.82106	-3.23720	.08476

Levene's statistic has a *p*-value for F > .05 and therefore F is not significant and homogeneity of variance can be assumed and we can accept the report of the *t*-test in the upper row. The *t*-test revealed that *t* (*df* = 104) is -1.796. The *p*-value is .075 (2-tailed), which indicates that there are no significant differences between the self-rated social responsibility levels of the White and Asian ethnic groups because *p* > .05.

However, when the Birmingham ethnicity data was previously analysed solely for the communities which had experienced recent flooding, Witton and Selly Park, it did not include policy maker data as the policy makers were non-specific to any one Birmingham community. Therefore, in order to draw accurate comparisons the *t*-test must be conducted again for Thornton Heath, including only the data from the householder and SME community groups. This will provide a direct comparison between matched community groups and matched experience of flooding between Birmingham and SE London communities.

Table 35: Independent samples *t*-test results for White and Asian ethnic groups in SE London (Householders and SMEs only)

Independent Samples T-Test

		Levene's Test for Equality of Variances		*t*-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Self-rated Social Responsibility	Equal variances assumed	.018	.894	-2.345	84	.021	-1.95837	.83517	-3.61920	-.29753
	Equal variances not assumed			-2.306	28.356	.029	-1.95837	.84924	-3.69698	-.21975

Levene's statistic has a *p*-value for F > .05 and therefore F is not significant and homogeneity of variance can be assumed and we can accept the report of the *t*-test in the upper row. The *t*-test revealed that *t* (*df* = 84) is -1.796. The *p*-value is .021 (2-tailed), which indicates that there is a significant difference between the self-rated social responsibility levels of the White and Asian ethnic groups within the householder and SME community groups because *p* > .05. This mirrors the results found in the previous analysis of the Birmingham community groups. It should also be noted that when this is done for the Black ethnic group, the significant difference previously found becomes even greater (*t* (*df* = 84)= 2750, *p*= .007). These results indicate that ethnic differences exist in self-rated levels of social responsibility for householders and SMEs within communities which have experienced flooding.

Table 36 shows the results of an independent samples *t*-test for Black and Asian ethnic groups in SE London.

Table 36: Independent samples *t*-test results for Black and Asian ethnic groups for all 3 SE London community groups

Independent Samples T-Test

		Levene's Test for Equality of Variances		*t*-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Self-rated Social Responsibility	Equal variances assumed	.000	.992	-3.842	45	.000	-3.88043	1.00998	-5.91463	-1.84624
	Equal variances not assumed			-3.846	45.000	.000	-3.88043	1.00908	-5.91283	-1.84804

Levene's statistic has a *p*-value for F > .05 and therefore F is not significant and homogeneity of variance can be assumed and we can accept the report of the *t*-test in the upper row. The *t*-test revealed that *t* (*df* = 45) is -3.842. The *p* < .001 (2-tailed), which indicates that there is a large significant difference between the self-rated social responsibility levels of the Black and Asian ethnic groups because *p* < .05. This is still significant when we explore only the householder and SME data (*t* (*df* = 36)= -4.128, *p* < .001).

The direction of the indicated ethnic differences can be seen when we explore the self-rated social responsibility scores of the White, Black and Asian ethnic groups.

Table 37: Self-rated social responsibility scores of White, Black and Asian ethnic groups in SE London

		Self-rated Social Responsibility					
		Count	Mean	Median	Standard Deviation	Variance	Range
Ethnicity	White	83	33.55	33.00	3.81	14.52	18.00
	Black	24	31.25	31.50	3.53	12.46	13.00
	Asian	23	35.13	35.00	3.39	11.48	11.00

Table 37 shows that the Asian ethnic group report significantly higher levels of social responsibility than the White ethnic group within the SE London community (which has experienced flooding). However, the White and Asian ethnic differences disappear when the policy maker results are introduced into the data set. This mirrors the results found in the previous analysis of the Birmingham community groups. Table 37 also shows that the Black ethnic group report significantly lower levels of social responsibility than both the White and Asian ethnic groups within the SE London community, which exists even with the policy maker data included in the analysis, but becomes more significant when the policy maker data is removed. As with the Birmingham data analysis, it was not possible to test the householders group individually for ethnic differences due to the reduction in numbers of participants within each ethnic group that would occur if the SME data was removed from the analysis.

6.3.5. SE London: Between Factors Analysis

Similar to the Birmingham communities, significant relationships have been found between the age and ethnicity variables and the self-rated perceptions of social responsibility, for Thornton Heath householders and SMEs. In order to determine which of these variables has the most influence upon self-rated social responsibility scores, a stepwise multiple regression was conducted. The results confirm that self-rated social responsibility scores correlate significantly with age at the 0.01 level of significance ($p < 0.0005$) and also correlate with both the Asian ethnicity group ($p = 0.001$) and the Black ethnicity group ($p = 0.001$). The results show that *R* is .63 for the regression of self-rated social responsibility upon the factor of age. The adjusted R square is .39 (39%), which represents a large effect size (effect sizes defined by Kinnear and Gray 2010:449). Please see appendix 23 for SE London PASW regression outputs.

The results also show that *R* is .66 for the regression of self-rated social responsibility upon the factors of age and Asian ethnicity. The adjusted R square is .42 (42%), which represents a large effect size. This shows that adding the Asian ethnicity group variable to the age variable improves the predictive power of the regression equation. This indicates that age is the greatest predictor of self-rated social responsibility score, as it accounts for 39% of the proportion of variance accounted for by the regression. It also indicates that the Asian ethnic group are more stable in their perceptions than the White or Black ethnic groups. This is because belonging to the Asian ethnic group is considered to be a greater predictor of self-rated social responsibility scores than belonging to the White or Black ethnic groups. This also indicates that the Black ethnic group

variable is not indicated to be a considerable predictor of social responsibility score, despite it being significantly correlated with these scores. This may be partly explained by the high predictive values of the age and Asian ethnicity variables and the comparatively lower number of Black ethnicity participants than Asian or White ethnicity participants.

Again, it is acknowledged that the between factors analysis was only conducted on a small scale within this research, which limits the extent to which the research can comment on this aspect beyond these initial indications.

6.4. Summary of SE London Questionnaire Results

Analysis of the SE London community data indicated many similarities with the previous analysis of the Birmingham data. This includes results which indicate that SMEs believe they are more socially responsible than householders and policy makers believe they are more socially responsible than the other two groups. The levels of social responsibility reported by participants mirrored those reported by participants within Birmingham communities which had also experienced recent flooding. Like Birmingham, each community group believes they are the most socially responsible group and they also perceive themselves to be more socially responsible than the other two groups believe them to be.

The SE London results supported the previous findings from the Birmingham results that policy makers are perceived as possessing a particular level of social responsibility, regardless of whether the community has experienced recent flooding or not. Further similarities with the Birmingham results can be seen in the SE London results which indicated that older participants were reporting higher levels of social responsibility than younger participants and there are no gender differences in self-rated levels of social responsibility. Ethnic differences were found between the White and Asian ethnic groups, with the Asian ethnic group reporting higher self-rated levels of social responsibility when analysing the householder and SME data separately, mirroring the results from Birmingham communities which had also experienced flooding. There were also ethnic differences found in self-rated social responsibility scores between the White and Black ethnic groups and the Black and Asian ethnic groups.

Given the number of similarities, it could be suggested that perceptions of social responsibility may not be independent of location. Joint analysis of perceptions of social responsibility is

required in order to establish whether there are differences between communities in different locations. The regression analysis results indicate that, in line with the previous findings from both SE London and Birmingham communities, age is one of the greatest predictors of social responsibility scores. This is followed by the Asian ethnicity variable. This investigation did not include a SE London community which had not experienced recent flooding and this is a limitation which should be explored by future research.

6.5. Joint Analysis of Results from Birmingham and SE London Questionnaires

Individual analysis of both the Birmingham and SE London community data sets has allowed a number of comparisons to be drawn, with the key findings so far being:

- All 3 community groups in both Birmingham and SE London communities believe they are the most socially responsible group
- Self-rated social responsibility scores for all 3 community groups in both Birmingham and SE London communities are higher than the scores given to them by the other groups
- Policy makers in both Birmingham and SE London report highest self-rated social responsibility scores.
- Householders in both Birmingham and SE London report lowest self-rated social responsibility scores
- Policy makers in both Birmingham and SE London communities are perceived as possessing a particular level of social responsibility, regardless of whether the community has experienced recent flooding or not
- The SE London social responsibility scores were similar to those from the Birmingham communities which also had recent experience of flooding, but with slightly lower householder and SME scores
- Older participants reported significantly higher levels of self-rated social responsibility than younger participants in both the Birmingham and SE London communities
- There were no significant gender differences found in self-rated levels of social responsibility in either the Birmingham or SE London communities
- The Asian ethnic group reported significantly higher levels of self-rated social responsibility than the White ethnic group in both the Birmingham and SE London householder and SME community groups, but not in the policy maker community group

This research will now further explore the apparent similarities arising from comparing the results of the Birmingham and SE London communities, firstly by comparing the data from Thornton Heath with data from the control group community of Digbeth and then by comparing the Thornton Heath data with the data from the matched experience of flooding communities of Witton and Selly Park.

6.5.1. Joint Analysis: Social Responsibility

Table 38 shows the differences between the mean and median levels of self-rated social responsibility for each community group, and the levels applied to them by the other groups, for both Birmingham and SE London communities.

Table 38: Social responsibility scores for all Birmingham and SE London community groups

				Self-rated		Householder		SME		Policy Maker	
				Mean	Median	Mean	Median	Mean	Median	Mean	Median
Location	Witton	Type	Household	35.25	36.00	-.	-.	28.10	27.00	29.36	30.00
			SME	36.87	36.00	25.13	24.00	-.	-.	28.70	29.00
	Selly Park	Type	Household	35.17	35.00	.	.	28.66	28.00	28.51	28.00
			SME	36.86	36.50	26.50	25.00	-.	-.	28.00	27.00
	Digbeth	Type	Household	29.92	30.00	-.	-.	26.76	26.00	27.88	28.00
			SME	30.33	31.00	27.07	27.00	-.	-.	28.41	28.00
	Thornton Heath	Type	Household	32.03	32.00	.	.	26.67	26.00	29.71	29.00
			SME	33.39	33.00	26.48	26.00	-.	-.	30.04	30.00
	Birmingham	Type	Policy Maker	37.88	38.00.	33.22	33.00	29.95	30.00	-.	-.
	SE London	Type	Policy Maker	37.50	38.00	29.65	30.00	30.04	31.00	-.	-.

Table 38 highlights that the self-rated social responsibility scores for householders and SMEs in the SE London community and the Birmingham communities which have experienced flooding appear to be similar, but slightly lower in SE London. A two-way ANOVA will be conducted in order to determine whether or not this slight difference is significant. As with the Birmingham analysis, the two-way ANOVA was chosen as the most appropriate test because, although there are two independent variables (Location and Community Group), there is only one dependent

variable (Self-rated Social Responsibility Score) and different participants are used in each location and community group. Again, before the two-way ANOVA was conducted the data was checked for extreme cases. Appendix 24 shows the clustered boxplot of self-rated social responsibility scores sorted by location and community group. The analysis is for householders and SMEs only, as the policy makers were non-specific to any particular Birmingham community, so the SE London policy makers have also been removed to allow direct comparisons.

The clustered boxplot shows that, as we found when previously exploring the Birmingham data, three of the householders from Witton (20, 31 and 37) and one of the householders from Selly Park (198) were highlighted as being extreme cases. These cases were removed from the analysis in order to make the distribution more symmetrical prior to conducting the two-way ANOVA. No extreme cases were found within the Thornton Heath data set. Table 39 shows the results of the two-way ANOVA.

Table 39: Two-way ANOVA results for self-rated social responsibility in Witton, Selly Park and Thornton Heath

Two-Way ANOVA with Univariate Data Set

Dependent Variable: Mean Self-rated Social Responsibility Scores

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	1012.467[a]	5	202.493	16.985	.000	.206
Intercept	280296.937	1	280296.937	23510.521	.000	.986
Location	594.096	2	297.048	24.916	.000	.132
Type	108.735	1	108.735	9.120	.003	.027
Location * Type	1.398	2	.699	.059	.943	.000
Error	3910.479	328	11.922			
Total	405162.000	334				
Corrected Total	4922.946	333				

a. R Squared = .206 (Adjusted R Squared = .194)

The two-way ANOVA results (exploring self-rated social responsibility scores) shown in table 39 indicate that there is a significant difference between the mean levels of self-rated social responsibility reported by householders (Witton = 35.25, Selly Park = 35.17, Thornton Heath = 32.03) and SMEs (Witton = 36.87, Selly Park = 36.86, Thornton Heath = 33.39) for the community group Type factor at the .01 significance level $F(1, 334) = 9.120$; $p = .003$; partial eta squared = .03

(which is a ‘small’ effect). This indicates that householders mean self-rated social responsibility scores and SMEs self-rated social responsibility scores are significantly different from each other. Furthermore, there is a significant difference between the mean levels of self-rated social responsibility reported in each Location $F(2, 334) = 24.916$; $p < 0.01$; partial eta squared = .13 (which is a ‘medium’ effect). However, there is no significant difference between the two-way interaction of Type x Location $F(2, 334) = .059$; $p = .943$. This indicates that SMEs are reporting significantly higher levels of social responsibility than householders when exploring both the Birmingham and SE London data sets together. However, there is also a significant difference between the levels of social responsibility reported between each community, indicating that the social responsibility scores reported by the Birmingham and SE London communities are significantly different, despite the mean self-rated social responsibility scores for Thornton Heath being only slightly lower than the mean scores for Witton and Selly Park. This indicates that householders and SMEs in Thornton Heath rate themselves as having lower levels of social responsibility than householders and SMEs in Witton and Selly Park. This suggests that perceptions of social responsibility vary between communities, although not as significantly as it does between communities which have and have not experienced recent flooding. This also indicates that perceptions of social responsibility are independent of community location, as communities in each location are displaying significantly different levels.

Another two-way ANOVA will now be conducted in order to determine whether the self-rated social responsibility scores are significantly different from the scores reported by the control group of Digbeth which has not experienced recent flooding. A clustered boxplot is not required because both Digbeth and Thornton Heath data sets have already been explored for extreme cases previously in the analysis and both did not contain any extreme scores.

Table 40: Two-way ANOVA results for self-rated social responsibility in Digbeth and Thornton Heath

Two-Way ANOVA with Univariate Data Set

Dependent Variable: Mean Self-rated Social Responsibility Scores

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	265.226[a]	3	88.409	6.389	.000	.094
Intercept	140823.095	1	140823.095	10177.115	.000	.982
Location	238.617	1	238.617	17.245	.000	.086
Type	28.013	1	28.013	2.025	.156	.011
Location * Type	7.922	1	7.922	.573	.450	.003
Error	2546.051	184	13.837			
Total	188222.000	188				
Corrected Total	2811.277	187				

a. R Squared = .094 (Adjusted R Squared = .080)

The two-way ANOVA results (exploring self-rated social responsibility scores) shown in table 40 indicate that there is are no significant differences between the mean levels of self-rated social responsibility reported by householders (Digbeth = 29.92, Thornton Heath = 32.03) and SMEs (Digbeth = 30.33, Thornton Heath = 33.39) for the community group Type factor at the .05 significance level $F(1, 188) = 2.025$; $p = .156$. This indicates that householders mean self-rated social responsibility scores and SMEs self-rated social responsibility scores are similar to each other, within each individual community. When exploring differences between communities, there is a significant difference between the mean levels of self-rated social responsibility reported in each Location $F(1, 188) = 17.254$; $p < 0.01$; partial eta squared = .09 (which is a 'medium' effect). However, there is no significant difference between the two-way interaction of Type x Location $F(1, 188) = .573$; $p = .45$. This indicates that there is a significant difference between the levels of social responsibility reported between each community, indicating that the social responsibility scores reported by the Digbeth and Thornton Heath communities are significantly different. The mean self-rated social responsibility scores for Thornton Heath and Digbeth indicate that householders and SMEs in Thornton Heath rate themselves as having significantly higher levels of social responsibility than householders and SMEs in Digbeth.

6.5.2. Joint Analysis: Age

Appendix 25 shows a scatterplot which explores the relationship between age and self-rated perceptions of social responsibility for all community groups in the Birmingham communities of Witton and Selly Park and the SE London community of Thornton Heath (the three test communities matched on experience of flooding). The control group community data (Digbeth householders and SMEs) has been removed, so that the test community data results can be observed independently.

As previous results suggested, when analysing the data from the three test communities together the scatterplot suggests some degree of positive linear relationship between age and self-rated social responsibility. Again, as with the previous analysis of age and social responsibility, the most appropriate test to discover if there is a significant association between age and self-rated levels of social responsibility is Pearsons Correlation. Pearsons Correlation shows that $r(405) = .437$; $p < .01$ ($p < 0.0005$). This means that the Pearsons Correlation indicates that there is a significant positive correlation ($p = .437$) between age and self-rated level of social responsibility at the 0.01 level (2-tailed). This indicates that when the data sets for the three test communities of Witton, Selly Park and Thornton Heath were combined, older participants were still reporting higher levels of social responsibility than younger participants, suggesting this is a common aspect across communities in different locations.

6.5.3. Joint Analysis: Gender

There have been no significant gender differences found so far in the analysis. To confirm this, a *t*-test will be conducted for gender and self-rated perceptions of social responsibility for all community groups in the Birmingham communities of Witton and Selly Park and the SE London community of Thornton Heath (the three test communities matched on experience of flooding). Again, the control group community data (Digbeth householders and SMEs) has been removed, so that the test community data results can be observed independently. The histograms of each gender have already been confirmed as meeting the criteria for testing during the previous individual analysis for each location. Table 41 shows the results of the independent samples *t*-test.

Table 41: Independent samples *t*-test results for gender and self-rated social responsibility within Witton, Selly Park and Thornton Heath community groups

Independent Samples T-Test

		Levene's Test for Equality of Variances		*t*-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Self-rated Social Responsibility	Equal variances assumed	5.097	.025	-1.075	403	.283	-.42646	.39662	-1.20617	.35325
	Equal variances not assumed			-1.101	399.255	.271	-.42646	.38727	-1.18780	.33488

Levene's statistic has a *p*-value for F < .05 and therefore F is significant and homogeneity of variance cannot be assumed and we must accept the report of the *t*-test in the lower row. The *t*-test revealed that *t* (*df* = 399.255) is -1.101. The *p*-value is .271 (2-tailed), which indicates that there is no significant difference between the self-rated social responsibility levels of males and females because $p > 0.05$. As expected, this finding indicates that there are no gender differences in self-rated levels of social responsibility for any community in any location. Therefore, this lack of gender differences is a common aspect across communities in different locations.

6.5.4. Joint Analysis: Ethnicity

Table 42 shows the differences between the self-rated social responsibility scores for each ethnic group within the three test communities of Witton, Selly park and Thornton Heath. Again, the control group community data (Digbeth householders and SMEs) has been removed, so that the test community data results can be observed independently. In addition, because the previous individual analyses of the Birmingham communities did not include policy maker data (due to policy makers being non-specific to a particular community) and further analysis suggested that significant ethnic differences may only exist within the householder and SME community groups, then the policy maker data has also been excluded.

Table 42: Self-rated social responsibility scores for each ethnic group within Witton, Selly Park and Thornton Heath (Householders and SMEs only)

		Self-rated Social Responsibility Scores					
		Count	Mean	Median	Standard Deviation	Variance	Range
Ethnicity	White	255	34.58	34.00	3.79	14.38	19.00
	Black	25	31.12	31.00	4.01	16.11	15.00
	Asian	40	36.40	37.00	3.58	12.81	14.00
	Chinese	5	36.00	34.00	4.30	18.50	10.00
	White/Black	4	30.00	30.00	1.83	3.33	4.00
	White/Asian	2	32.50	32.50	.71	.50	1.00
	Other	7	34.71	33.00	5.38	28.90	13.00

Even with combined data sets, the majority of the ethnic groups do not contain sufficient numbers for more in-depth testing. As we have put the data sets together, the normal distribution histograms for the three largest ethnic groups, White, Asian and Black (which accounts for 94.6% of the total participants) must be observed in order to determine whether or not they still meet the criteria for further testing.

Therefore, the histograms (see appendix 26) indicate that the data sets are largely normally distributed (as they do not show any major positive or negative skews and contain only a single maximum peak) independent samples *t*-tests will be conducted to see if there are significant differences between the self-rated levels of social responsibility of each of the White, Black and Asian ethnic groups.

Table 43: Independent samples *t*-test results for White and Asian ethnic groups in Witton, Selly Park and Thornton Heath (Householders and SMEs only)

Independent Samples T-Test

		Levene's Test for Equality of Variances		*t*-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Self-rated Social Responsibility	Equal variances assumed	.068	.794	-2.842	293	.005	-1.81961	.64016	-3.07951	-.55971
	Equal variances not assumed			-2.965	53.686	.005	-1.81961	.61371	-3.05019	-.58903

Levene's statistic has a *p*-value for F > .05 and therefore F is not significant and homogeneity of variance can be assumed and we can accept the report of the *t*-test in the upper row. The *t*-test revealed that *t* (*df* = 293) is -2.842. The *p*-value is .005 (2-tailed), which indicates that there is a significant difference between the self-rated social responsibility levels of the White and Black ethnic groups because $p < .01$. This indicates that the results from the combined data sets of the three test communities support the previous findings from their separate analyses. This suggests that White and Asian ethnic differences exist within the self-rated perceptions of social responsibility for householders and SMEs across different community locations.

Table 44: Independent samples *t*-test results for White and Black ethnic groups in Witton, Selly Park and Thornton Heath (Householders and SMEs only)

Independent Samples T-Test

		Levene's Test for Equality of Variances		*t*-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Self-rated Social Responsibility	Equal variances assumed	.000	.994	4.332	278	.000	3.46039	.79880	1.88792	5.03286
	Equal variances not assumed			4.134	28.363	.000	3.46039	.83713	1.74660	5.17419

Levene's statistic has a *p*-value for F > .05 and therefore F is not significant and homogeneity of variance can be assumed and we can accept the report of the *t*-test in the upper row. The *t*-test revealed that *t* (*df* = 278) is 4.332. The *p*-value is < .01 (2-tailed), which indicates that there is a significant difference between the self-rated social responsibility levels of the White and Black ethnic groups because *p* < .01. This indicates that the results from the combined data sets of the three test communities support the previous findings from their separate analyses. This suggests that White and Black ethnic differences exist within the self-rated perceptions of social responsibility for householders and SMEs across different community locations.

Table 45: Independent samples *t*-test results for Black and Asian ethnic groups in Witton, Selly Park and Thornton Heath (Householders and SMEs only)

Independent Samples T-Test

		Levene's Test for Equality of Variances		*t*-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Self-rated Social Responsibility	Equal variances assumed	.033	.856	-5.522	63	.000	-5.28000	.95623	-7.19087	-3.36913
	Equal variances not assumed			-5.376	46.687	.000	-5.28000	.98217	-7.25622	-3.30378

Levene's statistic has a *p*-value for F > .05 and therefore F is not significant and homogeneity of variance can be assumed and we can accept the report of the *t*-test in the upper row. The *t*-test revealed that *t* (*df* = 63) is 2.651. The *p*-value is < .01 (2-tailed), which indicates that there is a significant difference between the self-rated social responsibility levels of the White and Black ethnic groups because *p* < .01. This indicates that the results from the combined data sets of the three test communities support the previous findings from their separate analyses. This suggests that Black and Asian ethnic differences exist within the self-rated perceptions of social responsibility for householders and SMEs across different community locations.

The direction of the indicated ethnic differences can be seen when we explore the self-rated social responsibility scores of the White, Black and Asian ethnic groups.

Table 46: Self-rated social responsibility scores of White, Black and Asian ethnic groups in Witton, Selly Park and Thornton Heath (Householders and SMEs only)

		Self-rated Social Responsibility				
		Mean	Median	Standard Deviation	Variance	Range
Ethnicity	White	34.58	34.00	3.79	14.38	19.00
	Black	31.12	31.00	4.01	16.11	15.00
	Asian	36.40	37.00	3.58	12.81	14.00

Table 46 indicates that, similar to the individual analyses of the Birmingham and SE London communities, the combined data set for householders and SMEs in Witton, Selly Park and Thornton Heath show the Asian ethnic group reports significantly higher levels of social responsibility than both the White and Black ethnic groups. The White ethnic group also reports significantly higher levels of social responsibility than the Black ethnic group.

It should also be noted that further analyses were conducted which included the policy maker data in the combined data set and in contrast to the previous findings all three sets of ethnic comparisons resulted in significant differences. The White and Black ethnic differences were significant t (df = 335) is 3.849, p-value is < .01 (2-tailed), the White and Asian ethnic differences were significant t (df = 352) is -3.021, p-value is .003 (2-tailed) and the Black and Asian ethnic differences were also significant t (df = 79) is -5.055, p-value is < .01 (2-tailed). This suggests that the strength of the ethnic differences within the householder and SME groups within the combined data set is high enough to produce a significant difference, even when the policy maker data is introduced, which has already been shown to previously negate significant differences.

6.6. Summary of Joint Analysis

When analysed together, the householders and SMEs in both Digbeth and Thornton Heath were reporting closely matched self-rated social responsibility scores (within their individual communities), but the results indicate that householders and SMEs in Thornton Heath rate themselves as having lower levels of social responsibility than householders and SMEs in Witton and Selly Park. However, the mean self-rated social responsibility scores were significantly higher in Thornton Heath (which had recently experienced flooding) than Digbeth (control group which had not recently experienced flooding). Therefore, the results indicated that householders and

SMES in Thornton Heath perceive themselves to possess almost equal levels of social responsibility and the same is indicated of the householders and SMEs in Digbeth. However, when comparing the two communities, the overall levels of social responsibility possessed by householders and SMES in Thornton Heath are higher than those in Digbeth. Therefore, the results have shown that householders and SMEs in Thornton Heath perceive themselves to have significantly higher levels of social responsibility than the householders and SMEs in the control group of Digbeth. This supports the suggestion that experience of flooding increase self-rated perceptions of social responsibility.

However, householders and SMEs in Witton and Selly Park perceive themselves to have significantly higher levels of social responsibility than the householders and SMEs in Thornton Heath, despite all three communities having recent experience of flooding. This suggests that experience of flooding does not lead to a uniform percentage increase in perceptions of social responsibility and there are differences between communities in different locations. The combined data sets for the three test communities of Witton, Selly Park and Thornton Heath also indicated that older participants were still reporting higher levels of social responsibility than younger participants, suggesting this is a common aspect across communities in different locations. However, in line with the previous findings, no gender differences were found, indicating that lack of gender differences is a common aspect across communities in different locations. The Asian ethnic group reported significantly higher levels of social responsibility than both the White and Black ethnic groups. The White ethnic group also reported significantly higher levels of social responsibility than the Black ethnic group. This suggests that these ethnic differences within the householder and SME community groups are a common aspect across communities in different locations. In contrast to earlier results from separate analyses, the combined data set showed significant ethnic differences even when the policy maker data was included in the analysis.

7. QUALITATIVE RESULTS

The cognitive mapping analysis was conducted in two distinct phases. For each phase of the analysis a number of themes emerged from the cognitive maps, which were built by highlighting and interpreting codes within the transcripts. Please note that, as explained in the research methods regarding cognitive mapping (page 137, section 5.6.1.), the themes revealed are not distinct elements from each other, a degree of interaction takes place as codes can overlap multiple themes on pathways to a number of separate endings or conclusions within the narrative. For example, a code might contain information relating to both costs and how this has made the participant disinterested in becoming resilient, representing evidence for both the Cost Barrier theme and the Disinterest theme. It is the strength (repetition) and number of distinctive codes leading to these separate conclusions, and the interpretation of their underlying meanings, from which the separate themes are able to be deduced. The cognitive maps themselves contain the narrative for their respective themes. If codes overlap then it is indicated to which other theme the codes also relate and the reader should then go to the cognitive map for the other indicated theme for the full narrative of that theme.

Firstly, general cognitive mapping analysis was completed on the transcripts from each community group in each location in order to explore the recurrent themes present within the data set. This provides an overview of the messages that each different community group are trying to express. The persistent trends found throughout this phase of the analysis are presented as key findings in the summary.

In the second phase the data set was specifically analysed in relation to the subject areas of each of the main findings from the questionnaire analysis, in order to provide a contextual narrative for the quantitative results and provide a greater depth of information towards meeting the overall research objectives. This involved searching for codes that were specifically related to age or ethnicity.

It is acknowledged that there are limitations within the cognitive mapping findings due to lack of analysis of the interaction between factors. This is due to difficulties in apportioning strength weightings to demographic information and thereby rank the qualitative data in this research. Section 6.1.5., p.161, and section 6.3.5., p.173, explored the ranking of factors from the quantitative results, indicating the degree to which factors such as age and ethnicity influence

perceptions of social responsibility. However, as the qualitative findings are intended to provide a context for the quantitative results, then this needs to be an all encompassing and all inclusive context, which acknowledges all the opinions and perceptions present within the data set. For example, it would not be right to give greater weighting to the responses of participants from an Asian background over any other ethnicity, or to rank the perceptions of older participants as being of more significance than those of younger participants. Instead, the data will be explored through the cognitive mapping process in order to determine the degree of support that exists for, and potential explanations of, the earlier quantitative findings.

Once the cognitive mapping analysis was completed, similar themes were then grouped together into categories. The structure of the 5 categories and 14 themes discovered are presented in figure 20.

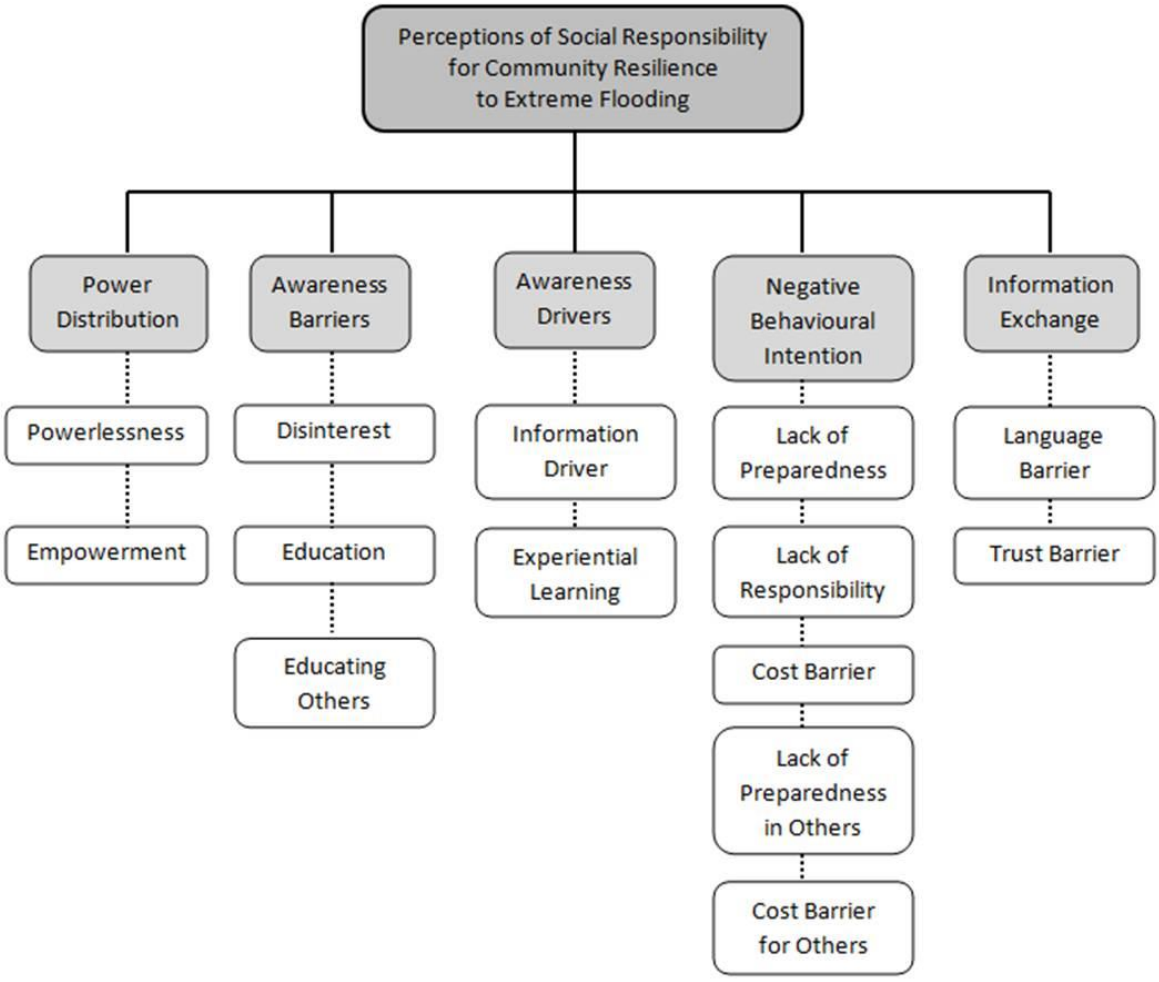

Figure 20: Categories and Themes Structure for Cognitive Mapping General Analysis

Explanations regarding the content of each category are provided upon their first instance within the following analysis. Explanations are also provided of what each theme has revealed to the researcher during the cognitive mapping process, along with examples of cognitive maps and examples of the codes used to interpret each theme. As there are a total of 59 cognitive maps, only one map is provided as an example for each section of analysis, with the reader directed to the remainder within the appendices. However, the interpretative analysis used to produce each map and highlight each theme remains the same for each.

It is acknowledged that many of these themes can be considered to be negative in nature. However, the themes are reflective of codes present within the data set and these may be reflective of the falling concern and increasingly negative scepticism that has been previously discussed within the review of literature (see Chapter 2.2., p.9, for discussion of findings by Leiserowitz, Maibach, and Roser-Renouf 2010, YouGov/EDF 2010 and European Commission 2009). It is also reflective of the findings by Nicholson-Cole (2005) who found a generally pessimistic view of climate change amongst members of the general public in the UK (see chapter 2.1, p.6, and chapter 2.2., p.9, for discussion).

7.1. Cognitive Mapping Analysis Phase 1: General Analysis

Cognitive mapping analysis was conducted on the transcripts from the Birmingham community groups. The Witton and Selly Park householders were analysed together as they both share the characteristics of having experienced recent flooding within the Birmingham area. The Witton and Selly Park SMEs were also analysed together for this same reason. The control group of Digbeth, which has not experienced recent flooding, was analysed separately. The Birmingham policy maker group was also analysed individually.

7.1.1. Witton and Selly Park Householders

The cognitive mapping analysis revealed 5 categories of themes within the Witton and Selly Park householder transcripts. These categories were Power Distribution, Awareness Barriers, Awareness Drivers, Negative Behavioural Intention and Information Exchange. Each of these categories had a number of themes derived from the coding of the transcripts. Table 47 lists the 5 theme categories and their 9 associated themes.

Table 47: Theme Categories and associated themes for Witton and Selly Park householders

No.	Categories	Themes
1	Power Distribution	Powerlessness
2	Awareness Barriers	Disinterest
		Education
3	Awareness Drivers	Experiential Learning
4	Negative Behavioural Intention	Lack of Preparedness
		Lack of Responsibility
		Cost Barrier
5	Information Exchange	Language Barrier
		Trust Barrier

The power distribution category relates to perceptions of what people or groups are able to achieve or have responsibility for. The awareness barriers category relates to perceptions, behaviours or observations that represent barriers to increasing knowledge and awareness of extreme flooding events. The awareness drivers category relates to aspects which represent perceptions, behaviour and observations which can increase knowledge and awareness of extreme flooding events. The negative behavioural intention category relates to people or groups whose perceptions or lack of pro-environmental behaviour represents barriers to community resilience to extreme flooding. The information exchange category relate to the perceptions that people or groups have about the way in which information is gathered or disseminated, as well as perceptions regarding the quality of that information. Please note that the overall definitions of these categories remain the same throughout the analysis.

Table 48 gives an overview of the themes and example codes found within the Witton and Selly Park householders community group.

Table 48: Themes and example codes for Witton and Selly Park householders

Themes	**Codes**
Powerlessness	*"I'm not sure what i can do anyway"* *"We don't have the ability to stop it"*
Disinterest	*"Have other priorities in their lives"* *"It's not seen as a major concern"*
Education	*"I don't know what i should be doing"* *"It's not something we are taught about"*
Experiential Learning	*"We should all learn from what we have been through"* *"They have been through it and know what to do"*
Lack of Preparedness	*"We could all do more to secure our homes"* *"By then it is too late to make any real difference"*
Lack of Responsibility	*"Did not read advice on council website"* *"Not many incentives for people to protect themselves"*
Cost Barrier	*"Particularly [reluctant] if it costs money"* *"Mostly affects poorer families"*
Language Barrier	*"Not enough information available"* *"There are inconsistencies with flooding information"*
Trust Barrier	*"We no longer have faith in the authorities to protect us"* *"Government keeps building on flood plains"*

The contextual narratives from which each of these themes are derived can be seen in their respective cognitive maps. The disinterest cognitive map in figure 21 is presented as the first example of how the maps are formed from coding within the transcripts and how the interconnections between then codes form a narrative from which the disinterest theme emerges. It also indicates where the codes can also be representative of interlinkages with the narratives of other themes, which are then continued in their respective cognitive maps. The cognitive map for the disinterest theme in figure 21 reveals that flooding is not a big enough concern in people's daily lives for them to take action. They don't expect it to flood and if it does they don't expect it to affect them. This means they do not seek advice and are reluctant to make adjustments to their homes or lifestyles.

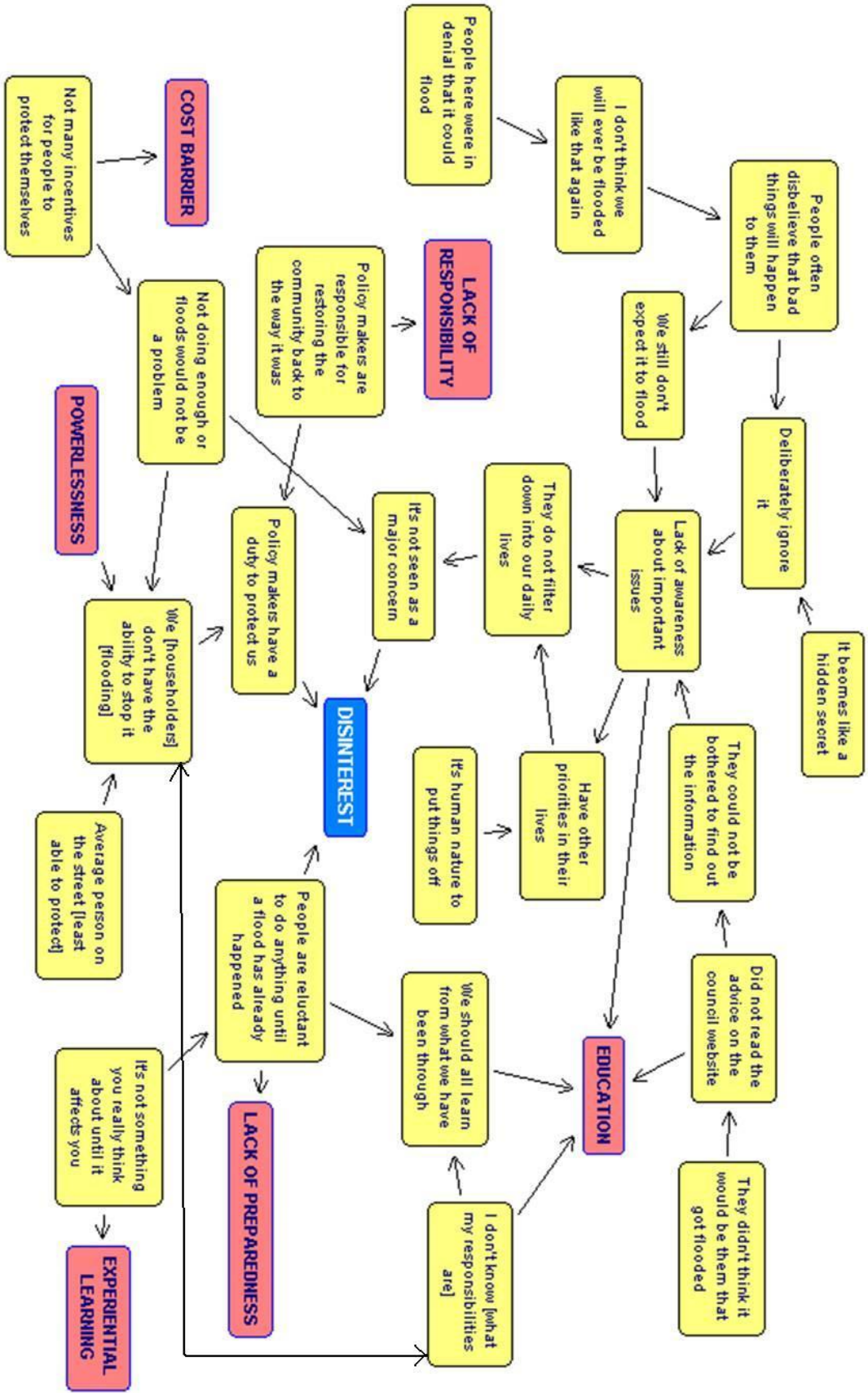

Figure 21: Disinterest Theme Cognitive Map for Witton and Selly Park Householders

In this manner, the other themes are also interpreted from the contextual narrative within their respective cognitive maps (see appendix 27 for the remainder of the Witton and Selly Park householders cognitive maps). The cognitive map for the powerlessness theme reveals that the householders understand that they may not be doing enough, but believe that they are not capable of doing much more. This is because they either don't know what they should be doing or cannot afford to take action. There is an expectation that the council and other authorities are in a better position to provide the required levels of protection. The cognitive map for the education theme reveals that householders don't know what to do before, during or after a flooding event. There is a general lack of local knowledge about flood risk and the authorities are expected to educate them, despite a lack of interest in the subject matter.

The cognitive map for the experiential learning theme reveals that people do learn from flooding experiences, some faster than others. This experience increases the likelihood of people taking protective measures and makes them feel more confident that they know what to do should it happen again. The cognitive map for the lack of preparedness theme reveals that householders often don't know how to prepare for a flood, but others still fail to prepare even when they know what they should be doing. This is because they rely on others too much to do it for them or don't believe it is worth the cost or effort. The cognitive map for the lack of responsibility theme reveals that householders believe that the majority of flood protection for a community is the responsibility of the authorities within that community. This includes both educational information and physical defence measures.

The cognitive map for the cost barrier theme reveals that householders who can afford to make changes will have higher levels of protection than those on lower incomes. However, this does not necessarily mean that those on higher incomes will make the necessary changes because it is also suggested that protection is not worth the cost. The cognitive map for the language barrier theme reveals that policy makers believe that people deliberately ignore the information they are providing. It also reveals that householders believe that the information is too small and inconsistent and that policy makers do not listen to them. The cognitive map for the trust barrier theme reveals that people don't feel that they have any choice but to follow what they are told by local authorities; despite there being inconsistencies within the information they are given. There is a general lack of faith in the authority's ability to protect them from extreme flooding.

7.1.2. Digbeth Householders

The cognitive mapping analysis revealed 4 categories of themes within the Digbeth householder transcripts. These categories were Power Distribution, Awareness Barriers, Negative Behavioural Intention and Information Exchange. Each of these categories has a number of themes derived from the coding of the transcripts. Table 49 lists the 4 theme categories and their 8 associated themes.

Table 49: Theme categories and associated themes for Digbeth householders

No.	Categories	Themes
1	Power Distribution	Powerlessness
2	Awareness Barriers	Disinterest
		Education
3	Negative Behavioural Intention	Lack of Preparedness
		Lack of Responsibility
		Cost Barrier
4	Information Exchange	Language Barrier
		Trust Barrier

The explanations of the four categories of power distribution, awareness barriers, negative behavioural intention and information exchange are the same as the explanations provided for each of these categories listed after table 47, p.191.

Table 50 gives an overview of the themes and example codes found within the Digbeth householders community group.

Table 50: Themes and example codes for Digbeth householders

Themes	Codes
Powerlessness	*"What more could I do?"* *"We rely upon the emergency services"*
Disinterest	*"I have never considered it"* *"Choose to ignore it"*
Education	*"Getting better climate education into schools [is important]"* *"[Need to] raise community awareness of flooding"*
Lack of Preparedness	*"It would catch most people by surprise"* *"I don't think floods are a priority for most people"*
Lack of Responsibility	*"I don't want to do something and then find it was all for nothing"* *"There is not much motivation to do anything"*
Cost Barrier	*"No one is willing to pay for protection"* *"Groups with power or wealth [most able to protect]"*
Language Barrier	*"[Need to] communicate with each other"* *"No one listens to you"*
Trust Barrier	*"You don' know the people who run your local businesses"* *"I don't fully trust them"*

The contextual narrative from which the lack of preparedness theme emerged can be seen in the cognitive map in figure 22. The cognitive map for the lack of preparedness theme reveals that there is an expectation that householders will be protected by the government. There is a lack of awareness about what they are supposed to do and reluctance to meet the financial costs of protection, especially as it is not seen as a priority.

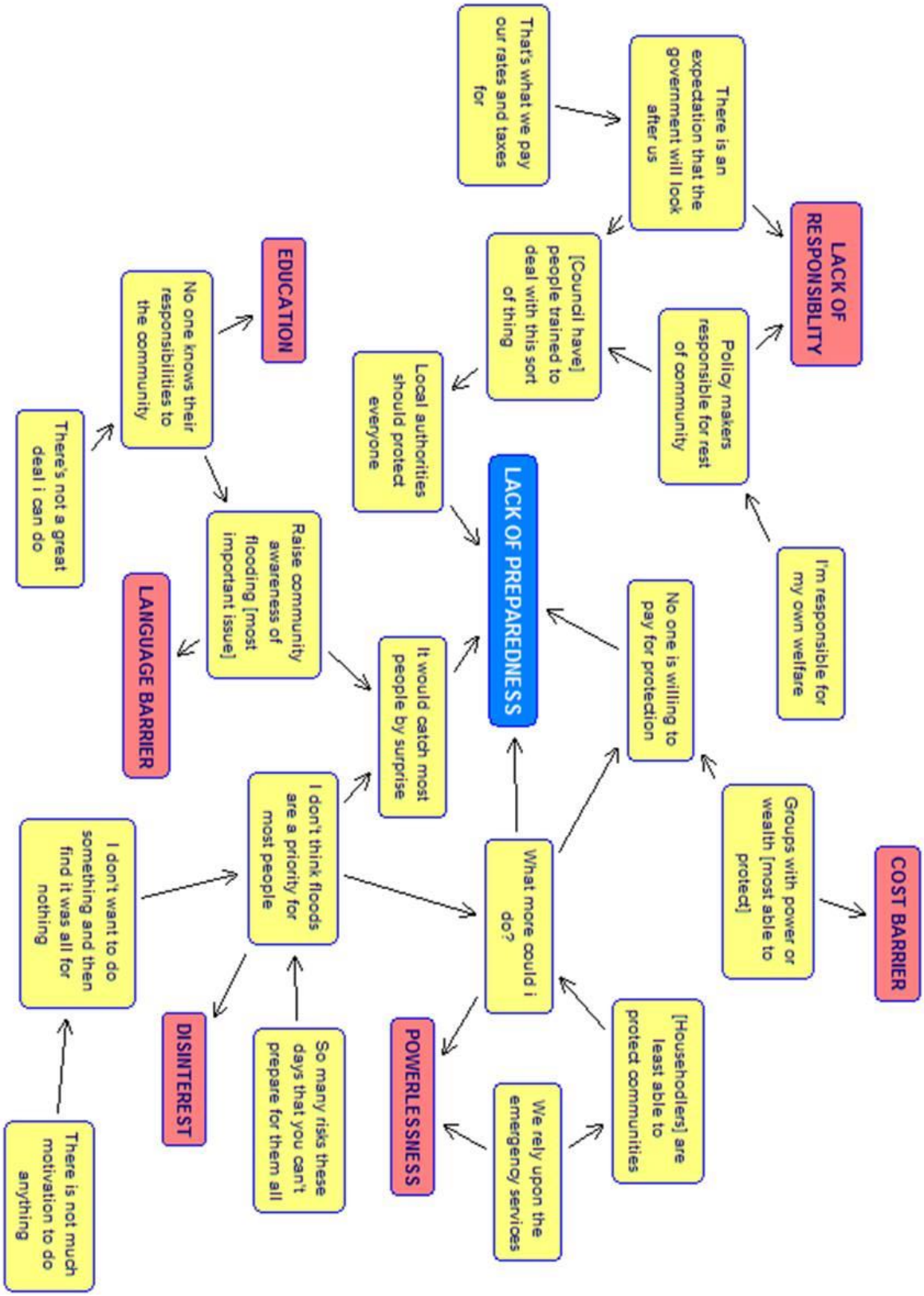

Figure 22: Lack of Preparedness Theme Cognitive Map for Digbeth Householders

The other themes are also interpreted from the contextual narrative within their respective cognitive maps (see appendix 28 for the remainder of the Digbeth householder's cognitive maps). The cognitive map for the powerlessness theme reveals that householders feel powerless because no one listens to them and they don't know what to do to protect themselves, so are forced to rely upon the authorities and emergency services. The cognitive map for the disinterest theme reveals that floods are not a priority for householders and it is a problem for those in charge. There is a lack of motivation to increase protection as you can't prepare for all the risks anyway. The cognitive map for the education theme reveals that some people feel that there is too much information, but most of it is not relevant to them. They feel that people should be formally educated about these issues.

The cognitive map for the lack of responsibility theme reveals that householders don't want to spend money on something that might not happen because that is the responsibility of the local authorities. People do not know what their responsibilities are and don't believe they have much to contribute to community resilience. The cognitive map for the cost barrier theme reveals that householders can't afford to pay for protection and hose that can afford it are not willing to make the investment. The poorer sections of the community are also considered to be the most at risk. The cognitive map for the language barrier theme reveals that authorities are not seen to be communicating with members of the community enough. This overwhelming one way flow of information is believed to be too complex and can often be distorted by the media. The cognitive map for the trust barrier theme reveals that the local authorities are expected to protect everyone but are failing to do so because they do not listen to residents and they do not have enough of a physical presence within the community.

7.1.3. Witton and Selly Park SMEs

The cognitive mapping analysis revealed 5 categories of themes within the Witton and Selly Park SME transcripts. These categories were Power Distribution, Awareness Barriers, Awareness Drivers, Negative Behavioural Intention and Information Exchange. Each of these categories has a number of themes derived from the coding of the transcripts. Table 51 lists the 5 theme categories and their 9 associated themes.

Table 51: Theme categories and associated themes for Witton and Selly Park SMEs

No.	Categories	Themes
1	Power Distribution	Powerlessness
2	Awareness Barriers	Disinterest
		Education
3	Awareness Drivers	Experiential Learning
4	Negative Behavioural Intention	Lack of Preparedness
		Lack of Responsibility
		Cost Barrier
5	Information Exchange	Language Barrier
		Trust Barrier

The explanations of the five categories of power distribution, awareness barriers, awareness drivers, negative behavioural intention and information exchange are the same as the explanations provided for each of these categories listed after table 47, p.191.

Table 52 gives an overview of the themes and example codes found within the Witton and Selly Park SMEs community group.

Table 52: Themes and example codes for Witton and Selly Park SMEs

Themes	**Codes**
Powerlessness	*"They don't have the ability to plan for it on a large scale"* *"Policy maker's responsibility is everyone's safety"*
Disinterest	*"We don't consider it a problem unless it happens regularly"* *"Gets forgotten about or pushed down their list of things to do"*
Education	*"Educating the current and future generations [important issue]"* *"Local authorities should give us clearer information"*
Experiential Learning	*"Affects people without experience of flooding the most"* *"People who are aware it may flood [most able to protect]"*
Lack of Preparedness	*"Not enough people are ready"* *"We are not meeting the required standards of protection"*
Lack of Responsibility	*"No one takes responsibility for preventing it"* *"Selfish behaviour makes us more vulnerable"*
Cost Barrier	*"We can only afford to do so much"* *"Main issue is affording to make the changes"*
Language Barrier	*"Groups that don't understand or listen to the information that public bodies produce [least able to protect"* *"There are so many legal and logistical barriers"*
Trust Barrier	*"Targets are set too low to make any difference"* *"Working together [is the most important issue]"*

The contextual narrative from which the powerlessness theme emerged can be seen in the cognitive map in figure 23. The cognitive map for the powerlessness theme reveals that SMEs believe that the authorities are the only ones with the expertise and resources to protect against extreme flooding.

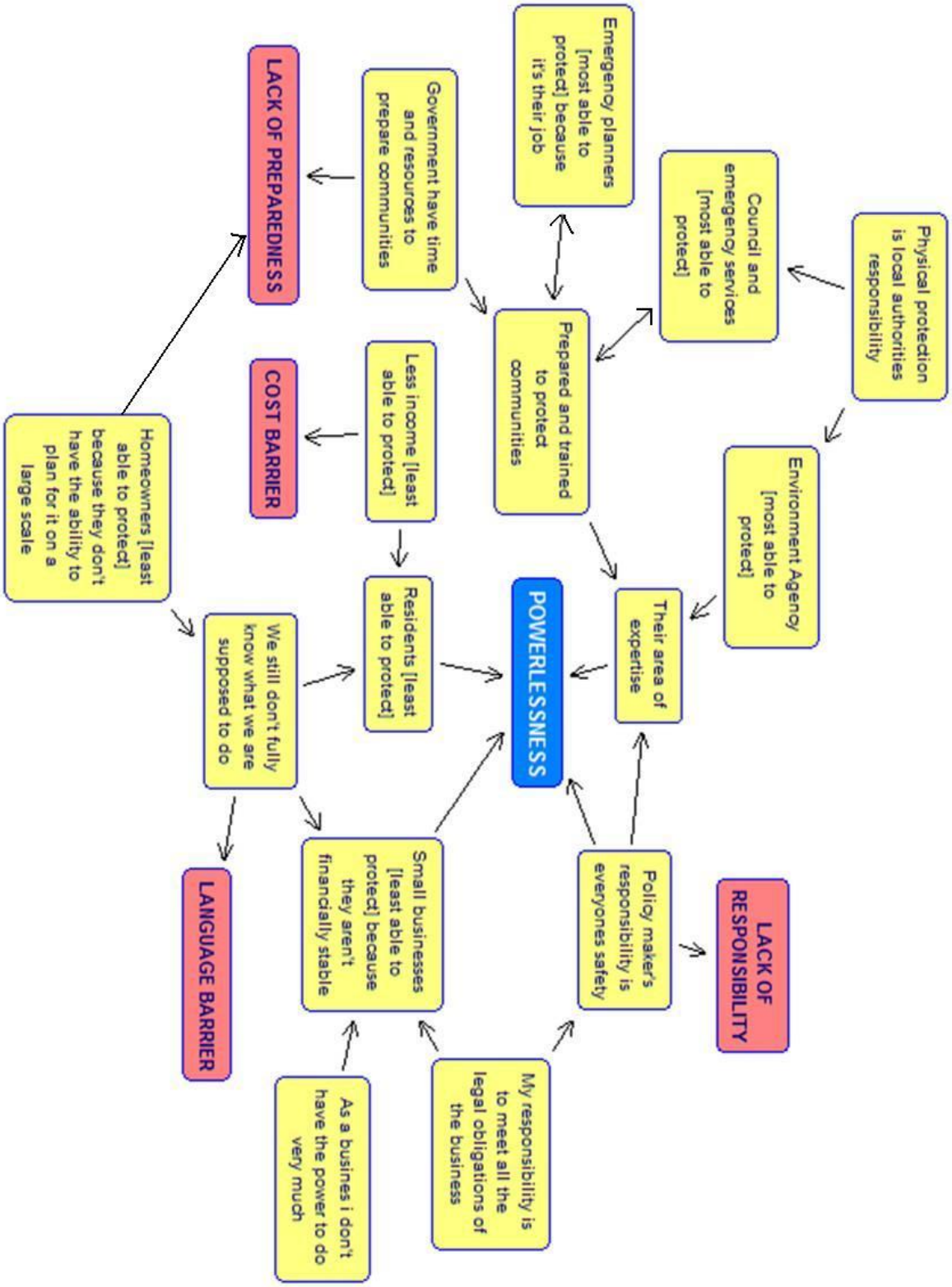

Figure 23: Powerlessness Theme Cognitive Map for Witton and Selly Park SMEs

The other themes are also interpreted from the contextual narrative within their respective cognitive maps (see appendix 29 for the remainder of the Witton and Selly Park SMEs cognitive maps). The cognitive map for the disinterest theme reveals that flooding is not considered to be a problem unless it happens regularly. Furthermore, because it has already flooded it is not believed that it will flood again and even if it does then it is not their responsibility to prepare for it. The cognitive map for the education theme reveals that local authorities should be the providers of education as many people are not aware that it may flood. The cognitive map for the experiential learning theme reveals that SMEs who are aware it may flood are in a better position to protect themselves as they will know what to do next time. The cognitive map for the lack of preparedness theme reveals that selfish behaviour is making people more vulnerable, with no one taking responsibility for protection as they feel that there is not much that they can do.

The cognitive map for the lack of responsibility theme reveals that SMEs are only doing the things that they are legally required to do, but are not doing much beyond that because they believe it is the role of local authorities to offer that level of protection. The cognitive map for the cost barrier theme reveals that SMEs aren't prepared to make financial sacrifices because it's not as easy for them to reach higher levels of protection as it is for larger businesses. The cognitive map for the language barrier theme reveals that clearer information and guidance is required for SMEs to know what their roles and responsibilities are and that local authorities should work more closely with local businesses to help them understand and achieve their goals. The cognitive map for the trust barrier theme reveals that there is an overreliance upon each other that makes modern communities more vulnerable to extreme flooding. The government does not set its targets high enough and does not keep its promises, which in turn means they fail to properly help local businesses to protect themselves from extreme flooding.

7.1.4. Digbeth SMEs

The cognitive mapping analysis revealed 4 categories of themes within the Digbeth SME transcripts. These categories were Power Distribution, Awareness Barriers, Negative Behavioural Intention and Information Exchange. Each of these categories has a number of themes derived from the coding of the transcripts. Table 53 lists the 4 theme categories and their 5 associated themes.

Table 53: Theme categories and associated themes for Digbeth SMEs

No.	Categories	Themes
1	Power Distribution	Powerlessness
2	Awareness Barriers	Disinterest
3	Negative Behavioural Intention	Lack of Preparedness
		Cost Barrier
4	Information Exchange	Language Barrier

The explanations of the four categories of power distribution, awareness barriers, negative behavioural intention and information exchange are the same as the explanations provided for each of these categories listed after table 47, p.191.

Table 54 gives an overview of the themes and example codes found within the Digbeth SMEs community group.

Table 54: Themes and example codes for Digbeth SMEs

Themes	Codes
Powerlessness	*"We don't have the ability to handle floods on our own"* *"We imagine that the authorities will fully protect us"*
Disinterest	*"It's not a big enough problem yet"* *"We don't pay [risks] enough attention"*
Lack of Preparedness	*"Not enough resources to protect all of the people all of the time"* *"People don't expect it to happen to them"*
Cost Barrier	*"Resilience is expensive"* *"Affects poorer households more than affluent ones"*
Language Barrier	*"Asking for advice when it is needed and being able to trust that advice [is the most important issue]"* *"Making sure that everyone who has an idea or opinion is able to express it"*

The contextual narrative from which the language barrier theme emerged can be seen in the cognitive map in figure 24. The cognitive map for the language barrier theme reveals that SMEs believe that policy makers have the ability to provide them with the information they require to become more resilient, but this information does not always reach its intended targets. In addition, SMEs believe that the policy makers are not open to suggestions from other community groups. However, many SMEs still refuse to believe that it will flood, which makes them less open to giving or receiving advice.

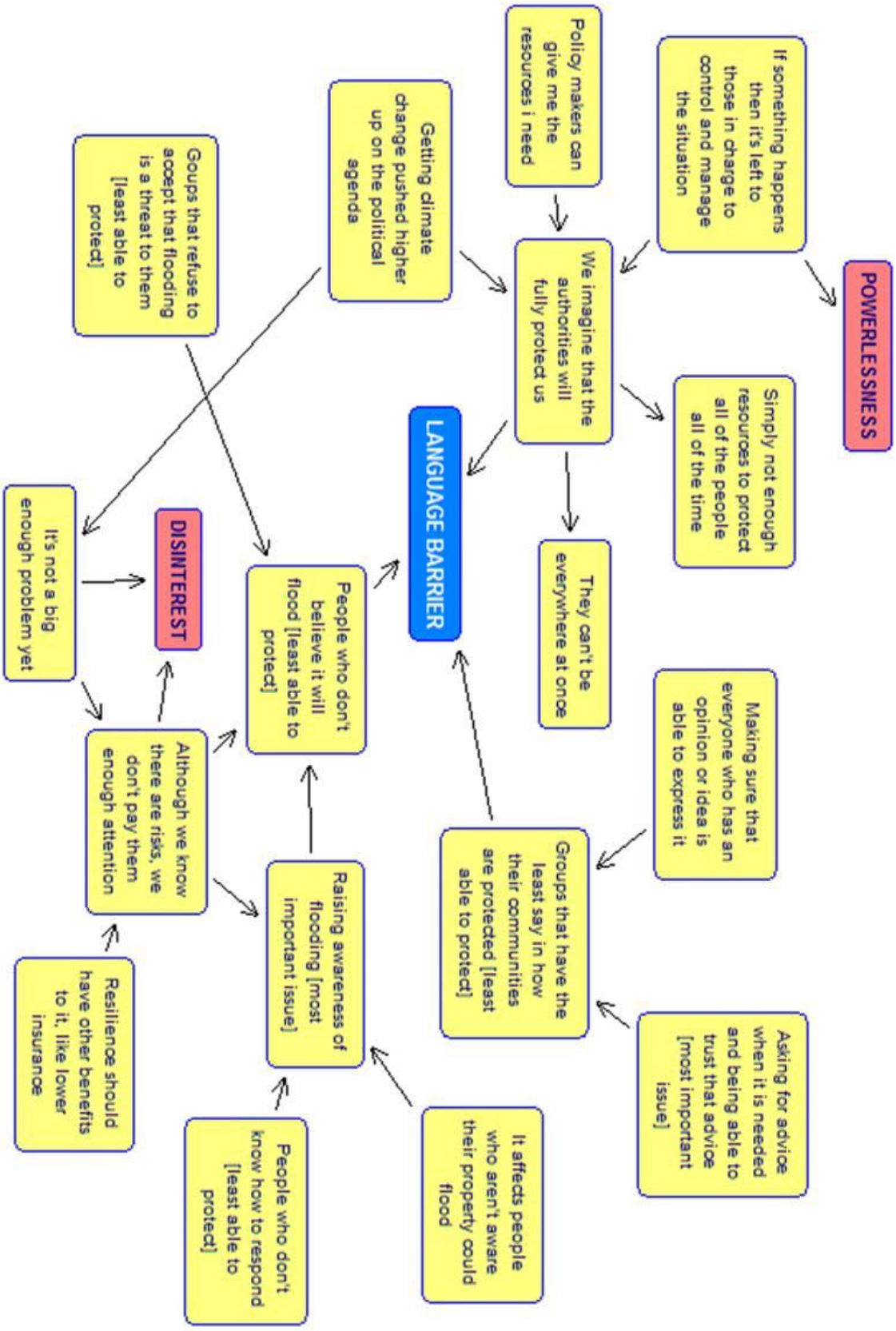

Figure 24: Language Barrier Theme Cognitive Map for Digbeth SMEs

The other themes are also interpreted from the contextual narrative within their respective cognitive maps (see appendix 30 for the remainder of the Digbeth SMEs cognitive maps). The cognitive map for the powerlessness theme reveals that SMEs believe that the government should fund and coordinate all protection measure within the community because people and businesses can't protect themselves. The cognitive map for the disinterest theme reveals that there is a lack of accountability, which leads to protection from extreme flooding to be viewed as someone else's problem and an inevitable lack of awareness and action. The cognitive map for the lack of preparedness theme reveals that SMEs believe that the local authorities should make the preparations for them as they don't have the ability to protect themselves. They also note that this level of protection may be an impossible task for the authorities, but as their interest and awareness is not high enough then they are reluctant to help. The cognitive map for the cost barrier theme reveals that both local authorities and people in general with less financial resources are less likely to be able to increase their own, or the community's, protection from extreme flooding.

7.1.5. Birmingham Policy Makers

The cognitive mapping analysis revealed 5 categories of themes within the Birmingham policy makers transcripts. These categories were Empowerment, Awareness Barriers, Awareness Drivers, Negative Behavioural Intention and Information Exchange. Each of these categories has a number of themes derived from the coding of the transcripts. Table 55 lists the 5 theme categories and their 6 associated themes.

Table 55: Theme categories and associated themes for Birmingham policy makers

No.	Categories	Themes
1	Power Distribution	Empowerment
2	Awareness Barriers	Educating Others
3	Awareness Drivers	Information Driver
4	Negative Behavioural Intention	Lack of Preparedness in Others
		Cost Barrier for Others
5	Information Exchange	Language Barrier

The explanations of the five categories of power distribution, awareness barriers, awareness drivers, negative behavioural intention and information exchange are the same as the explanations provided for each of these categories listed after table 47, p.191.

Table 56 gives an overview of the themes and example codes found within the Birmingham policy makers community group.

Table 56: Themes and example codes for Birmingham policy makers

Themes	Codes
Empowerment	*"Help communities become prepared"* *"Trying to get people to come to us for advice"*
Educating Others	*"Inform the public about their rights and expectations"* *"Getting 'green' issues into the public forum"*
Lack of Preparedness in Others	*"People don't want to think about it"* *"It's difficult to get people to protect themselves"*
Cost Barrier for Others	*"It's always the poorest, nations, communities and people that are affected the most"* *"Those on low incomes have other things to worry about"*
Language Barrier	*"They are not listening to the information that we are giving them"* *"It might just be something that they want to ignore"*
Information Driver	*"Working within the community to distribute information to the right people"* *"Identifying new hazards and making people aware"*

The contextual narrative from which the empowerment theme emerged can be seen in the cognitive map in figure 25. The cognitive map for the empowerment theme reveals that policy makers are focused on providing information to people in order to motivate them to increase their protection to extreme flooding and inform them how they can do this. Policy makers are also concerned with trying to raise awareness and interest so that people and businesses are more likely to come to them for advice. The policy makers understand that they can't protect everyone, which is why people should protect themselves. However, they believe that people are not listening to their advice and are reluctant to become involved in the resilience process.

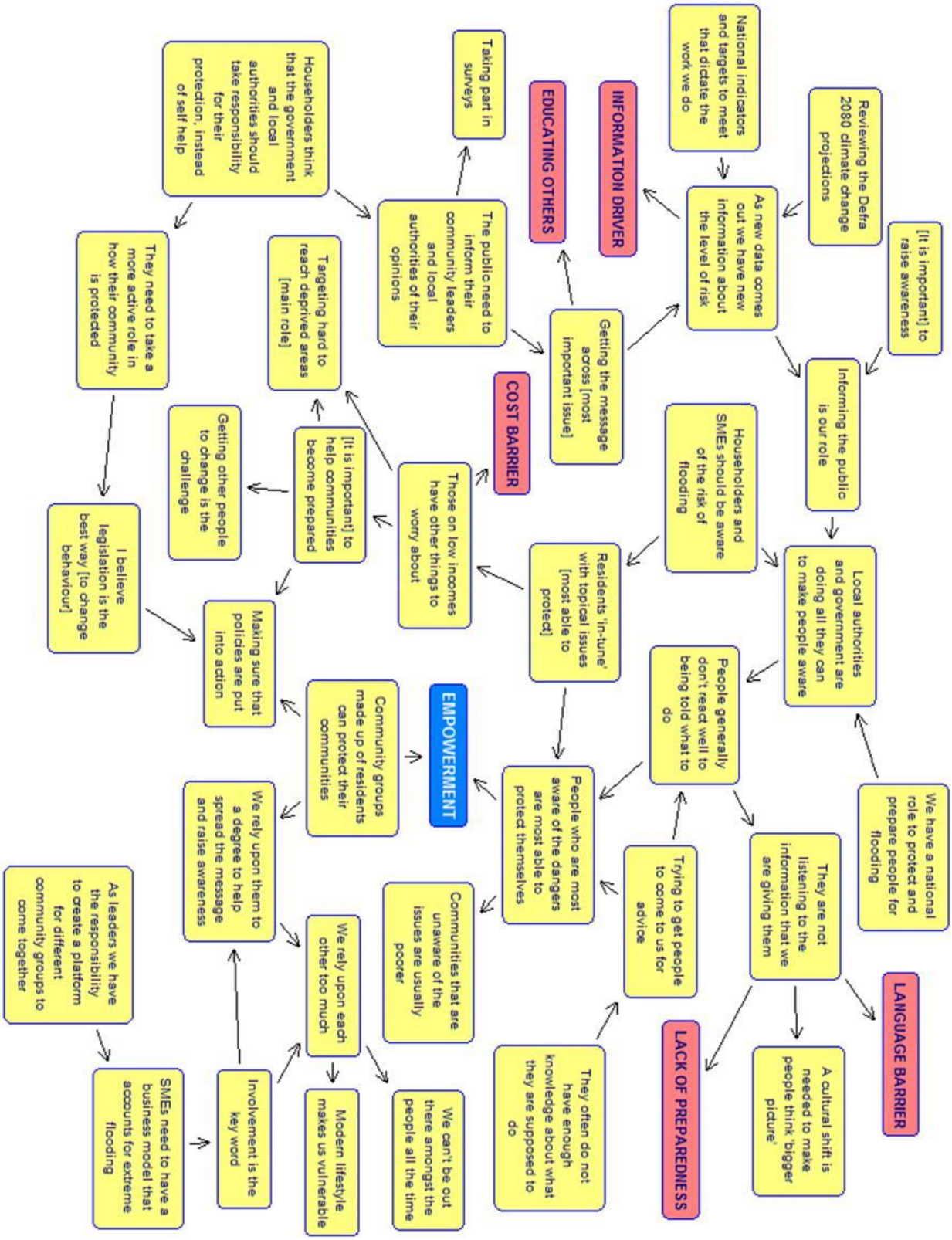

Figure 25: Empowerment Theme Cognitive Map for Birmingham Policy Makers

The other themes are also interpreted from the contextual narrative within their respective cognitive maps (see appendix 31 for the remainder of the Birmingham policy maker's cognitive maps). The cognitive map for the educating others theme reveals that people are largely unaware of the risks around them, but are also not interested in learning about or countering these risks. Policy makers believe that the more awareness they can raise about the issue, and the more information they can disseminate within the community, the better protected people will be. The cognitive map for the lack of preparedness in others theme reveals that people and businesses are not meeting required standards of protection because they shift responsibility on to the authorities and don't want to be held accountable if the protection measures fail. Furthermore, it's not a priority for people and businesses, but preparing the community is one of the main job roles for policy makers.

The cognitive map for the cost barrier for others theme reveals that policy makers are trying to help the hard to reach members of a community become more resilient to extreme flooding. They recognise that they must devote enough resources to this effort and to building physical defences in order to protect the community, but there has to be a balance between cost and protection. Therefore, it is of even greater importance that people try to increase their own protection, because policy makers don't have the resources to protect everyone. The cognitive map for the language barrier theme reveals that policy makers view their main role as being an information provider, but many people and businesses are no longer paying attention to that information. They are also failing to come to the policy makers for advice or give any input into the resilience process. Yet people and businesses do not react well to being told what to do. Therefore, policy makers have to provide what they believe is the best protection for the majority of the community.

The cognitive map for the information driver theme reveals that almost everything that policy makers do is driven by the need to use new and existing information to increase resilience to extreme flooding. Policy makers hope that by having the latest information residents and businesses will recognise the threat and act upon it by increasing their individual resilience to extreme flooding, which in turn would increase the overall community resilience. This information comes from a wide variety of sources and must be turned into something that people can understand. However, as people are no longer listening to new information, it may be necessary to implement some of the most important changes through the legal system.

7.1.6. Thornton Heath Householders

The cognitive mapping analysis revealed 5 categories of themes within the Thornton Heath householder transcripts. These categories were Power Distribution, Awareness Barriers, Awareness Drivers, Negative Behavioural Intention and Information Exchange. Each of these categories has a number of themes derived from the coding of the transcripts. Table 57 lists the 5 theme categories and their 7 associated themes.

Table 57: Theme categories and associated themes for Thornton Heath householders

No.	Categories	Themes
1	Power Distribution	Powerlessness
2	Awareness Barriers	Disinterest
		Education
3	Awareness Drivers	Experiential Learning
4	Negative Behavioural Intention	Lack of Preparedness
		Lack of Responsibility
5	Information Exchange	Language Barrier

The explanations of the five categories of power distribution, awareness barriers, awareness drivers, negative behavioural intention and information exchange are the same as the explanations provided for each of these categories listed after table 47, p.191.

Table 58 gives an overview of the themes and example codes found within the Thornton Heath householders community group.

Table 58: Themes and example codes for Thornton Heath householders

Themes	Codes
Powerlessness	*"We are not given the power to control our own destiny"* *"There is a lack of trust placed in the general public"*
Disinterest	*"People need proof"* *"It won't change until we are forced to change"*
Education	*"People don't appreciate or understand the risks"* *"Don't realise there is more that could be done"*
Experiential Learning	*"Remembering what happened last time is important"* *"I didn't think about the other ways it could flood"*
Lack of Preparedness	*"There is no reward for doing it"* *"The council should help me prepare for a flood"*
Lack of Responsibility	*"Why should I go out of my way to help others"* *"It's someone else's job"*
Language Barrier	*"Need to provide more localised information"* *"Low quality information needs to be improved"*

The contextual narrative from which the education theme emerged can be seen in the cognitive map in figure 26. The cognitive map for the education theme reveals that there needs to be improvements in the quality of information available. Policy makers are believed to be responsible for these improvements and for delivering educational information to the rest of the community.

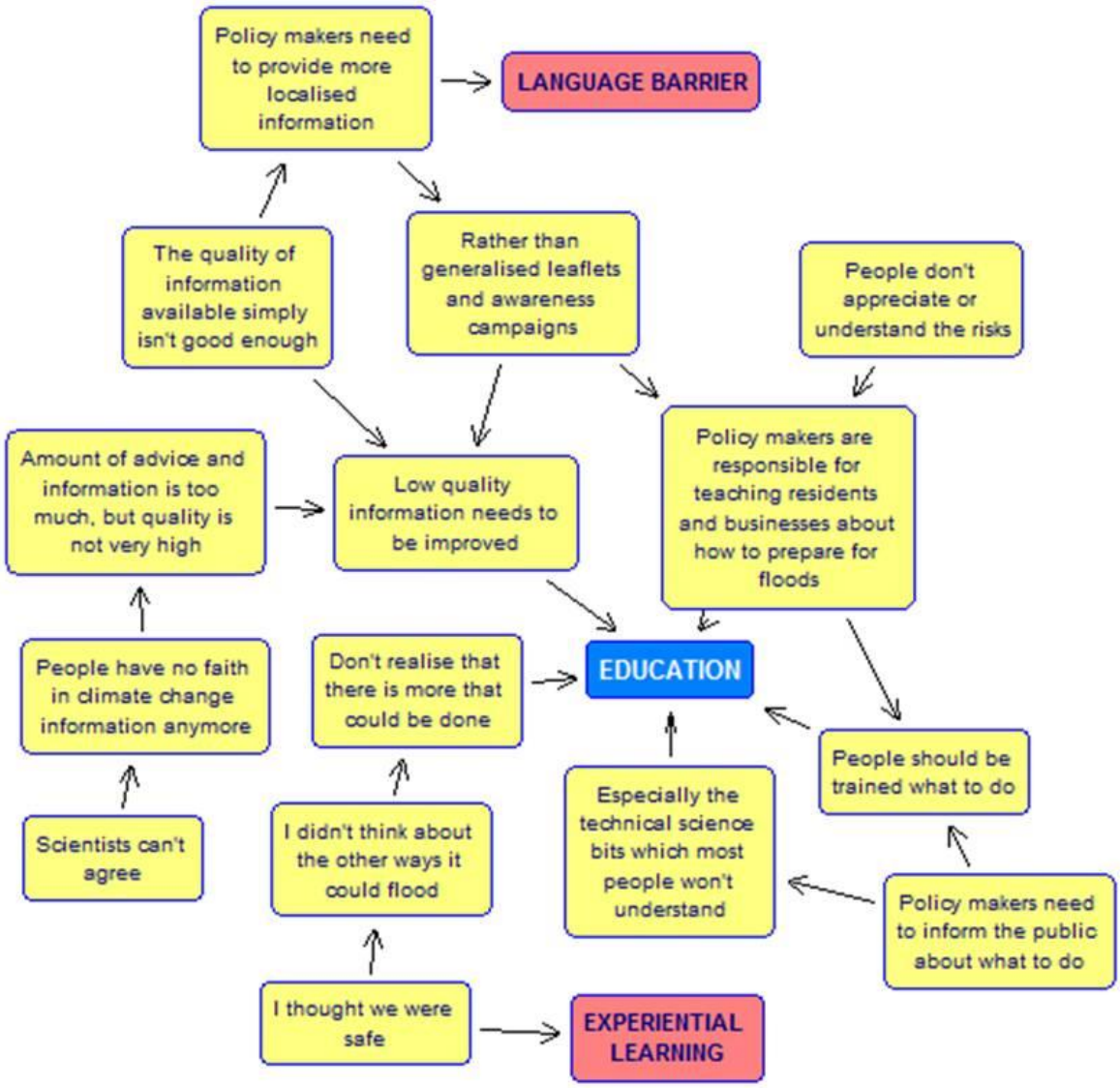

Figure 26: Education Theme Cognitive Map for Thornton Heath Householders

The other themes are also interpreted from the contextual narrative within their respective cognitive maps (see appendix 32 for the remainder of the Thornton Heath householder's cognitive maps). The cognitive map for the powerlessness theme reveals that householders believe that local authorities are responsible for protection from extreme flooding because there are limits on what people can achieve for themselves. Householders also believe that local authorities do not listen to them and simply try to get the public to do their job for them, while still not fully trusting the public to do a satisfactory job. The cognitive map for the disinterest theme reveals that extreme weather information is seen more as entertainment programmes,

rather than vital information for people to act upon in their daily lives. There are no rewards for taking action so many people won't change until they are forced to.

The cognitive map for the experiential learning theme reveals that householders are more likely to take action if they have already experienced a flood because they are more aware of the risks and what is required to counter them. The cognitive map for the lack of preparedness theme reveals that householders won't take action until they are sure that it will be beneficial to them. Householders also believe that they can only do so much before the authorities will have to step in to increase protection. The cognitive map for the lack of responsibility theme reveals that householders believe that because the authorities built the houses in that location, then they should be responsible for their protection. It is perceived to be the local authority's job to protect the community, not householders who don't believe they are able to achieve an acceptable level of protection. The cognitive map for the language barrier theme reveals that policy makers need to provide householders with more localised information. Householders also believe that policy makers should listen to them more and incorporate their knowledge into the protection process. The information also needs to be improved in both quality and accessibility.

7.1.7. Thornton Heath SMEs

The cognitive mapping analysis revealed 5 categories of themes within the Thornton Heath SME transcripts. These categories were Power Distribution, Awareness Barriers, Awareness Drivers, Negative Behavioural Intention and Information Exchange. Each of these categories has a number of themes derived from the coding of the transcripts. Table 59 lists the 5 theme categories and their 8 associated themes.

Table 59: Theme categories and associated themes for Thornton Heath SMEs

No.	Categories	Themes
1	Power Distribution	Powerlessness
2	Awareness Barriers	Disinterest
		Education
3	Awareness Drivers	Experiential Learning
4	Negative Behavioural Intention	Lack of Preparedness
		Lack of Responsibility
		Cost Barrier
5	Information Exchange	Language Barrier

The explanations of the five categories of power distribution, awareness barriers, awareness drivers, negative behavioural intention and information exchange are the same as the explanations provided for each of these categories listed after table 47, p.191.

Table 60 gives an overview of the themes and example codes found within the Thornton Heath SMEs community group.

Table 60: Themes and example codes for Thornton Heath SMEs

Themes	**Codes**
Powerlessness	*"It's up to those in power to protect communities"* *"I'm not sure how I can increase community resilience"*
Disinterest	*"It only makes the new is it's really bad"* *"There is no way of getting the message across to some people"*
Education	*"Not enough information about flooding available to us"* *"It's not taught in schools"*
Experiential Learning	*"Floods only get respected after they have killed people"* *"Groups that have already experienced a flood have learnt what to do"*
Lack of Preparedness	*"Because it's extreme it's hard to prepare for"* *"Most people haven't experienced a flood before so don't know what to do"*
Lack of Responsibility	*"They just look after themselves"* *"Rarely are we willing to go that extra mile"*
Cost Barrier	*"There just isn't the money to deal with it"* *"It's expensive to make changes"*
Language Barrier	*"Making climate change interesting again after years of exposure"* *"Getting the information I need to become more resilient"*

The contextual narrative from which the language barrier theme emerged can be seen in the cognitive map in figure 27. The cognitive map for the language barrier theme reveals that there is not enough information available, which means there is a lack of knowledge amongst SMEs. The information that is available is not interesting and is difficult to disseminate amongst community members.

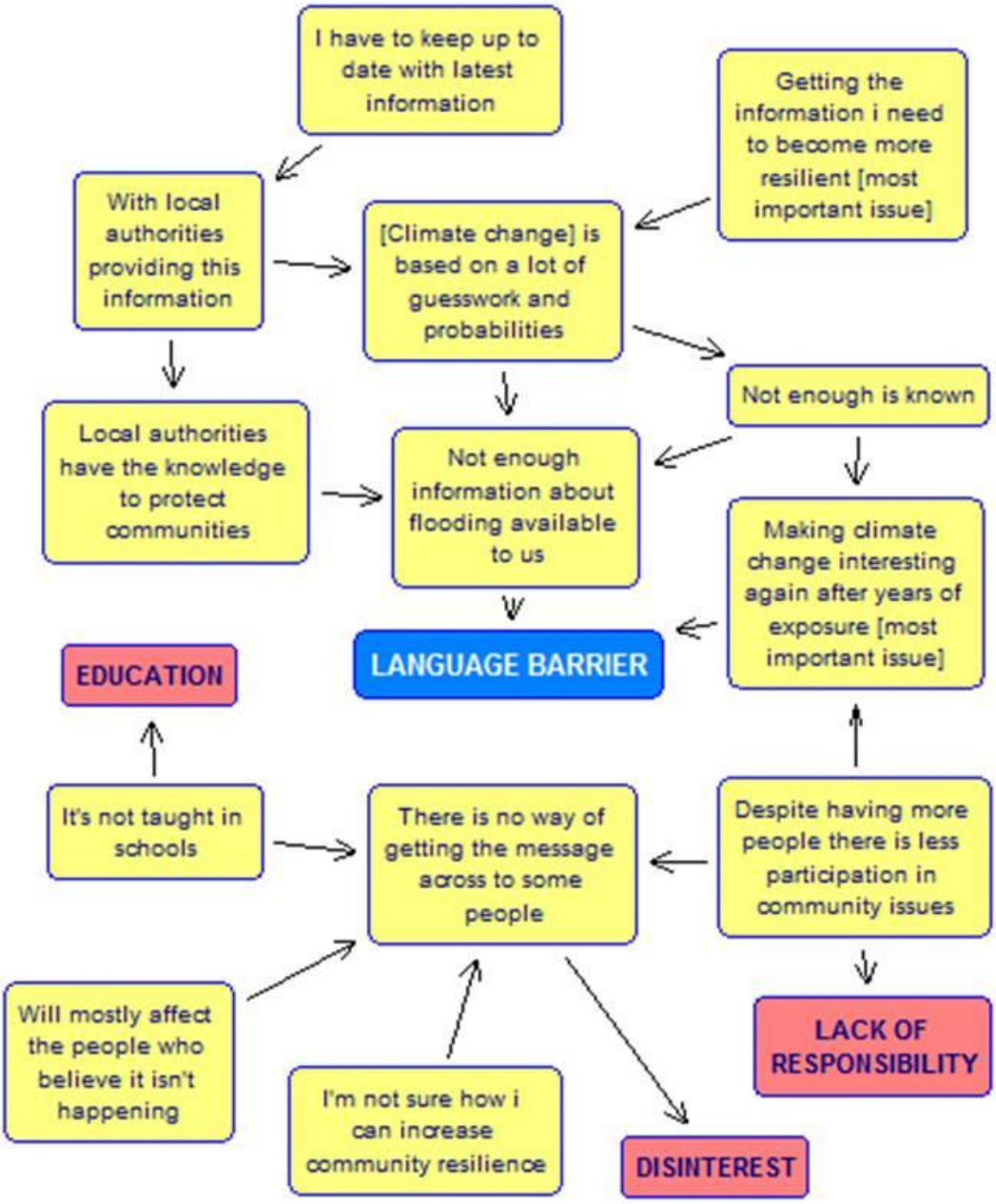

Figure 27: Language Barrier Cognitive Map for Thornton Heath SMEs

The other themes are also interpreted from the contextual narrative within their respective cognitive maps (see appendix 33 for the remainder of the Thornton Heath SMEs cognitive maps). The cognitive map for the powerlessness theme reveals that SMEs believe that policy makers have a duty to prevent and protect from extreme flooding. This responsibility stems from the belief that SMEs are unable to make a large difference to levels of protection. The cognitive map

for the disinterest theme reveals that SMEs don't respect the threat of flooding and often refuse to acknowledge that floods could happen. The cognitive map for the experiential learning theme reveals that experience of flooding improves knowledge because people know what to do next time.

The cognitive map for the lack of preparedness theme reveals that SMEs believe it is difficult to prepare for extremes so they expect help to be provided by others. The cognitive map for the education theme reveals that SMEs will only keep up with the latest information if it is provided to them by policy makers. It is believed that the accuracy and quality of the information needs to be improved because not enough is known about extreme flooding. The cognitive map for the lack of responsibility theme reveals that SMEs believe that people don't help each other, they just look after themselves. However, people also expect help from others, particularly from policy makers, who are believed to be responsible for the protection of all members of the community. The cognitive map for the cost barrier theme reveals that SMEs don't believe they have the financial resources to protect against extreme flooding, but policy makers do.

7.1.8. SE London Policy Makers

The cognitive mapping analysis revealed 5 categories of themes within the SE London policy makers transcripts. These categories were Power Distribution, Awareness Barriers, Awareness Drivers, Negative Behavioural Intention and Information Exchange. Each of these categories has a number of themes derived from the coding of the transcripts. Table 61 lists the 5 theme categories and their 7 associated themes.

Table 61: Theme categories and associated themes for SE London policy makers

No.	Categories	Themes
1	Power Distribution	Empowerment
2	Awareness Barriers	Educating Others
3	Awareness Drivers	Information driver
4	Negative Behavioural Intention	Lack of Preparedness in Others
		Cost Barrier for Others
5	Information Exchange	Language Barrier

The explanations of the five categories of power distribution, awareness barriers, awareness drivers, negative behavioural intention and information exchange are the same as the explanations provided for each of these categories listed after table 47, p.191.

Table 62 gives an overview of the themes and example codes found within the SE London policy makers community group.

Table 62: Themes and example codes for SE London policy makers

Themes	**Codes**
Empowerment	*"In the future it is hoped that everyone will play a role in protection"* *"It's still possible for everyone to improve their own protection"*
Educating Others	*"We prepare people for extreme events"* *"Aid in raising awareness"*
Information Driver	*"It's critical that we raise awareness in the community"* *"All these groups are there to provide information"*
Lack of Preparedness in Others	*"People think that responsibility for protection is best left to local authorities"* *"People don't see the benefit of it"*
Cost Barrier for Others	*"Families with higher annual incomes will be able to adjust more quickly"* *"Deprived areas of the community [are least able to protect]"*
Language Barrier	*"People who ignore our warnings [are least able to protect]"* *"We need to regain their trust"*

The contextual narrative from which the empowerment theme emerged can be seen in the cognitive map in figure 28. The cognitive map for the empowerment theme reveals that policy makers believe that it's possible for everyone to improve their own level of protection against extreme flooding. Policy makers also believe that people need to listen to the information they are providing and be open to change.

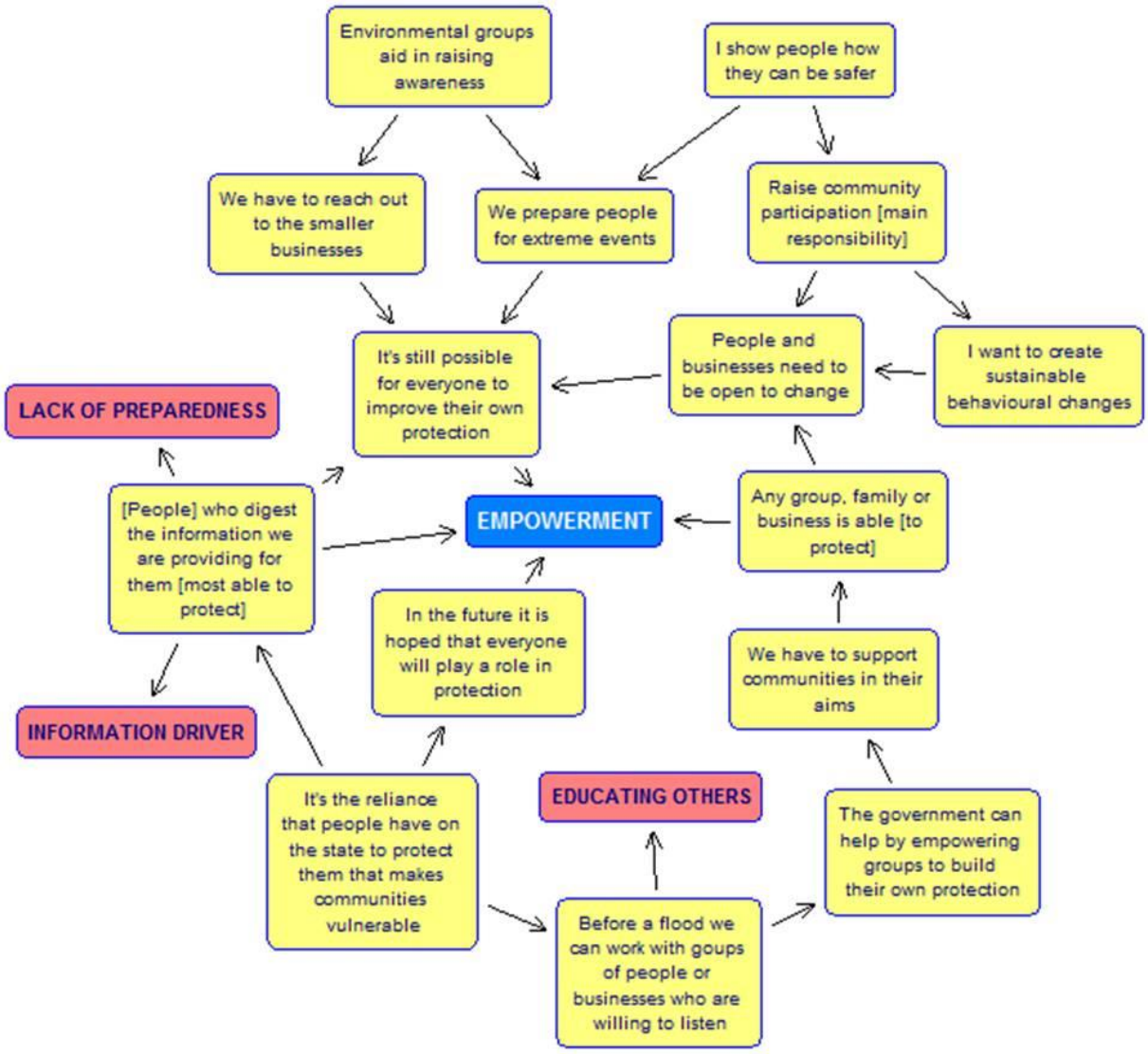

Figure 28: Empowerment Cognitive Map for SE London Policy Makers

The other themes are also interpreted from the contextual narrative within their respective cognitive maps (see appendix 34 for the remainder of the SE London policy maker's cognitive maps). The cognitive map for the educating others theme reveals that policy makers help people prepare by running workshops and events which raise awareness of flooding issues, with the people who take the most interest becoming better protected than those who ignore the information. The cognitive map for the information driver theme reveals that policy makers use information to inspire people to take protective measures after their awareness of the issue has been raised.

The cognitive map for the lack of preparedness in others theme reveals that policy makers believe that people and businesses do not take the threat of extreme flooding seriously. Policy makers also believe that people and businesses deliberately deny or ignore the information they are providing in an attempt to decrease their own responsibility for the issue. The cognitive map for the cost barriers for others theme reveals that prosperous areas of the community usually have higher levels of protection per household. Smaller businesses, lower income households and authorities with lower budgets will often struggle to meet the costs of protection. The cognitive map for the language barrier theme reveals that people who ignore warnings are the least protected as they miss out on vital information. People have little faith in authorities and this hinders policy maker's ability to get messages of resilience across.

7.2. General Cognitive Mapping Analysis: Key Findings

A number of recurring themes were found to be present throughout the first phase of the cognitive mapping process. Some of these themes were closely related to each other and as such were grouped together within theme categories. Having presented the findings within the context of their respective community groups, it is important to also present these findings in relation to their respective categories, so that they may be better understood. Please not that the findings are listed here and will be related back to existing knowledge in the discussion in chapter 8, p.234.

7.2.1. Power Distribution

The cognitive mapping analysis showed two distinct themes that were related to power distribution. Firstly, there was a feeling of powerlessness amongst the householder and SME community groups. The powerlessness theme was present in the householder and SME community groups in the flood experience communities in both Birmingham and SE London, as well as the control group community. Secondly, there was a responsibility for empowerment displayed by the policy maker community group. This theme was present in both the Birmingham and SE London policy maker community groups. The key findings for the power distribution category of themes were as follows:

- Householders and SMEs don't believe they have the ability to do much more than they are already doing
- Policy makers believe that householders and SMEs are not doing enough and could do much more

- Policy makers feel that they are providing adequate information that householders and SMEs are not being motivated by or acting upon
- Householders and SMEs don't know what to do with the information they are given
- Householders and SMEs feel that policy makers don't listen to them
- Policy makers feel that householders and SMEs are generally disinterested in providing input and rarely come to them for advice
- Householders and SMEs may not have the financial capability to do much more
- Policy makers believe that everyone can do something, no matter how small
- Householders and SMEs believe that it is the policy makers responsibility to protect them, which can lead to disinterest and suggested feelings of powerlessness
- Some householders and SMEs may deliberately make themselves appear powerless through ignorance and disinterest to shift responsibility and blame (with power comes responsibility)

7.2.2. Awareness Barriers

The cognitive mapping analysis showed that there were three themes that represented barriers to awareness. The disinterest theme symbolised the general lack of interest that householders and SMEs were showing towards resilience promoting information and behaviours. The disinterest theme also represented these information and behavioural barriers which policy makers were attempting to overcome. The disinterest theme was present in the householder and SME community groups in the flood experience communities in both Birmingham and SE London, as well as the control group community. The education theme symbolised the lack of knowledge that householders and SMEs had regarding flood awareness. The education theme was present in all the householder community groups in each location, as well as the Witton and Selly Park and Thornton Heath SME groups. It was not present in the Digbeth SME group. The educating others theme represented ways in which policy makers were attempting to educate communities about protection against extreme flooding. This theme was present in both of the policy maker community groups. The key findings for the awareness barriers category of themes were as follows:

- Flooding is not a big enough concern in the daily lives of householders and SMEs
- Householders and SMEs don't expect it to flood and if it does they don't expect to be affected by it

- Disinterest leads to a reluctance to listen to information, seek advice and change behaviour
- Householders and SMEs believe there is a lack of incentives to prepare for extreme flooding
- Householders and SMEs don't feel they know what to do before, during or after a flood
- Householders and SMEs have a lack of knowledge regarding flood risk
- Householders and SMEs expect policy makers to educate them about protection against extreme flooding, despite displaying a general lack of interest
- Householders and SMEs believe that there is either not enough high quality information and too much low quality information that is too complex to understand or is not relevant to their localised risks
- Policy makers believe that householders and SMEs deliberately ignore the information they provide and find a number of excuses to remain uneducated, including deliberately ignoring information and being reluctant to accept information

7.2.3. Awareness Drivers

The cognitive mapping analysis showed that there were two themes that represented awareness drivers. The information driver theme was symbolised by policy makers who relied heavily upon finding, assessing and disseminating information which they expected people to be motivated by and to act upon. This was seen as being one of the main job role responsibilities for policy makers. This theme was present in both of the policy maker community groups. The experiential learning theme symbolised householders and SMEs who had learnt from their previous experience of being flooded, or understood that there was the potential for learning, behavioural change and adaptation to take place. The experiential learning theme was present in the householder and SME community groups in Witton and Selly Park and Thornton Heath, all of which had recent experience of flooding. The theme was not present in the householder and SME community groups of the control group community of Digbeth or in either of the policy maker community groups. The key findings for the awareness drivers category of themes were as follows:

- Experience of flooding can increase awareness of risk
- Experience of flooding can increase behavioural intention to adopt protective measures

- Experience of flooding can increase confidence that the householder or SME will know what to do if it floods again, however this also carries the negative connotations that if they have survived one experience then they may not need to take extra precautions
- Information is used by policy makers to increase knowledge and awareness relating to extreme flooding
- Information is used by policy makers to motivate the uptake of protective measures and behavioural change in householders and SMEs
- It may become necessary to use new information in the creation of new legal measures designed to increase resilience, in order to counter the barriers of created by disinterest and lack of responsibility

7.2.4. Negative Behavioural Intention

The cognitive mapping analysis showed that there were five themes that were related to negative behavioural intention. The lack of preparedness theme symbolised the effect that the indentified barriers were having upon the mental (lack of knowledge and awareness), physical (lack of physical defences and adaptations) and behavioural (lack of pro-environmental behaviour) preparations against extreme flooding for householders and businesses. The lack of preparedness theme was present in the householder and SME community groups in the flood experience communities in both Birmingham and SE London, as well as the control group community. The lack of responsibility theme symbolised householders and SMEs reluctance to accept that they were in any way responsible for their own protection, or that they had an obligation to contribute towards community resilience to extreme flooding.

The lack of responsibility theme was present in all the householder community groups in each location, as well as the Witton and Selly Park and Thornton Heath SME groups. It was not present in the Digbeth SME group. The cost barrier theme symbolised the financial constraints experienced by householders and SMEs, noting that higher incomes and prosperous areas of a community were representative of the capability to increase resilience to extreme flooding. However, having the financial capability does not necessarily mean that householders and SMEs were able to justify the expenditure. The cost barrier theme was present in all three of the Birmingham householder community groups, but not in the Thornton Heath householder community group. The cost barrier theme was present in all the SME community groups in each location. The lack of preparedness in others theme symbolised policy maker's recognition that

householders and SMEs were not meeting required levels of preparedness which could increase resilience to extreme flooding. This theme was present in both the Birmingham and SE London policy maker community groups. The cost barrier for others theme symbolised policy maker's recognition that householders and SMEs on lower incomes or in deprived areas of the community were not able to meet the costs associated with increasing protection against extreme flooding. Policy makers also recognised the reluctance of those who could meet the costs to actually take the next step in adopting resilience measures. This theme was present in both the Birmingham and SE London policy maker community groups. The key findings for the negative behavioural intention category of themes were as follows:

- Householders and SMEs do not prepare because they do not know how to or do not feel that they can make a difference
- Householders and SMEs do not prepare because there is no clear incentive or benefit to do so, particularly as there are often associated financial costs
- Householders and SMEs do not prepare because they rely on or expect policy makers to make the necessary preparations for them because it is their job or duty to do so
- Householders and SMEs believe that policy makers are responsible for protecting the community on all levels
- Householders and SMEs do not know what their responsibilities are and will only usually meet the minimum legal requirements
- Householders and SMEs on lower incomes or from deprived areas of a community don't believe that they can afford to adopt resilience measures
- Householders and SMEs on higher incomes or from prosperous areas of a community could afford to adopt resilience measures, but lack the incentives required to do so
- Policy makers with larger budgets allocated to resilience measures are better able to protect their communities
- Householders and SMEs expect policy makers to meet the costs of protection
- Policy makers believe that householders and SMEs fail to prepare for extreme flooding because it is not seen as a priority, partly caused by identified barriers such as disinterest in resilience information and associated costs

7.2.5. Information Exchange

The cognitive mapping analysis showed that there were two main themes that were related to information exchange. The language barrier theme encompassed literal language barriers, such as non-English speaking community members, and information based language barriers, such as the reluctance of householders and SMEs to pay attention to resilience information. The language barrier theme also represented householders and SMEs views regarding the amount, quality and dissemination of information by policy makers, as well as the apparent failure of each community group to listen to each other. The language barrier theme is present in all of the three types of community groups in both Birmingham and SE London. The trust barrier theme symbolises that householders and SMEs do not trust policy makers to provide them with accurate information and they lack faith in policy maker's ability to protect them from extreme flooding. The trust barrier theme is only present in the householder community groups of Witton, Selly Park and Digbeth, as well as the Witton and Selly Park SME community group. The key findings for the information exchange category of themes were as follows:

- Policy makers believe that householders and SMEs often deliberately ignore resilience information, while householders and SMEs believe that policy makers do not listen to them
- Householders and SMEs believe that the information provided by policy makers contains too much irrelevant, uninteresting, low quality content and not enough accessible, localised, interesting, high quality content
- Householders and SMEs believe that the information provided by policy makers is often inconsistent and can be too complex or become distorted via dissemination vehicles such as the media, failing to reach its intended audience
- Policy makers believe that their main role is to be information providers
- Householders and SMEs have lost faith in policy makers which in turn means they largely ignore the information they provide
- Householders and SMEs do not believe that policy makers are able to fully protect them from extreme flooding

7.3. The Influence of Insurance

Researchers have explored the ways in which insurance might be able to aid in adapting to climate change impacts (Botzen and Van Den Bergh 2008). Insurance is thought of as being a practical responsibility to climate change risk that people should engage with (Jamieson 2010). It was stated within the review of early literature that over-reliance upon cheap insurance was an indication of low responsibility (Work, Spencer and Osborne 1999). Whitmarsh (2009) suggested that the adoption of one pro-environmental behaviour was often detrimental to the uptake of other pro-environmental behaviours.

Therefore, if insurance was of such importance that it was perceived to be the main pro-environmental behaviour that participants engaged in, then it is reasonable to expect this to be reflected within the data. However, insurance was not found to be a strong enough code within the data to be defined as either a barrier or driver for community resilience. Only 9 of the 481 participants explicitly mentioned insurance within their responses for the cognitive mapping analysis. This represents less than 2% of the total participants (1.87%). Furthermore, on the few instances it was mentioned, it was often in relation to what other people should be doing, or in relation to another issue, rather than being expressed as a personal responsibility to engage in.

The instances of insurance being explicitly mentioned within the date are listed in table 63.

Table 63: Summary of Insurance Related Data

No.	Community	Type	Data
1	Birmingham	Policy Maker	'Wealthier families can afford better insurance.'
2	Birmingham	Policy Maker	'SMEs and householders should also make sure they have the right type of insurance for the area in which they live.'
3	Digbeth	Householder	'Insurance companies [are most able to protect communities].'
4	Digbeth	SME	'Getting insurance is my main responsibility.'
5	Selly Park	Householder	'SME's could get better insurance.'
6	Selly Park	Householder	'I don't think the council want to panic anyone and floods can affect house prices and insurance premiums.'
7	Selly Park	SME	'Physical protection is local authority's responsibility. Insurance companies offer a different kind of protection.'
8	Thornton Heath	Householder	'Yes [we are more vulnerable] as people can be refused insurance if they live in flood-prone areas, leaving you with a community of uninsured, vulnerable properties and people.'
9	Witton	Householder	'Families on low incomes [are least able to protect] because they can't afford to buy the best insurance.'

The references to insurance presented in table 63 will now be discussed in greater detail.

The two examples from Birmingham policy makers (numbers 1 and 2 in table 63, p.225) suggest that insurance is an expectation that people and businesses should have, but may be related to income, an aspect already highlighted by the cost barrier theme discovered within the cognitive mapping analysis.

Within the control group community (numbers 3 and 4 in table 63, p.225), the two examples indicate that insurance is able to offer financial protection and that this is viewed as being a responsibility for each person or business. This supports other's expectations of them, as indicated by the previous comment made by Birmingham policy maker number 2.

The Selly Park Householders (numbers 5 and 6 in table 63, p.225) indicate again that insurance is an expectation by others, and that insurance is related to the cost barrier theme.

The Selly Park SME (number 7 in table 63, p.225) is an example of an SME clearly suggesting that insurance is only one type of protection, which covers them financially, but does not actually provide any physical protection from flooding within the community.

The Thornton Heath householder example (number 8 in table 63, p.225) suggests that insurance can be related to financial vulnerability, with insurance companies failing to offer protection for communities.

The Witton Householder example (number 9 in table 63, p.225) supports the previous suggestions that insurance is related to the cost barrier theme.

Having discussed the presence of insurance within the data responses, the findings indicate that there may be a link between insurance and other aspects (such as cost barriers), but that this only offers one type of protection (financial) and is individual in nature (an expectation of each individual person or business). Due to the low number of times insurance was mentioned, it suggests that insurance is not a perceived to be a social responsibility aspect, as getting insurance for yourself would not necessarily make your community more resilient. Instead, it is the physical changes that an individual can make or do which are deemed to be more important, rather than

simply protecting themselves financially. This may have highlighted a difference between what is perceived as an individual responsibility (getting insurance) and the more socially responsible aspects highlighted by the results. Future research should explore this aspect in greater depth.

It is also noted that the different types of protection (financial and physical) are also often related, as discussed in many of the themes highlighted by this research. However, this research did not explicitly register the level of insurance that each participant had for their property, which presents a limitation upon the degree of reflection that this research is able to have upon this area. Future research should record this aspect within their data collection.

7.4. Cognitive Mapping Analysis Phase 2: Quantitative Results Analysis

The general cognitive mapping analysis conducted in phase 1 has allowed us to gain an insight into the context behind a number of the quantitative results, which will be considered at length in the discussion section (chapter 8, p.234). This includes reasoning behind why each community group rates themselves as being more socially responsible than the other two groups, as well as rating themselves higher than the other groups perceive them to be.

What has not yet been covered in enough depth during the general cognitive mapping analysis is the reasoning behind the age and ethnicity differences found within the quantitative results. Therefore, cognitive mapping analysis was conducted on all the transcripts in order to discover potential codes and emergent themes that may provide a context for, or be related to, the specific subjects of age and ethnicity. The main quantitative findings from each of these areas form the central focus of their respective cognitive maps.

7.4.1. Age Focused Cognitive Mapping Analysis

The cognitive mapping analysis for the age related quantitative findings was focused around the main finding that older participants were reporting higher levels of social responsibility than younger participants. The cognitive mapping analysis revealed 3 themes within the transcripts. These themes were Wealth, Vulnerability and Experience. The wealth theme relates to coding which suggests that older participants may be more willing to meet, or are more able to justify meeting, the costs associated with resilience measures. The vulnerability theme relates to coding which suggest that older participants have a greater interest in resilience due to them being more vulnerable to extreme weather events. The experience theme relates to coding which suggests that older participants are likely to have more experience of extreme flooding. Table 64 gives an overview of the themes and example codes found within the transcripts (number in brackets indicates age of participant where relevant).

Table 64: Themes and example codes for age focused cognitive mapping

Themes	**Codes**
Wealth	*(48) "Groups that can afford to increase protection could just a easily be groups of residents"* *(24) "Why should I go out of my way to help others at my own expense"*
Vulnerability	*"It will affect old people the greatest"* *(59) "We should be more aware of flooding related information"* *(24) "I'm not going to act until I know for sure it's worth it"*
Experience	*(52) "It floods a lot more than it used to"* *(25) "I don't think it floods much round here so I don't know [what I am supposed to be doing]"*

The contextual narrative from which each of these themes emerged can be seen in the age focused cognitive map in figure 29.

Figure 29: Age Focused Cognitive Map

The cognitive map reveals that older people are considered to be more vulnerable to extreme weather events. This is linked to the trend of older participants accepting that they need to be aware of flooding and adopt resilience measures, as the threat or risk to older participants is accepted as being greater. The increased threat is increasing interest in their welfare. At the opposite end of the scale, younger participants showed more disinterest in the risk of extreme flooding and greater reluctance to adopt resilience measures. Older participants also displayed more willingness to meet the costs associated with the uptake of resilience measures, again linked to an increased interest. They are better able to balance the costs with the benefit of greater protection from an increased sense of vulnerability. Furthermore, the map revealed that older participants were also more likely to have noticed increases in extreme weather throughout their lives and were more likely to have experienced a flood. This again is linked to greater awareness and pro-environmental behaviour.

7.4.2. Ethnicity Focused Cognitive Mapping Analysis

The cognitive mapping analysis for the ethnicity related quantitative findings was focused around the three main findings that 1) participants in the White ethnic group were reporting higher levels of social responsibility than those in the Black ethnic group 2) participants in the Asian ethnic group were reporting higher levels of social responsibility than the White and Black ethnic groups and 3) policy makers were not reporting ethnic differences. The cognitive mapping analysis revealed 4 themes within the transcripts. These themes were High Responsibility, Middle Responsibility, Low Responsibility and Job Role. The high responsibility theme relates to an individual accepting that risks exist and engaging in pro-environmental behaviour. The middle responsibility theme relates to an individual accepting that risks exist, but not necessarily engaging in pro-environmental behaviour, or only engaging behaviours that are concerned with the self. The low responsibility theme relates to individuals that don't accept risks and don't engage in pro-environmental behaviour. The job role theme relates to the importance and focus of policy maker's job roles and responsibilities overriding individual ethnic differences. Table 65 gives an overview of the themes and example codes found within the transcripts (participant ethnic group is in brackets where relevant).

Table 65: Themes and example codes for ethnicity focused cognitive mapping

Themes	**Codes**
High Responsibility	*(Asian) "We need to change the way we do things, think about the environment more"* *(Asian) "We have a responsibility to protect ourselves and others"* *(White) "I believe i have to help people who can't help themselves"*
Middle Responsibility	*(White) "I'm responsible for everything inside my house"* *(White) "My immediate responsibility is making my own property more resilient"* *(Asian) "Prepare an escape plan [is my most important issue]"*
Low Responsibility	*(Black) "Why should I go out of my way to help others"* *(Black) "I'm not going to act until I know for sure it's worth it"* *(White) "Most people can't protect themselves"*
Job Role	*(Asian) "We are doing what we can to protect communities"* *(White) "Government [most able to protect] because they have data and access to region wide plans and trends"* *(Black) "Local authorities [most able to protect] because they know where the risks are and how to counter them"*

The contextual narrative from which each of these themes emerged can be seen in the ethnicity focused cognitive map in figure 30.

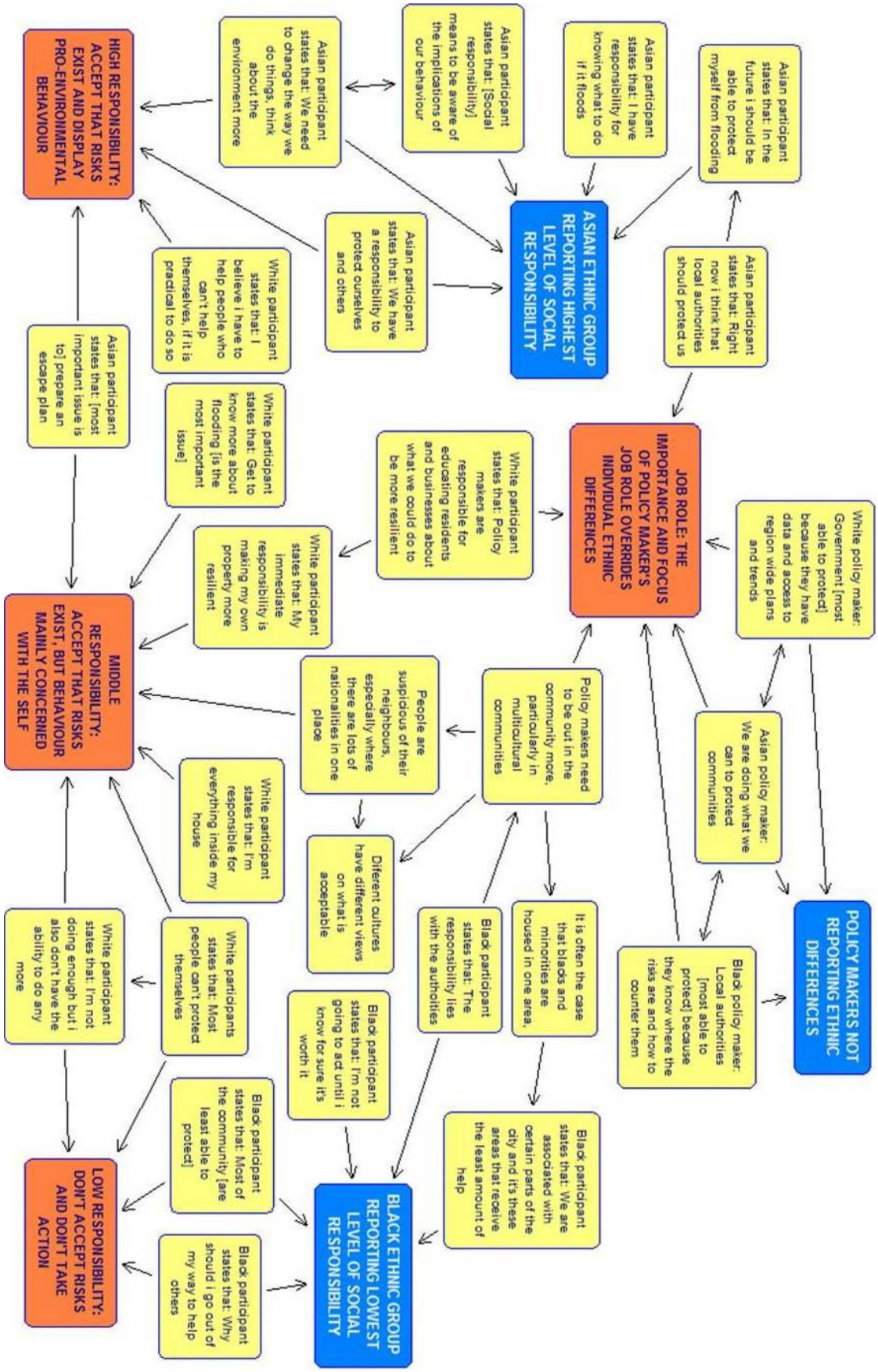

Figure 30: Ethnicity Focused Cognitive Map

The cognitive map reveals that participants from the Asian ethnic group displayed a greater awareness and acceptance of the risk of flooding and were more likely to adopt resilience measures than participants in the White and Black ethnic groups. Participants in the White ethnic group displayed a limited awareness of the risk of flooding, but also displayed either a lack of action or self-centred motivations and behaviours related to the adoption of resilience measures. Participants in the Black ethnic group generally did not accept the risk of flooding, or did not believe that it was a problem for them. This is linked to coding which indicates that the Black participants believed that they were often neglected by policy makers as minority groups were often house together in deprived areas of a community.

This suggests that flood risk may not have been of great importance to them because they already have a number of other priorities (such as meeting other costs and the lack of perceived support suggested by the findings), some of which are linked to an increased vulnerability to extreme flooding. All three ethnic groups displayed a tendency to rely upon policy makers to deal with extreme flooding and be responsible for their welfare. This view was actually supported by policy makers from all three ethnic groups who state various job related reasons, such as access to data and planning resources, for why they would be able to make a community more resilient to extreme flooding. This indicates that the importance and focus of the work that policy makers do overrides any individual ethnic difference which may have been present.

8. DISCUSSION

The main aim of this investigation was to explore perceptions of social responsibility, in relation to extreme flooding, within the community. This was achieved by identifying gaps in current knowledge which were classified as research needs. From these needs the researcher was able to formulate two research objectives which were used to guide the research and obtain the results (see table 66).

Table 66: Research Objectives

No.	Objective
1	Establish and empirically investigate a theoretical framework for community level social responsibility research and create and empirically investigate a conceptual model of community group perceptions of social responsibility.
2	Explore factors which were considered to be related to perceptions of social responsibility, these being age, gender, ethnicity and experience of flooding.

The first objective was designed to assess the validity of the proposed theoretical concepts. The second objective was designed to explore aspects highlighted by the review of literature as containing the potential to have an effect upon perceptions of social responsibility. The community social responsibility framework (chapter 3, page 47, figure 5) and the conceptual model of community group perceptions of social responsibility (chapter 3, page 54, figure 6) have already been established, meeting the first part of objective 1. The other parts of both objectives were then explored through the application of questionnaires and cognitive mapping analysis of interview transcripts. This chapter will now discuss each of the key results in greater detail, describe how they relate to the concept of community resilience to extreme flooding and determine their degree of support for the previous research discussed in the review of literature. This will be done by discussing each part of each objective. The application and limitations of each set of findings are also discussed.

8.1. Objective 1: Assess the validity of the community social responsibility framework

This part of objective 1 was met through empirical investigation of social responsibility that adhered to the recommendations within the community social responsibility framework (chapter 3, page 47, figure 5). An exploration of perceptions of social responsibility was conducted within each of the key community groups, including exploring the perceptions that they hold of each other. This approach had a number of benefits.

The results indicated that each of the community groups believed that they were the most socially responsible group. It would not have been possible to discover this finding if the research had been conducted within the confines of a public relations process framework (chapter 3, page 44, figure 4). As the review of literature had highlighted, the public relations process model was representative of the way in which previous research had been based upon the limited view of social responsibility defined by corporate social responsibility. Therefore, the new conceptual framework for social responsibility research provided by the community social responsibility framework has already proved to be useful in gaining new insights into perceptions of social responsibility. This meets calls from previous research which stated that we must recognise and further explore the social context of flooding (e.g. Spence et al. 2011, Wisner et al. 2004, Canon 2000, Fordham 1998).

Further benefits can be seen when we consider the other insights that have been gained by conducting the research within this new framework. The results indicated that self-rated social responsibility scores for all three community groups in both Birmingham and SE London communities are higher than the scores given to them by the other groups. This result highlights the ability of the community social responsibility framework to gather data on attitudes and judgements relating to the relationship that one group has with the other community groups, rather than householders simply only being able to provide feedback on pre-chosen aspects that are provided for them by another group (for example businesses, in the public relations process).

The ability of the community social responsibility framework to provide an insight into the interrelationships between community groups, as opposed to a circular relationship dictated by a single group with another, is also an important factor in a number of other key findings. For example, the results also indicated that policy makers in both Birmingham and SE London communities are perceived as possessing a particular level of social responsibility, regardless of whether the community has experienced recent flooding or not. This highlights the way in which the community social responsibility framework not only allows exploration of interrelationships, but can also then in turn form the basis for exploring these relationships in conjunction with other related aspects, in this case with experience of flooding. This makes the community social responsibility framework a useful tool in providing a deeper level of understanding for the exploration of perceptions of social responsibility within the community, as well as being an excellent platform from which further related aspects can be explored.

The success of this approach has also met a number of research needs highlighted by the literature review (chapter 4.12., p.118). Firstly, it has provided a new conceptual tool for gaining a better understanding of ways to improve non-technical flood resilience measures and is particularly useful for exploring perceptual factors. Secondly, it has allowed the researcher to explore perceptions of social responsibility within UK communities. The framework is readily adaptable for future researchers to apply it to communities in other countries, in order to gain a comparison between communities in different countries. A third research need has been met through the use of the framework as it has allowed the researcher to explore perceptions related to extreme flooding, with future research applications of the framework then allowing comparisons with other extreme weather events.

One of the key research needs that the framework has also met is to further explore perceptions at the community level, as well as comparing perceptions between different communities. This important benefit is further strengthened when we consider that it has also allowed the researcher to further explore perceptions within and between the three key community groups of householders, SMEs and policy makers in a number of different communities. This level of investigation would not have been possible with the limited view of corporate social responsibility or with the circular nature of the public relations process. The further research needs related to the effects of perceptions of social responsibility and its related aspects, such as age and ethnicity, were also able to be met because the framework provided the basis for further investigation. Therefore, the community social responsibility framework has demonstrated its validity as a research tool for exploring perceptions of social responsibility within the community. The benefits it provides far outweigh the limited circular thinking associated with corporate social responsibility and the public relations process. This indicates that the community social responsibility framework would also be suitable for meeting the final research need highlighted by the review of literature. The final need was to provide a common definition and framework so that social responsibility research could be both understood and be comparable across a number of academic disciplines and within institutional policies and agendas.

Despite its success as a research framework, there are a number of limitations for its application that must also be considered. Firstly, the community social responsibility framework may not be suitable for research at either the micro or macro level. At the meso level of research, which was identified by the review of literature as including the community level (chapter 2, page 17, figure

1) then the framework is able to succeed as a research tool because the number of participants within each community group are a manageable size. Applying the tool at the level of the individual (micro) may cause misleading results because the perceptions of individuals may not be reflective of perceptions of social responsibility in general within their respective community groups. This includes perceptions of both the self and others. Therefore, it would not be possible to gain a true picture of the way in which perceptions may be present or how these may influence behaviour. In turn, applying the tool at the level of an entire region or country (macro) may also cause misleading results as the current set of results have indicated that perceptions of social responsibility differ between locations. For example, the results indicated that perceptions of social responsibility within the control group community of Digbeth were significantly different from those in the other three communities. These community differences would become lost should the framework be up scaled and applied at the macro level. Furthermore, the measures designed to increase pro-environmental behaviour based upon its application at the macro level may not then be applicable to particular communities, which would limit any chance of success it may have.

8.2. Objective 1: Assess the validity of the conceptual model of perceptions of social responsibility

This part of objective 1 was met through empirical investigation of the effect that each of the factors highlighted as potential influencers of perceptions of social responsibility (age, gender, ethnicity and experience of flooding) have upon perceptions of social responsibility, within each of the key community groups. Detailed reports of the degree to which each potential indicator was found to influence perceptions of social responsibility are provided in the discussion sections of each of their respective parts of objective 2. This section will give an overview of the bearing that the results have upon the validity of the conceptual model of perceptions of social responsibility as a whole (chapter 3, page 75, figure 7).

The conceptual model of perceptions of social responsibility was based upon previous research findings and was built up throughout the literature review, incorporating each piece of new evidence in order to arrive at the final model. The results indicated that older participants reported higher levels of self-rated social responsibility than younger participants in both the Birmingham and SE London communities. This validates the inclusion of age in the model as having an influence on perceptions of social responsibility. The results also indicated that the Asian ethnic group reported significantly higher levels of social responsibility than both the White

and Black ethnic groups. The White ethnic group also reported significantly higher levels of social responsibility than the Black ethnic group. This validates the inclusion of ethnicity in the model as having an influence on perceptions of social responsibility. The results indicated that the social responsibility given by the communities which had experienced flooding were significantly different to the scores given by the control group community which had not experienced flooding. This validates the inclusion of experience in the model as having an influence on perceptions of social responsibility.

For the final suggested influence, the results indicated that there were no gender differences found in self-rated levels of social responsibility in either the Birmingham or SE London communities. This mean that gender was not found to be an influence on perceptions of social responsibility and must therefore be removed from the model being created by the current investigation. This finding is in contrast to previous research and deserves further exploration. It should be noted that it was beyond the scope of the current investigation to be able to investigate every aspect that may have been related to perceptions of social responsibility and, therefore, it is important to acknowledge that there may be other potential factors which have not yet been accounted for. The purpose of the current investigation was to explore those factors which had been highlighted in greater detail and present them in a conceptual model to enhance understanding of perceptions of social responsibility and its influencing factors, and this has been achieved.

The cognitive mapping analysis revealed themes related to the category of negative behavioural intention to be present within the community groups. This category had the most number of associated themes, with five distinct themes present within the transcripts. Furthermore, either two or three of these themes were present within the data from every single community group. This is a strong indication that perceptions of social responsibility are having an effect upon the decision making process of individuals within these community groups, particularly in relation to negative behavioural intention. Therefore, this supports the pathway suggested by the conceptual model where perceptions of social responsibility can influence decision making, which in turn can lead to negative behavioural intention. The five themes for negative behavioural intention also indicate that negative intention will often result in non-socially responsible behaviour. For example, the lack of preparedness theme associated with negative behavioural intention was built from codes within the transcripts which indicated that participants had not prepared (non-

socially responsible behaviour) and did not intend to prepare in the future (negative behavioural intention). This combination of a lack of socially responsible behaviour and negative behavioural intention was present within all five themes.

The lack of preparedness in others theme indicated that participants had not prepared (non-socially responsible behaviour) and did not intend to prepare in the future (negative behavioural intention). The lack of responsibility theme indicated that participants were not behaving responsibly (non-socially responsible behaviour) and did not intend to behave responsibly in the future (negative behavioural intention). The cost barrier and cost barrier for others themes indicated that participants refused to meet the costs associated with resilience (non-socially responsible behaviour) and did not intend to meet these costs in the future (negative behavioural intention). These findings validate the inclusion of the non-socially responsible behaviour aspect of the conceptual model. However, it also highlights a key omission from the conceptual model. Within the majority of these themes there was an indication that non-socially responsible behaviour was already occurring and this was both preceded and followed by negative behavioural intention.

This distinction between current and future behavioural intention is an element which is not yet reflected in the model and must be included. This is supported by previous research which stated that people select which new information they acknowledge based upon continuation and consistency of their already held beliefs and biases in order to maintain an attitudinal certainty (Steg and Vlek 2009, Eiser 1994, Greenwald 1980). This suggests that people will base their future decisions on the outcome of past decisions, representing a cognitive loop. These findings also suggest that the decision making process itself is in a continual loop, where the current behaviours and intention can only be changed by an alteration to the influences upon perceptions of social responsibility, which will then in turn potentially change the decision making process and behaviour. But not all the influences can be changed, for example ethnicity. Therefore, the loop only applies to changeable influences. However, there are also other results which must be taken into consideration.

The results indicated that there were ethnic differences in reported levels of self-rated social responsibility in both the Birmingham and SE London householder and SME community groups, but not in the policy makers community groups. Cognitive mapping analysis revealed that the

policy maker's job role was more influential in determining their perceptions of social responsibility than any of the other influences. Therefore, the conceptual model must be updated to reflect these findings, with the initial influences split by community group and the job role influence included. The cognitive mapping analysis also revealed that the negative behavioural intention related themes found within the policy maker's data were actually indicative of their perceptions of negative behavioural intention within the other two community groups. The themes were lack of preparedness in others and cost barrier for others. This meant that there were no negative behavioural intentions associated with the policy maker groups themselves. This indicates that the strength of the job role creates a clear pathway through the positive behavioural intention decision making process and leads to socially responsible behaviour. This is further supported by the empowerment and educating others themes associated with the policy maker groups, both of which are clear indications of positive behavioural intention and socially responsible behaviour. The conceptual model must be updated to include this pathway.

The cognitive mapping analysis revealed that policy makers use information as the major driver for positive behavioural change. It was beyond the scope of this thesis to explore every single potential aspect that may influence perceptions of social responsibility. The main aspects highlighted by the review of literature were the ones chosen as the most appropriate for further investigation. However, now the analysis has revealed that policy makers use information as a tool for changing perceptions, to an unanticipated degree, then it must also be included in the conceptual model so that future research may be able to investigate it further. The influence aspect to represent this information shall be called 'knowledge'. As knowledge can be gained by a number of sources then the model must reflect this. Therefore, knowledge within the model must be shown to be able to come from outside sources, as well as from the job role of policy makers. It is also closely linked with the experience aspect, although it is not considered to be in a direct pathway, as alterations to the level for experience influence may come from a number of sources, such as emotional experience, rather than being purely information based knowledge. The conceptual model must account for all these complex considerations that have arisen from discussion of the research results.

So far the discussion within this section has concluded that gender influence must be removed from the model and there must also be a continuous loop that goes through behavioural intentions a second time and returns to the changeable influences at the start of the model.

These are only applicable to householders and SMEs though, because the strength of policy maker's job role appears to create a more consistently positive conceptual pathway. Figure 31 reflects these suggested changes in a new Conceptual Model of Community Group Perceptions of Social Responsibility.

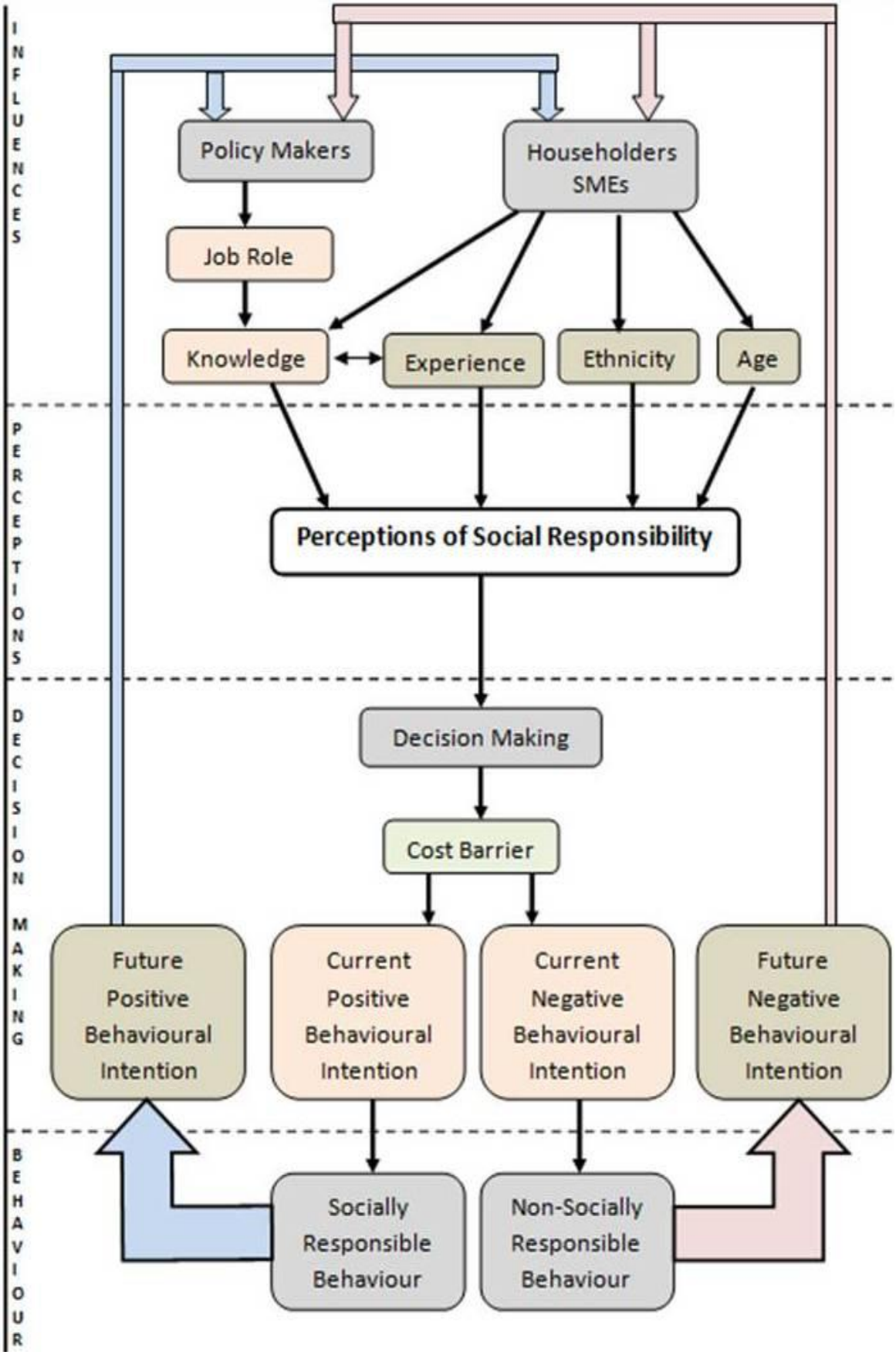

Figure 31: Conceptual Model of Community Group Perceptions of Social Responsibility

Please note that the reasoning behind the inclusion of the cost barrier within the decision making process is discussed in detail later in this chapter (see discussion of cost barriers in the discussion of cognitive mapping analysis in section 8.6., p.251).

Please note that the conceptual model is not intended to be a definitive understanding of all factors that can affect community group perceptions of social responsibility. It is a visual representation of both the quantitative findings and the contextual narrative of the cognitive mapping findings from this investigation, put together to form an understanding of the way in which the decision making process might work, from initial influences to final behaviour. For example, a householder or SME might be influenced by age, ethnicity, experience or knowledge when forming their perceptions of social responsibility. These perceptions may then affect their decision making, in addition to cost barriers also affecting that decision making, when deciding whether or not they intend to engage in pro-environmental behaviour (intention). This intention then leads to their actual behaviour, the consequences (or lack of consequences) of which can have an effect upon their future intended behaviour (for example they may gain knowledge or experience or change perceptions as they age).

The creation of the conceptual model of community group perceptions of social responsibility presented in figure 31 also contributes to meeting a number of research needs identified by the review of literature (chapter 4.12., p.118). The conceptual model provides an insight into the way in which perceptions of social responsibility affects pro-environmental behaviour, which in turn has been shown to affect community resilience. Therefore, the conceptual model has met the need to gain a better understanding of ways to improve non-technical flood resilience measures, in particular perceptual and behavioural factors. The model allows exploration of the effect of perceptions on behaviour within UK communities, in order to allow comparison with other countries, and also allows exploration of perceptions related to extreme flooding, in order to allow comparison with other extreme weather events.

As it is a community level conceptual model, this meets the need to further explore perceptions at the community level, as well as comparing perceptions between different communities. It also demonstrates the ability to explore perceptions within and between the three key community groups of householders, SMEs and policy makers in a number of different communities. The conceptual model also provides a platform to explore the effect that perceptions of social

responsibility may have upon pro-environmental decision making and behaviour in relation to community resilience to extreme flooding. The model also meets the specific research need to explore factors which may influence perceptions of social responsibility, in particular age, gender, ethnicity and experience of flooding, as well as the more general need to provide common definitions and frameworks so that social responsibility research can be both understood and be comparable across a number of academic disciplines and within institutional policies and agendas.

The main limitation for the application of the conceptual model is that it was designed to aid researchers in understanding the way in which perceptions of social responsibility may have an effect upon pro-environmental behaviour. Therefore, the model may not be applicable to the investigation of other types of perceptions. Future research should test the model further and attempt to draw comparisons with other types of perceptions in order to determine where common elements between perceptions and their affect upon behaviour may be found.

8.3. Objective 2: Explore the affect of age on perceptions of social responsibility

This part of objective 2 was met through empirical investigation of the relationship between age and self-rated perceptions of social responsibility. The results indicated that older participants reported higher levels of self-rated social responsibility than younger participants in both the Birmingham and SE London communities. This suggests that age was having an effect on perceptions of social responsibility and that this effect was consistent across different locations and community groups. Furthermore, this effect was found in both the communities that had experienced recent flooding and the control group community which had not experienced recent flooding. This supports previous research which found that increasing age was related to greater pro-environmental behaviour in both seismic hazard adjustments (Lindell and Whitney 2000) and preparations for El Nino (Siegel et al. 2003).

Contextual reasoning for these results can be found in the cognitive mapping analysis which revealed that older people are considered to be more vulnerable to extreme events, both within the perceptions they hold of themselves and within the perceptions that younger people have of them. This provides reasoning for the quantitative findings, because if older people in general are considered to be more vulnerable to extreme events then they would display a greater interest and uptake of resilience measures, which are representative of higher levels of social responsibility. This perceived vulnerability also supports previous research which stated that

elderly people were more fearful of earthquakes than younger age groups (Armas 2006) and that older people were more vulnerable to extreme events (Armas 2006, Granger and Hayne 2001).

The cognitive mapping analysis also revealed a trend of older participants accepting that they need to be aware of flooding and adopt resilience measures. This is also thought to be linked to perceived vulnerability, with the threat to older participants accepted as being greater, further supporting the findings of previous researchers already discussed. The increased threat is increases interest in their welfare. This supports previous research which stated that higher perceived risk was found to increase pro-environmental behaviour (Whitmarsh and O'Neill 2010, Floyd, Prentics-Dunn and Rogers 2000, Neuwirth, Dunwoody and Griffin 2000) and lower perceived risk lead to a lack of pro-environmental behaviour (Whitmarsh 2011, Spittal et al. 2005, Johnston 1999, Harris 1996). This also supports the line of reasoning that the higher levels of social responsibility reported by older participants stems from their need to take more interest in the topic and become more resilient due to their perceived increased vulnerability. This is also supported by the opposing results which indicated that younger participants showed more disinterest in the risk of extreme flooding and greater reluctance to adopt resilience measures. It also provides an explanation as to why Hakes and Viscusi (2004) found that older people are able to estimate risks more precisely than younger people. The increased interest in their welfare also supports previous research by Dwyer et al. (2004) who stated that older people will take longer than younger people to recover from mild to serious injuries which could occur as the result of an extreme weather event. However, the results are in contrast to previous early research which indicated that it is actually younger people that display more fear of hazards than older people, or that age is not a factor at all (Safi, Smith and Liu 2012, Whitmarsh 2008, Leiserowitz 2006, Savage 1993, Brenot, Bonnefous and Marris 1998).

Cognitive mapping analysis revealed that older participants also displayed more willingness to meet the costs associated with the uptake of resilience measures. This was again linked to the line of reasoning that older participants take an increased interest in their welfare due to perceived greater vulnerability. Older people are thought to be better able to justify the costs to gain the higher level of protection that they believe they need. This supports previous research which found that people who perceive themselves to be most at risk from extreme events are more likely to take measures to counter that risk, including supporting government initiatives, even if they have to make personal sacrifices to do so (Armas et al. 2003). Cognitive mapping analysis

revealed that older participants were also more likely to have noticed increases in extreme weather throughout their lives and were more likely to have experienced a flood. This again is linked to greater awareness and pro-environmental behaviour.

Exploration of the affect of age on perceptions of social responsibility met a number of research needs identified by the review of literature (chapter 4.12., p.118). The main specific need met by this aspect was the need to explore factors which may influence perceptions of social responsibility, in particular age. The results also provided a greater depth of knowledge regarding the effects of social responsibility, allowed further exploration of perceptions within and between the three key community groups and aided in exploring the effect that perceptions of social responsibility may have upon pro-environmental decision making and behaviour in relation to community resilience to extreme flooding. The results will also help to gain a better understanding of ways to improve non-technical flood resilience measures in UK communities.

There are a number of limitations for the generalisability of the age results which need to be taken into consideration. Firstly, some of the findings within previous research regarding age related effects are referring to people aged 65 or over. While the current investigation has demonstrated age effects on perceptions of social responsibility, these are not directly comparable to previous results because there were no participants aged over 65 in the current study. However, what has been demonstrated is that these effects increase with age. Therefore, further research should be conducted which explores perceptions of social responsibility in people aged over 65. Another point to note is that the current investigation did not control the age variable. This means that, although there was good representation throughout the participant's age range, this representation was not equal. Future research may wish to apply more restrictive age limits and controls in order to give equal weighting to particular age groups.

8.4. Objective 2: Explore the affect of gender on perceptions of social responsibility

This part of objective 2 was met through empirical investigation of the relationship between gender and self-rated perceptions of social responsibility. The results indicated that there were no gender differences in perceptions of social responsibility in either the Birmingham or SE London communities. This suggests that the lack of gender differences is a common aspect across communities in different locations. As there were no gender differences found within the quantitative questionnaire results then cognitive mapping analysis was not conducted on this

aspect. It had been indicated by previous research that females were more vulnerable to the effects of extreme weather events than males (Balbus and Malina 2009, Granger & Hayne, 2001). Therefore, gender differences had been expected. Kahan et al. (2007) had stated that females may be more inclined to feel more vulnerable to dangers in general, due to them possessing a reduced sense of political empowerment than males and thereby having less trust in authorities.

As seen with the age discussion, this increased vulnerability may have presented itself in the form of increased interest and awareness of risk, including increased perceptions of social responsibility. The results do not support this previous research though. This suggest that there are differences between perceptions of risk and perceptions of social responsibility, with factors that have been found to affect one not always affecting the other in the same way. This line of reasoning is supported by recent research by Butler and Pidgeon (2009) who found that, while perceptions of required behavioural change, perceptions of societal change and perceptions of control were recognised by individuals who had experienced flooding in summer 2007, these perceptions did not necessarily lead to an acceptance of a greater level of social responsibility. This underlines the importance of establishing research into perceptions of social responsibility as a separate research area in its own right, the platform for which has been provided by the framework and conceptual model presented within the current investigation.

Further distinctions between factors or indicators and their different affects of different perceptions can also be seen when we consider the previous recent research by Soffer et al. (2011) who found that gender and perceptions of threat and coping ability can influence an individual's potential to survive an earthquake. This again indicates that gender differences are present in relation to an extreme weather event. The gender differences are also related covariates of perceptions of the threat and perceptions of coping ability. However, gender was not found to be related to perceptions of social responsibility. It could be argued that these gender differences arose because the previous research was looking at earthquakes instead of extreme flooding. However, previous research has already indicated that there are differences in male and female responses to extreme flooding events (Bartlett 2008, Fordham and Ketteridge 1998, Enarson and Morrow 1998). This again suggests that the gender differences are associated with different types of perceptions, rather than different types of extreme weather events.

The lack of gender differences in the communities which had experienced recent flooding were also in contrast to previous finding which had stated that gender differences have been found to be present after an extreme flooding event, with females being affected more than males by changes within the community (Bartlett 2008, Fordham 1998). The findings were also in contrast to previous research which had stated that females were more likely to take action to reduce greenhouse gas emissions (Markowitz et al. 2012, Thogersen and Olander 2006, O'Connor, Bord and Fischer 1999) and displayed more intent to make pro-environmental adjustments to seismic hazards than males (Lindell and Whitney 2000). This again supports the argument that gender may be found to affect certain types of perceptions, but not others. Hawkes and Rowe (2008) had found that females rate risks associated with hazards as being higher than the ratings given by males. The lack of a significant gender difference in perceptions of social responsibility indicates though that if females do indeed rate risks higher, then this does not have an effect upon their perceptions of social responsibility. Therefore, this previous finding is also not supported by the current investigation.

Despite the lack of evidence for the presence of gender differences, exploration of the affect of gender on perceptions of social responsibility did meet a number of research needs identified by the review of literature (chapter 4.12., p.118). The main need met by this aspect was the need to explore factors, such as gender, which may influence perceptions of social responsibility. The results also provided an insight into the effects of social responsibility, allowed further exploration of perceptions within and between the three key community groups and aided in exploring the effect that perceptions of social responsibility may have upon pro-environmental decision making and behaviour in relation to community resilience to extreme flooding.

The main limitation is that, although there was near equal gender representation for some aspects of the analysis, there was not equal gender representation in all community groups for all stages of the analysis. Future research may wish to apply more restrictive gender controls in order to give equal weighting to both genders and allow a more direct comparison between the two genders.

8.5. Objective 2: Explore the affect of ethnicity on perceptions of social responsibility

This part of objective 2 was met through empirical investigation of the relationship between ethnicity and self-rated perceptions of social responsibility. The results indicated that the Asian ethnic group reported higher levels of self-rated social responsibility than the White ethnic group in both the Birmingham and SE London householder and SME community groups which had experienced flooding. In SE London, the results also indicated that here were ethnic differences found in self-rated social responsibility scores between the White and Black ethnic groups and the Black and Asian ethnic groups. There were no ethnic differences within the control group community which had not experienced recent flooding. The results also indicated that there were no ethnic differences present within the policy makers community groups.

The cognitive mapping analysis revealed that participants from the Asian ethnic group displayed a greater awareness and acceptance of the risk of flooding and were more likely to adopt resilience measures than participants in the White and Black ethnic groups. This supports, and provides contextual reasoning for, the quantitative finding that participants from the Asian ethnic group were reporting high levels of social responsibility than other ethnic groups. These findings support and help further clarify previous research which had found that individuals who regard themselves as belonging to the Asian ethnic group may hold different perceptions of a community's response to and recovery from an extreme flooding event (Tapsell 2000, Tapsell et al. 1999).

Cognitive mapping analysis also revealed that participants in the White ethnic group displayed a limited awareness of the risk of flooding, but also displayed either a lack of action or self-centred motivations and behaviours related to the adoption of resilience measures. This suggests that the White ethnic group were displaying some degree of social responsibility, but were also displaying non-socially responsible perceptions and behaviours. This supports, and provides contextual reasoning for, the quantitative finding that the White ethnic group perceived their social responsibility to be about average, rating it above the Black ethnic group, but below the Asian ethnic group. There was some evidence of individualistic, non-socially responsible views being displayed by participants in the White ethnic group, which offers some degree of support to previous research which stated that there is a particular type of white male group within the general population who are highly sceptical about risks in general and hold extremely individualistic attitudes (Conti et al. 2011, Kahan et al. 2007, Palmer 2003, Finucane et al. 2000).

Cognitive mapping analysis revealed that participants in the Black ethnic group generally did not accept the risk of flooding, or did not believe that it was a problem for them. This is linked to coding which indicates that the Black participants believed that they were often neglected by policy makers, believing that they were often housed together in deprived areas of a community. This suggests that flood risk may not have been of great importance to them because they already have a number of other priorities, some of which are linked to an increased vulnerability to extreme flooding. This provides further contextual explanation for the low perceptions of social responsibility found within the questionnaire analysis.

Overall, the findings suggested that members of the Black ethnic group did not hold socially responsible perceptions. This supports, and provides contextual reasoning for, the quantitative finding that the Black ethnic group were reporting the lowest levels of perceived social responsibility. These results are in contrast to previous research which stated that whites of both sexes rated environmental risks as less serious than did African-Americans (Whitfield et al. 2009, Kahan et al. 2007). This is because if whites were to rate environmental risks as being less serious, then they would be expected to also display less social responsibility towards extreme flooding, due to them having less concern. The differences within these findings may be an indication that ethnic differences can vary between countries, in this case between the USA and the UK. However, it may also indicate that differences in the effect that ethnicity has on different types of perceptions. In the same way that it was argued that gender may be an indicator for one type of perception, but not for another, so too may ethnicity. Member of the White ethnic group may display higher perceptions of social responsibility, but member of the Black ethnic group may display higher perceptions of risk. Support for this line of reasoning can be found in previous research which stated that members of the Black ethnic group had more dread of hazards, the reasoning for which was related to their perceptions about personal exposure to hazards (Whitfield et al. 2009, Brenot Bonnefous and Marris 1998, Savage 1993). Again, this is not supported by the results of the current investigation, but can be explained by the suggestion that ethnicity affects different perceptions in different ways.

It is interesting to note that the reasons provided by previous research for potential gender differences, that they may be more inclined to feel vulnerable to dangers in general, due to them possessing a reduced sense of political empowerment than other ethnicities and thereby having less trust in authorities, are also the identical reasons given for potential ethnic differences (Kahan

et al. 2007). Gender and ethnic discrimination are commonly considered to be more serious and widespread than age discrimination. Therefore, they may hold a greater influence over certain types of perceptions. This theory needs to be explored further by future research.

Exploration of the affect of ethnicity on perceptions of social responsibility met a number of research needs identified by the review of literature (chapter 4.12., p.118). The primary need met by this aspect was the need to explore ethnicity factors which may influence perceptions of social responsibility. The results also provided insights towards understanding the effects of social responsibility, allowed further exploration of perceptions within and between the three key community groups and aided in exploring the effect that perceptions of social responsibility may have upon pro-environmental behaviour and decision making for community resilience to extreme flooding. The results will also help to gain a better understanding of ways to improve non-technical flood resilience measures in UK communities.

There are a number of limitations for the generalisability of the ethnicity results which need to be taken into consideration. The most obvious criticism that could be levelled at the results is that the low number of participants within certain ethnic groups meant that not all ethnic groups contained sufficient numbers for analysis. Future research should conduct further analysis with equal ethnic representation throughout each community group so that more ethnic groups can be investigated and equal representation will allow more balanced comparisons between ethnic groups.

8.6. Objective 2: Explore the affect of experience of flooding on perceptions of social responsibility

This part of objective 2 was met through empirical investigation of perceptions of social responsibility in communities which have experienced recent flooding and in those which have not. The results indicate that the levels of social responsibility reported by participants within the community which had not experienced recent flooding were far lower than those reported by participants within communities which had experienced recent flooding. This suggests that people who have experience of flooding have higher perceptions of social responsibility than people who have not experienced flooding. This supports previous research which has shown that experience of a disaster can often have an influence upon an individual's motivation to cope with future risks (Siegrist and Gutscher 2008, Siegel et al. 2003). It also supports previous research by Nicholson-Cole (2005) which indicated that personal experience can have a positive effect upon people's

ability to visualise climate change and can alter perceptions of its importance, as well as perceptions of their ability to enhance their own resilience to it.

However, the results also indicated that householders and SMEs in Witton and Selly Park perceive themselves to have significantly higher levels of social responsibility than the householders and SMEs in Thornton Heath, despite all three communities having recent experience of flooding. This suggests that experience of flooding does not lead to a uniform percentage increase in perceptions of social responsibility and there are differences between communities in different locations. The results also indicated that policy makers are perceived as possessing a particular level of social responsibility, regardless of whether the community has experienced recent flooding or not. This suggests that, as was found with ethnic differences, the importance and focus of the work that policy makers do overrides any individual differences which may have been present.

Cognitive mapping analysis was conducted on the transcripts from the communities which had experienced recent flooding and on the control groups which had not experienced recent flooding. The emergence of particular themes within each of these communities provided an insight into the effect that experience of flooding has upon perceptions of social responsibility. The cognitive mapping analysis for the householder community groups revealed that the communities of Witton, Selly Park and Thornton Heath, all of which had recent experience of flooding, contained the theme of experiential learning within their transcripts. This theme was categorised as an awareness driver. This theme was not present in the control group community of Digbeth which did not have recent experience of flooding. This supports previous research which found that an individual's perception of home as a secure place changes after experiencing a flooding event (Tapsell and Tunstall 2008).

The cognitive mapping analysis for the SME community groups revealed that, similar to the householder findings, the communities of Witton, Selly Park and Thornton Heath, all of which had recent experience of flooding, contained the theme of experiential learning within their transcripts. Again, this theme was categorised as an awareness driver and was not present in the control group community of Digbeth which did not have recent experience of flooding. These findings support previous research which found that experience of Hurricane Hugo in 1989 was found to be a predictor of an individual's level of preparation for Hurricane Emily in 1993 (Sattler,

Kaiser and Hittner 2000). It also supports research which indicated that individuals who experience a high level of exposure to natural disasters are more likely to engage with the issue and create coping strategies (Spence et al. 2011, Fillmore et al. 2008, Work, Spencer and Osborne 1999, Lave and Lave 1991).

The cognitive mapping analysis also revealed that the transcripts for the SME community groups in the communities which had recent experience of flooding contained the lack of responsibility theme. However, this theme was not present within the transcripts from the control group community which had not recently experienced flooding. This initially suggests a seemingly counter-intuitive conclusion that experience of flooding had lead to a lack of social responsibility being displayed, despite higher perception of social responsibility scores being reported in within those communities which had experienced flooding. At first this appears to support previous findings by Siegel et al. (2003) who found that an individual's level of property damage experienced in previous earthquakes was not a predictor of level of preparation for El Nino. However, it may be more appropriate to interpret the findings as a whole in order to gain a clearer picture.

The SMEs in the community which had not recently experienced flooding did not display the 'lack of responsibility' theme within their transcripts. This could be explained though by their lack of experiential learning, which means they may have less knowledge and lower expectations of what they are supposed to do, or what level of resilience they are expected to attain. The community groups did not believe that they lacked social responsibility because they didn't know that there were more ways they could be socially responsible. This is supported by their lower self-rated perceptions of social responsibility, which indicates that they are less socially responsible than their flood experienced counterparts, which is linked to less knowledge and lower expectations. Therefore, it could be reasoned that the SMEs in the community without recent experience of flooding did not display the 'lack of responsibility' theme in their transcripts because they are not fully aware or concerned enough to understand that this lack of social responsibility exists within their individual or collective perceptions and behaviour.

This explanation is further supported by the results which indicate that the education theme, which is considered to be representative of an awareness barrier, is present within the transcripts of the SME groups which have recent experience of flooding, but again not in the SME group

which has not recently experienced flooding. This education theme was characterised by a lack of knowledge and understanding, which is recognised by community groups which have experienced recent flooding. But again it suggests that communities which have not experienced recent flooding are not fully aware or concerned enough to understand that this lack of social responsibility exists within their individual or collective perceptions and behaviour. Given this logical reasoning, it can be argued that experience of flooding creates experiential learning, which makes people more aware of what their roles and responsibilities should be, which allows them to acknowledge and understand that there is lack of responsibility within their current perceptions and behaviours. These potential links highlighted by the current investigation between experience of flooding, experiential learning, lack of knowledge and a lack of responsibility for SMEs requires further exploration by future research.

Exploration of the affect of experience of flooding on perceptions of social responsibility met a number of research needs identified by the review of literature (chapter 4.12., p.118). The experience results allowed exploration of factors which may influence perceptions of social responsibility. The results also provided a greater depth of knowledge regarding the effects of social responsibility, specifically within and between the three key community groups. The results also aided in exploring the effect that perceptions of social responsibility may have upon pro-environmental decision making and behaviour in relation to community resilience to extreme flooding. The results will also help to gain a better understanding of ways to improve non-technical flood resilience measures in UK communities.

The main limitation for the experience of flooding aspect of the research was that it not possible to directly compare self-rated perceptions of social responsibility because the policy makers were not associated with any specific community. The perceptions of the policy makers given by the householder and SME community groups were able to be analysed though. Future research, which do not have such tight time constraints, should identify and isolate exactly which policy makers are able to represent each community and explore their self-rated perceptions between communities which have and have not experienced extreme flooding.

8.7. Additional Findings from the Questionnaire and Cognitive Mapping Analysis

The methods used in the current investigation were designed to meet a number of research needs and objectives. However, the analysis of the questionnaires and the cognitive mapping analysis also revealed a number of more general findings that were in addition to the set objectives. This section provides discussion of the key additional findings which have not yet been fully explored previously in this chapter and relates them to the findings from the review of literature.

The results from the questionnaire analysis revealed that:

- All three community groups in both Birmingham and SE London communities believe they are the most socially responsible group, with their self-rated social responsibility scores being higher than the scores given to them by the other groups.
- The results also indicated that policy makers in both Birmingham and SE London rated themselves as having the highest levels of social responsibility, with householders rating themselves as having the lowest levels of social responsibility.

The cognitive mapping analysis results revealed a number of insights which can provide a context to the quantitative findings from the questionnaire analysis. These will be discussed in relation to their respective theme categories. The results in general though support the view that people's perceptions of climate change issues creates a number of barriers and challenges to the successfully communicating and instilling positive behaviour (Whitmarsh 2009, Stamm, Clark and Eblacas 2000). Furthermore, the results support the view that perceptions can affect an individual's decision to prepare for extreme flooding (Keller, Siegrist and Gutscher 2006, Grothmann and Reusswig 2006, Siegrist and Gutscher 2006). For example, older participants reported higher levels of social responsibility and also reported an increased awareness of flood risk and a greater likelihood to engage in flood resilience measures, in particular meeting the costs of protection.

The power distribution category revealed that:

- Householders and SMEs generally felt powerless to protect themselves from extreme flooding.
- This supports previous findings which stated that traditional ways of dealing with extreme weather events, including power structures, are acting as a barrier to the implementation of successful, long-term resilience measures (Doppelt et al. 2011, Spence et al. 2011, Ribot 2002, Patt and Gwata 2002).
- It also supports previous research which found that householders and businesses do not know where assistance can be obtained, who should be giving this assistance and what they themselves should be doing (Crichton 2006).
- Empowerment of householders and SMEs was found to be one of the main drivers for policy makers.
- This suggests that policy makers are aware of where the problems for resilience can arise and are showing a high level of social responsibility in trying to counter these issues.
- This supports the view that governing bodies recognise that society must undergo significant changes in order to counter climate change (Richardson et al. 2009).
- This provides additional reasoning for why policy makers report higher levels of social responsibility than householders and SMEs.
- It should also be noted that householders and SMEs are generally aware that policy makers are making these efforts and believe that it is their duty to do so.
- This supports research by Spence et al. (2010) who found that only 10% of people surveyed thought that individuals and their families are responsible for helping to counter climate change.

Explanations for the current investigation findings can also be found in previous research which states that the implementation of new measures, or proposed physical changes, often require community approval and engagement to be successful (Haggett 2009, Owens and Driffill 2008). However, as further previous research has indicated, people often shift the responsibility of preparing for flooding from themselves to the government (Werrity et al. 2007, Krasovskaia 2005). This supports the reasoning for the importance of the policy maker's job role overriding individual differences in perceptions of social responsibility. This also provides reasoning for the consistently high perceptions of social responsibility that householders and SMEs believe policy makers to possess. This suggests a common acknowledgement of roles and responsibilities within

each community group, with increased expectations creating increased perceptions of responsibility for policy makers.

The awareness barriers category revealed that:

- Householders and SMEs were generally disinterested in acknowledging the threat of extreme flooding, or in acquiring knowledge that could increase their resilience to extreme flooding.
- This supports previous findings which stated that denial of risk is used to justify lack of action on climate change (Dunlap and McCright 2010, Stoll-Kleemann, O'Riordan and Jaeger 2001) and that many people are unaware or are in denial about the risks they live with each day (McCright and Dunlap 2011, Lorenzoni and Langford 2001).
- This also supports the view of previous researchers that pro-environmental behaviours have still not been incorporated into mainstream UK culture (Reid, Sutton and Hunter 2010).
- Educating householders and SMEs was another main driver for policy makers.
- This again suggests that policy makers are aware of where the problems for resilience can arise and are showing a high level of social responsibility in trying to counter these issues.

The importance of policy makers acknowledging that they need to educate others provides support for previous research which found that even individuals who display pro-environmental perceptions may not take that to the next stage and actually engage in pro-environmental behaviour because they do not feel that they personally need to (Steg and Vlek 2009, Hobson 2003). This further supports the importance of policy maker's job role highlighted by the cognitive mapping analysis and discussed in relation to a number of different aspects previously in this chapter. It also provides further reasoning for the higher levels social responsibility reported by and given to policy makers, because there is again a common expectation amongst the community groups that the policy makers are responsible for educating all members of the community.

The awareness drivers category revealed that:

- The provision and distribution of information was the basis of perceptions surrounding the roles and responsibilities of policy makers.

- This confirms the views of previous research stated in the *Foresight Future Flooding* report (Evans et al. 2008) and the Stern Review (2007), both of which highlight the importance of informing everyone about the risks posed by climate change and how it may affect their daily lives.
- This was a common acknowledgement found within all three community groups.

This finding supports lines of reasoning from the discussion of previous categories which highlight the influence of, and expectations surrounding, a policy maker's job role in determining both their self-rated and given perceptions of social responsibility. Therefore, the information driver theme is also related to the empowerment and educating others themes. The nature of this relationship is explained in part by previous research which stated that perceptions of need and ability to mitigate climate change are precursors to personal behaviour change (American Psychological Association 2010, Spence and Pidgeon 2009).

The negative behavioural intention category revealed that:

- There was a general lack of preparedness and lack of responsibility being displayed by householders and SMEs in relation to extreme flooding.
- This lack of preparedness in householders and SMEs was recognised by policy makers. Furthermore, householders and SMEs were concerned with the costs associated with the uptake of resilience measures.
- This cost barrier for others was again recognised by policy makers.
- Therefore, this again suggests that policy makers are aware of where the problems for resilience can arise and are showing a high level of social responsibility in trying to counter these issues.
- This was an aspect also noted by the Pitt (2008) review which found that the overall take-up of resilience measures was low, even for simple, low-cost measures.

With regards to the cost barrier, in the previous expectations of provision from policy makers, such as empowerment, information and education, there has been a common acknowledgement of responsibility from all three community groups. But with the cost barrier there is a direct contrast between the perceptions and expectations held by householders and SMEs and those held by policy makers. Householders and SMEs generally expect policy makers to meet the majority of the resilience costs, but policy makers believe that householders and SMEs are

responsible for meeting a number of costs, particularly those associated with making their own homes and businesses more resilient to extreme flooding. The cognitive mapping analysis has therefore highlighted cost barriers as being one of the most important and difficult barriers related to social responsibility. This cost barrier though is perceived to be a behavioural barrier, rather than an influence upon perceptions of social responsibility. It has therefore, been included in the decision making section of the conceptual model of community group perceptions of social responsibility (figure 31, page 188).

The information exchange category revealed that:

- Householders and SMEs believe that the information provided by policy makers contains too much irrelevant, uninteresting, low quality content and not enough accessible, localised, interesting, high quality content.
- Furthermore, the information is often inconsistent and can be too complex or become distorted via dissemination vehicles such as the media, failing to reach its intended audience.
- This supports previous findings which stated that many of the policies, guidance, codes and regulations, currently in place in the UK tend to be complex and difficult to apply consistently (Doppelt, Hamilton and Vynne 2011, Crichton 2006, Spence 2004).
- Previous research also suggests that this often leads to differences between an individual's knowledge regarding climate change and them actually using this knowledge to make the decision to engage in pro-environmental behaviour (Kennedy et al. 2009, Barr 2004, Kollmuss and Agyeman 2002).
- This is also linked to previous research which stated that people in the UK are becoming more sceptical about the risks posed by climate change (Leiserowitz et al. 2010).
- This language barrier theme also indicates that the efforts of policy makers in trying to resolve the resilience issues previously discussed are being undermined by the quality and quantity of information that they are able to provide.
- This is a particularly important finding when we consider that information was found to be the main driver for the empowerment and educating others themes.
- Furthermore, previous research has indicated that top down information (i.e. policy makers telling people what should be done) does not work and bottom up information (i.e. community groups integrating information together) is needed to improve risk communication and community resilience (Dufty 2008).

- It has also been recognised by previous researchers that the creation of policy based on a probabilistic understanding of risk can actually increase vulnerability to that risk (Sellke and Renn 2010, Sarewitz, Pielke and Keykhah 2003).
- This is because people often follow set procedures to counter a theoretical threat, created and reinforced though overreliance upon low quality information, which may not be representative of the threat they currently face.
- The general disinterest and lack of trust that this is creating within the householder and SME groups also indicates that the dissemination of low quality information may actually be doing more harm than good, as it changes people's perceptions of policy maker's ability to protect them from extreme flooding.

This lack of trust in policy makers and the language barriers created by poor quality information provides potential reasoning for why each of the community groups rated themselves as having the highest levels of social responsibility, despite the common acknowledgement that policy makers have a majority share of the responsibility in relation to education and empowerment. This trust barrier supports the findings of previous research which found that there is a link between perceptions of hazards and perceptions that people hold of key community groups, for example perception of trust in authorities (Su et al. 2008).

These additional findings contributed towards a number of research needs identified by the review of literature (chapter 4.12., p.118) and are listed here in table 67.

Table 67: Summary of Additional Findings Contribution to Research Needs

No.	Contribution to Research Needs
1	The results have allowed an insight into the effect of perceptions on behaviour related to extreme flooding within UK communities.
2	The results have provided further exploration of perceptions at the community level, within and between the three key community groups and explored the effect that perceptions of social responsibility may have upon pro-environmental decision making and behaviour.
3	The results have provided a greater depth of knowledge regarding the effects of social responsibility and have further met the need to explore factors which may influence perceptions of social responsibility.

The limitations of the questionnaire analysis and cognitive mapping analysis have been previously discussed in their respective research methods sections (see chapter 5.5.3., p.134, for limitations of the questionnaires and chapter 5.6.2., p.140, for limitations of cognitive mapping analysis).

8.8. Relevance for Institutional Policies and Agendas

This section will discuss a number of key findings and suggestions from the review of social responsibility within policies and agendas in relation to the findings from the current investigation.

The UK National Security Strategy states that communities play a key role in resilience (Cabinet Office 2008). The current investigation presented a new conceptualisation of how to investigate perceptions of social responsibility within the community so that its affect upon community resilience could be explored, the community social responsibility framework. This is also supported by the Pitt (2008) review, one of the key reference documents for addressing flooding in the UK, which strongly approves of attempts to increase resilience at the community level. Policy research also highlighted the importance of attempting to understand motivating factors behind pro-environmental behaviour (Uzzell et al. 2006, Jackson 2005, Darnton 2004). The current investigation provided information towards this call by identifying age, experience and ethnicity factors which were found to have an effect upon perceptions of social responsibility and pro-environmental behaviour. These factors were presented as influences upon perceptions and behaviour within the conceptual model of community group perceptions of social responsibility presented earlier in this chapter.

The cognitive mapping analysis revealed a number of themes that represented barriers to communities working together. For example, the powerlessness felt by householders and SMEs, as well as the cost barriers, all meant that these community groups were not as involved in the resilience process as they could be. Further barriers were also identified, with a general lack of interest and denial being displayed by members of the householder and SME community groups. The affect of these barriers on perceptions of social responsibility was discussed. It was also noted that much of the policy maker's job role is focused around using information as a driver for pro-environmental perceptions and behaviour, with a number of informational barriers and issues also identified. These findings highlight a number of aspects which should be taken into consideration by policy makers. For example, it was noted that the United Nations International

Strategy for Disaster Reduction, which proposes that the successful implementation of their key framework for increasing national and community resilience to disasters, the Hyogo Framework for Action 2005 – 2015, is reliant upon the involvement of local communities (UN/ISDR 2007a, UN/ISDR 2007b). Furthermore, the Draft Climate Change Adaptation Strategy published by GLA highlights the need for individuals and communities to increase their own resilience to flooding in order to increase London's overall resilience to flooding (Greater London Authority 2010). Given that the success of these strategies relies upon engagement from local communities, it is reasonable to suggest that the barriers highlighted by the current investigation will need to be addressed in order to maximise community involvement.

This is of particular importance when we consider the specific aims and objectives of the Draft Climate Change Adaptation Strategy, with aim 6 designed to 'encourage and help business, public sector organisations and other institutions prepare for the challenges and opportunities presented by climate change' (Greater London Authority 2010:16). Similarly, aim 8 is to 'raise general awareness and understanding of climate change with Londoners and improve their capacity to respond to changing climate risks' (Greater London Authority 2010:16). This emphasis on the importance of raising awareness and uptake of resilience measures within householder and SME community groups was revealed by the cognitive mapping analysis to be fundamental aspects of the policy maker's job role.

The analysis also contained a number of barriers that can affect the ability of the GLA to achieve these aims. It appears from these aims that the GLA recognise and are attempting to counter the feelings of powerlessness within the householder and SME community groups. However, the current investigation has found that raising awareness and promoting responsible behaviour encounters problems within the information that policy makers are providing, particularly a lack of interest and faith in resilience information. Furthermore, there was a lack of willingness to become responsible and prepared for extreme weather events. These issues were based around the cost barriers to the uptake of resilience measures and a reluctance to engage with the issue from younger participants, particular ethnic groups and those without experience of flooding. The GLA should take these findings into consideration when planning their specific measures designed to achieve their aims.

The UK Sustainable Development Strategy also emphasised the importance of finding ways to influence people's behaviour to be more pro-environmental (Barr and Gilg 2005). The current investigation suggests that finding ways to overcome the perceptual and behavioural barriers to policy maker's successfully carrying out their responsibilities would improve the ability of this strategy to achieve its aims. The community resilience barriers identified within the powerlessness theme support the need to recognise the social aspects of flooding and involve individuals and community groups in the management of flood risk. This was identified as a fundamental element of DEFRA's 'Making Space for Water' (DEFRA 2005). There were criticisms within the review of policies and agendas that Making Space for Water' (DEFRA 2005) is actually more of a 'vision' rather than a 'policy' (Johnson and Priest 2008:516). Therefore, it is important that policy makers are made aware of, and pay attention to, the findings of this investigation which can help inform current and future policies, with detailed information, frameworks and models provided in order to help guide this process.

There are a number of limitations for the use of the current investigation findings in informing policies and agendas. The current investigation was conducted at the level of the community (meso level), but the majority of policies and agendas are created and implements at the national and international level (macro level). Therefore, further research may need to be conducted to explore whether these community level findings can be applied to a larger scale, before they are incorporated into future policies. In addition, the current investigation was only focused on exploring extreme flooding and further research will be required in order to discover whether these findings are applicable across a broader range of extreme weather events, before they can be included in generalised extreme weather related policies.

8.9. Relevance for Measures of Community Resilience

This section will discuss the structure and content of the measures of community resilience reviewed in chapter 4.1., p.77, in relation to the findings from the current investigation.

The current investigation has provided a number of findings which will prove valuable for helping to achieve a greater level of understanding of the ways in which characteristics of community groups may affect both the resilience of these individual groups and wider community resilience. This is an important aspect defined by the social domain of Tieney and Bruneau's (2007) measure of community resilience, which focuses on population and community characteristics that render

social groups either more vulnerable or more adaptable to hazards. The results suggest that the population characteristics of age and ethnicity are related to perceptions of social responsibility, which in turn is linked to vulnerability to hazards. The results also indicated that experience of flooding can increase an individual's perception of social responsibility, with this experience considered to be a community characteristic, as the experience is shared by all members within the flooded community. Therefore, the results support the inclusion of the social dimension within Tieney and Bruneau's (2007) measure of community resilience, while also providing more depth in the form of specific indicators that are representative of the population and community aspects.

The current investigation also provides support for a number of aspects within the three factors of community resilience defined by Paton (2007). The personal factor was related to critical awareness, self efficacy, sense of community, outcome expectancy, action coping and resources available. The results suggest that there are a number of awareness barriers within community groups which can affect perceptions of social responsibility and behaviour, which can be considered to be supportive of the critical awareness aspect. There is also the powerlessness theme present within householder and SME community groups, which is related to the level of self-efficacy and resources available aspects. This is because the powerlessness was shown to emanate from both a lack of knowledge for an individual to improve their own resilience and a lack of monetary and informational resources. This also supports the importance of the community participation aspect found by Paton (2007) to influence community resilience. The outcome expectancy theme is also partially supported by findings which indicate that the expectations that people hold can affect their behaviour. For example, low expectations of the risk of flooding can lead to reluctance to meet the costs of resilience and a general disinterest in the subject. This also supports the negative outcome expectancy aspect which was found by Paton (2007) to be one of seven key influences on community resilience. Therefore, the results of the current investigation show support for numerous aspects of Paton's (2007) personal factor of community resilience.

The community factor was related to collective efficacy, participation, commitment, information exchange, social support, decision making and resources available. The results suggest that there is a lack of collective resilience, with the majority of the responsibility being left to policy makers. This is related to the level of collective efficacy and participation aspects. The results also showed

strong support for the information exchange aspect, as this was found to be an important theme category. Within this theme category there were a number of issues surrounding the quality and quantity of information available. The analysis also showed that the importance of the responsibilities that come with the policy maker's job role override a number of other factors that were found to be related to perceptions of social responsibility. This is an important aspect because the ability to communicate community problems was also found by Paton (2007) to be one of the seven key influences on community resilience. Therefore, the results have shown support for the importance of social support, the decision making process and the resources that are available. This means that all aspects of Paton's (2007) community factor of community resilience have been found to be supported within the results of the current investigation.

The institutional factor was related to empowerment, trust, resources and mechanisms for community problem solving. The results suggest that empowerment is one of the key concerns for policy makers, with it being represented as a theme within the analysis of their transcripts and often being called for by householders and SMEs within the powerlessness theme. This supports the inclusion of the empowerment aspect. Empowerment was also one of the seven key aspects found by Paton (2007) to influence community resilience. Trust barriers were also found to be a theme for a number of the community groups, supporting the trust related aspect. Again, trust was also found to be one of the seven key aspects identified by Paton (2007) that influence community resilience. The cost barriers and information drivers found within the themes support the importance of the resources aspect, particularly for policy makers who were dedicated to resolving community problems through encouragement and empowerment. Therefore, all aspects of Paton's (2007) institutional factor of community resilience were found to be supported within the results of the current investigation.

The current investigation provides support for a number of the indicators within Cutter et al.'s (2008) five domains of resilience. The importance of demographics within the social domain appears to be fully supported by results which indicated that age and ethnicity can have an effect upon perceptions of social responsibility. These findings also aid in identifying which specific characteristics can have an effect and to what degree, of particular importance given the lack of gender differences found within the current investigation, which was not in line with the findings of previous research. Participation in a range of aspects was considered to be indicators for the institutional domain. The importance of participation is highlighted by policy makers who attempt

to increase knowledge and participation in community resilience through empowerment of the householder and SME community groups. These responsibilities for the policy maker job role were driven by the need to create and disseminate information, as well as educating others, which supports the inclusion of lack of understanding of risk as an indicator of the community competence domain. The majority of the indicators within each of Cutter et al.'s (2008) five domains did not find support within the current investigation. However, it must be remembered that this research was not designed to specifically investigate the validity of measures of community resilience. Therefore, such a task was beyond the scope of the current investigation. As stated in the review of literature, future research should investigate specific aspects of the measures of community resilience in greater detail to provide more depth of support for each aspect included within their structure.

9. CONCLUSION

This chapter provides an overview of the entire research project, from initial conceptualisation through to discussion of the final results. Contributions to new knowledge are highlighted and recommendations made for future research.

9.1. Summary of Theory, Objectives and Methodological Approach

It was suggested within the review of literature that climate change is making extreme weather events more frequent and more severe, with extreme flooding one of the biggest risks faced by increasingly vulnerable UK communities. Physical and economical resilience measures have been shown to be inadequate as they do not take into account the way in which humans behave, both as individuals and as community groups. Research has largely focused upon measuring physical aspects of behaviour, rather than exploring the perceptual motivations behind pro-environmental behaviours. Research needs to explore in greater depth the perceptual and behavioural factors which can influence resilience. This research needs to be conducted within the community, allowing behaviour of individuals to be contextualised within a social group, which in turn allows exploration of the interrelationships between different community groups.

This is of particular importance given the complexities and inconsistencies within policy guidance, the failings of technological measures of resilience and the over-reliance upon interconnectedness within modern societies. The current investigation is multi-disciplinary, but the main research focus on social responsibility and the emphasis on the social level places it largely within the field of vulnerability. Definitions of both resilience and community resilience in the context of the current investigation were established. The research highlighted that householders, SMEs and policy makers are the three community groups which are the key to increasing resilience to extreme flooding events, with their importance evident in community resilience models and both policy and academic research.

Perceptions of social responsibility were presented as an important area of research. Definitions of social responsibility for vulnerability and resilience research were also established. The majority of social responsibility research was found to focus on corporate social responsibility, which fails to adequately integrate the perceptions held by key community groups into resilience promoting measures. The current investigation proposed a new framework for investigation of community social responsibility, which can account for the effect of perceptions upon behaviour within and

between a number of key community groups. This framework was supported by both theory and real world examples of the way in which perceptions of social responsibility influence decision making and behaviour. It was also demonstrated that perceptions of social responsibility may differ between community groups in different locations and research should therefore explore and compare perceptions in a number of different communities. The importance of social responsibility was further highlighted by its inclusion within institutional aims and agendas at both national and international levels, as well as policies aimed at local communities.

The research also argued that perceptions of social responsibility may have their own influencing factors, with experience of flooding and the demographics of age, gender and ethnicity being proposed as potential factors that require further research. These factors were chosen because previous research had already highlighted them as the factors which contain the most potential to be able to influence perceptions. The research reviewed a number of existing measures of community resilience which supported the notion of viewing communities as social units, with householders, SMEs and policy makers supported as the three key community groups. The review also supported the effect that perceptions of social responsibility may have upon decision making and behaviour, as well as further highlighting the influence of demographic characteristics. It was demonstrated that a lack of cohesion within these models is brought about by a lack of depth in the knowledge that research currently has about individual factors and how they affect community resilience. This lead to a number of issues that research needs to address in order to inform both these and future measures of community resilience.

The research presented communities in Birmingham and London as appropriate locations in which to conduct the research. Four communities in two separate cities were chosen because the discussion of literature and review of measures of community resilience highlighted the need for separate communities to be compared to each other. This also allowed comparison between communities in different locations who face different levels of risk, as well as between communities who had experienced flooding and those who had not.

The review of literature highlighted a number of gaps in knowledge and competing arguments where significant contributions to new knowledge can be made. These gaps in knowledge were expressed as a number of key research needs which the current investigation sought to address. These needs were based around gaining a better understanding of ways to improve non-technical

flood resilience measures, in particular perceptual and behavioural factors associated with perceptions of social responsibility and community resilience to extreme flooding. Research needs were also based upon exploring the effect of perceptions related to extreme flooding on behaviour within UK communities, including exploring perceptions within and between the three key community groups of householders, SMEs and policy makers in a number of different communities. Perceptions of social responsibility was highlighted as requiring further research, as well as the need to explore factors which may influence perceptions of social responsibility, in particular age, gender, ethnicity and experience of flooding. Research was also found to need common definitions and frameworks so that social responsibility research can be both understood and be comparable across a number of academic disciplines and within institutional policies and agendas.

The gaps in knowledge highlighted by the review of literature and their associated research needs were used to generate two research objectives. The first objective was to establish a theoretical framework for community level social responsibility research and to create a conceptual model of community group perceptions of social responsibility. This was achieved through the creation of the community social responsibility framework and the conceptual model of community group perceptions of social responsibility. These were based upon evidence and critical analysis within the literature review. The first objective was also to empirically assess the validity of the framework and conceptual model respectively by conducting research that both adhered to their theoretical framework and tested the content of their structure. The second objective was designed to explore factors which were considered to be related to perceptions of social responsibility, these being age, gender, ethnicity and experience of flooding respectively.

The two objectives were explored through a mixed methodological approach which combined quantitative questionnaires and qualitative interview transcripts analysed using cognitive mapping technique. This allowed a large amount of complex data to be obtained and analysed, while also retaining the ability provide a context for the research findings.

9.2. Summary of Results and Contributions to Knowledge

The results showed support for utilising the community social responsibility framework to structure community level social responsibility research. The framework displayed a number of advantages over the public relations process model, which was shown to be representative of

corporate social responsibility. These advantages included greater depth of information about individual community groups and greater scope to compare results between community groups. The creation of this framework as a conceptual research tool represents a contribution to new knowledge within the social responsibility and community resilience research areas.

The results showed support for the majority of aspects within the conceptual model of community group perceptions of social responsibility. The model was finalised within the discussion section as the results were interpreted and incorporated within its structure. Evidence for interpretation of the aspects it contains and their relationship to each other came from previous research within the review of literature and from the results and analysis of the current investigation. The creation of the final model as a conceptual aid for social responsibility research represents a contribution to new knowledge.

The age results indicated that:

- Older participants reported higher levels of self-rated social responsibility.
- Older people were considered to be more vulnerable to extreme events, meaning they would they would display a greater interest in hazards, acceptance of risk and uptake of resilience measures.
- Older people were also more willing to meet the costs of resilience. This indicates that older people were displaying higher levels of social responsibility.
- These findings provide further contextual reasoning to a number of findings by previous researchers, presenting additional support to age related theories and a greater depth of understanding for a number of research areas.
- This depth was achieved by exploring age related aspects within and between three community groups, across communities in different geographical locations, each with different levels of experience of flooding.
- This represents a contribution to new knowledge for many academic research areas, institutional policies and public agendas concerned with the effects that age has on perceptions of social responsibility for extreme flooding.

The gender results indicated that:

- There were no gender differences in perceptions of social responsibility within or between any community or community groups in the current investigation.

- These results were in contrast to previous research findings presented within the review of literature. However, many of these findings indicated a relationship between gender perceptions of risk, rather than perceptions of social responsibility, which was highlighted by the current investigation as being an understudied area of research.
- Therefore, the results suggested that there may be differences between perceptions of risk and perceptions of social responsibility, with factors that have been found to affect one not always affecting the other in the same way.
- These findings confirmed the need and importance for perceptions of social responsibility to be a distinct research area from other perceptions.
- Again these findings come from an increased depth of knowledge that was achieved by exploring gender related aspects within and between three community groups, across communities in different geographical locations, each with different levels of experience of flooding.
- This represents a contribution to new knowledge for many academic research areas, institutional policies and public agendas concerned with the effects that gender has on perceptions of social responsibility for extreme flooding. It also represents a contribution to new knowledge for the increasingly important research area of perceptions of social responsibility itself.

The Asian ethnicity results indicated that:

- The Asian ethnic group reported higher levels of self-rated social responsibility than the White ethnic group, who in turn reported higher levels of self-rated social responsibility than the Black ethnic group. These results were for householder and SME community groups only.
- There were no ethnic differences within the control group community which had not experienced recent flooding or in the policy maker community groups.
- Analysis indicated that participants from the Asian ethnic group displayed a greater awareness and acceptance of the risk of flooding and were more likely to adopt resilience measures than participants in the White and Black ethnic groups.
- These findings suggested high social responsibility with the Asian ethnic group.
- These findings support and provide further contextual reasoning for previous research which had suggested that individuals who regard themselves as belonging to the Asian ethnic group may hold different perceptions of a community's response to and recovery from an extreme flooding event.

The White ethnicity results indicated that:

- The analysis also indicated that participants in the White ethnic group displayed a limited awareness of the risk of flooding, but also displayed either a lack of action or self-centred motivations and behaviours related to the adoption of resilience measures.
- These findings suggested a medium level of social responsibility within the White ethnic group.
- The results provided support for previous research which had indicated that there is a White male group within the population who are highly sceptical of risk.
- However, the results were in contrast to previous research which suggested that non-minority groups would be able to estimate risks more precisely.
- The current investigation findings have provided new knowledge to this debate.

The Black ethnicity results indicated that:

- The analysis indicated that participants in the Black ethnic group generally did not accept the risk of flooding, or did not believe that it was a problem for them.
- These findings suggested a low level of social responsibility.
- The results are in contrast to previous findings which indicated that African-Americans rated environmental risks as more serious than Whites.
- This suggests that ethnic differences are not consistent between countries.
- Furthermore, it may also provide more support to the argument that factors which can act as indicators for one type of perception, may not influence other perceptions.
- Again, this is because the previous research was based upon perceptions of risk and the current investigation was focused on perceptions of social responsibility.

The policy makers analysis found that:

- The importance and focus of the work that policy makers do overrides any individual ethnic difference which may have been present.
- As with the age and gender analysis, the ethnicity related findings come from an increased depth of knowledge that was achieved by exploring gender related aspects within and between three community groups, across communities in different geographical locations, each with different levels of experience of flooding.

- This represents a contribution to new knowledge for many academic research areas, institutional policies and public agendas concerned with the effects that ethnicity has on perceptions of social responsibility for extreme flooding.

The experience of flooding results indicated that:

- The levels of social responsibility reported by participants within the community which had not experienced recent flooding were far lower than those reported by participants within communities which had experienced recent flooding.
- This suggests that people who have experience of flooding have higher perceptions of social responsibility than people who have not experienced flooding.
- However, the results also indicated that householders and SMEs in Witton and Selly Park perceive themselves to have significantly higher levels of social responsibility than the householders and SMEs in Thornton Heath, despite all three communities having recent experience of flooding.
- This suggests that experience of flooding does not lead to a uniform percentage increase in perceptions of social responsibility and there are differences between communities in different locations.
- The results also indicated that policy makers are perceived as possessing a particular level of social responsibility, regardless of whether the community has experienced recent flooding or not.
- This suggests that, as was found with ethnic differences, the importance and focus of the work that policy makers do overrides any individual differences which may have been present.
- The cognitive mapping analysis revealed that participants who had experienced flooding displayed experiential learning, supporting and providing new evidence for previous research related to other types of extreme weather events.
- However, the results also seemed to display a lack of social responsibility within the same participants who had experiential learning, which also supported a similarly counter-intuitive finding from previous research.
- Due to its greater depth than previous research, the current investigation was able to explore these themes further in relation to each, in order to provide a line of reasoning for both the current and previous research findings.

- With support from the education theme, it was argued that experience of flooding creates experiential learning, which makes people more aware of what their roles and responsibilities should be, which in turn can create a sense of a lack of responsibility within their perceptions.
- Again these findings come from an increased depth of knowledge that was achieved by exploring gender related aspects within and between three community groups, across communities in different geographical locations, each with different levels of experience of flooding.
- This depth proved vital for providing a new insight into a seemingly counter-intuitive debate within the flood experience literature.
- This represents a contribution to new knowledge for many academic research areas, institutional policies and public agendas concerned with the effects that experience of flooding has on perceptions of social responsibility for extreme flooding.

The application of cognitive mapping analysis within the current investigation, which was guided by the community social responsibility framework, also represents a contribution to new knowledge. The cognitive mapping analysis successfully provided a context to the quantitative results from the questionnaires and provided new insights through the identification of a number of key themes within the community groups. It was able to be applied in a subject-focused manner to meet particular objectives and in a more general manner to provide further analysis outside of the set objectives. The current investigation has therefore demonstrated the ability of cognitive mapping analysis to be an excellent research tool within many related areas of research and within multi-disciplinary research.

Examples of the way in which cognitive mapping was able to achieve this can be seen through the analysis of the institutional policies and agendas and through the analysis of the measures of community resilience. The analysis was able to provide support for the inclusion of social responsibility within national, international and community-based policies and agendas. This in turn highlights that policies that do not include or acknowledge the role of social responsibility within their remit are not fully considering all the influencing factors that are present within modern communities. The analysis also highlighted where there was support for factors and indicators within the key measures of community resilience discussed within the review of literature. The depth of information provided for consideration in existing and future policies,

agendas and measures of community resilience also represents a valuable contribution to new knowledge for both academics and policy makers.

9.3. Recommendations for Future Research

The review of literature highlighted a number of research needs, from which specific research objectives were formed. The methodological approach allowed these objectives and their associated research need to be met. Additional information was also able to be revealed above and beyond the set objectives. The results made a number of significant contributions to new knowledge. However, as with all research, the limitations were also acknowledged and this gave rise to a number of recommendations for future research.

Future research may wish to further verify the validity and reliability of the community social responsibility framework by using it to research other communities both within the UK and abroad. This includes having a non-flooded control group community in each location to act as a comparison to flooded communities. This would provide further evidence for its strengths or limitations as a conceptual research tool.

The conceptual model of community group perceptions of social responsibility was built and refined throughout the entire research process, created from evidence within the literature review and altered as new evidence emerged from the results of the current investigation. The final model presented within the discussion section is the culmination of this interpretative construction process. Future research may wish to further verify the validity and reliability of the conceptual model of community group perceptions of social responsibility by assessing its application within other communities. This would provide further evidence for its strengths or limitations as a conceptual model, both for its individual aspects and the relationships that exist between these aspects.

Future research may wish to apply stricter controls over age, gender and ethnic representation within the community groups. Larger sample sizes of each controlled community group would then provide even greater ability to explore perceptions within and between these groups. Future age research may wish to also include distinct age groups, which should include an over 65 age group to allow for exploration of extremes and the effects displayed within an even greater range of ages. Future research may wish to further explore the apparent dichotomy between factors

that influence different perceptions, highlighted by the lack of gender differences and results from the ethnicity analysis within the current investigation. This further research should explore the hypothesis proposed by the current investigation that, because gender and ethnic discrimination are commonly considered to be more serious and widespread than age discrimination, they may hold a greater influence over certain types of perceptions.

As stated within the experience of flooding section future research should identify and isolate exactly which policy makers are able to represent each community and explore their self-rated perceptions between communities which have and have not experienced extreme flooding. These may be different policy makers to those used within this investigation. This would allow a direct comparison between policy maker's self-rated perceptions of social responsibility, which was not possible within the current investigation.

It would also be valuable to work with community groups to improve their resilience, based upon the findings of this investigation. This would involve practical application of the findings. For example, the way in which policy makers engage with the community is important and meetings could be held between all key community groups to specifically identify existing language barriers within current policies. The powerlessness felt by householders and SMEs, as well as the cost barriers, meant that these community groups were not as involved in the resilience process as they could be, which may also be overcome through group meetings and the information exchange process. There was also a general lack of interest and denial being displayed by members of the householder and SME community groups. The results suggested that age and ethnicity are related to perceptions of social responsibility, which in turn is linked to vulnerability to hazards. Therefore, targeted interventions with particular age or ethnic groups may increase engagement with these issues. An informational approach would also help overcome the awareness barriers within community groups suggested by the findings, as well as achieve a greater sense of empowerment and involvement for community groups.

There may also be the potential to work with policy makers to improve institutional policies related to flooding and community resilience measures. The importance of policies aimed at the community level has been highlighted. Age, experience and ethnicity were found to have an effect upon perceptions of social responsibility and pro-environmental behaviour and these aspects should be given consideration when attempting to understand motivating factors for

engagement with policies and agendas. This is of particular importance when we consider that much of a policy maker's job role is focused around using information as a driver for pro-environmental perceptions and behaviour. The barriers highlighted by the current investigation will need to be addressed in order to maximise community involvement. The information could be used to help meet current targets, as well as help shape future measures.

Another aspect highlighted by this investigation was the potential difference between aspects which are specifically perceived to be related to individual responsibility, which might not be associated with social responsibility. This was highlighted by the lack of discussion related to insurance within the data. It was suggested that insurance is not a perceived to be a social responsibility aspect, as getting insurance for yourself would not necessarily make your community more resilient. Instead, it is the physical changes that an individual can make or do which are deemed to be more important, rather than simply protecting themselves financially. It was noted that a limitation of this investigation was that level of insurance was not recorded. Future research should explore this aspect in greater depth by comparing perceptions between individuals with and without insurance.

Finally, as the current investigation contains a number of new theoretical and empirical elements, then future research may wish to copy the precise procedures of the research in order to explore the validity and reliability of these new elements. Further adjustments could also include exploring whether community level findings can be applied to a larger scale and determining whether these findings are applicable across a wider range of extreme weather events.

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Appendices

Appendix 1: Pilot Study Questionnaire

Researching Flooding in your Local Community

We are investigating opinions on flooding in the local community and would like your input on the following questions.

This is an anonymous questionnaire. However, if you wish to answer these questions at a later date, or wish to raise any other points about this topic, then please leave your name and email address and the researchers will contact you.

Alternatively, you can email your opinions to the lead researcher Aaron Mullins at: mullinsa@coventry.ac.uk

What do you perceive the level of risk of flooding to be in your neighbourhood? (circle appropriate answer)

Very Low Low Average High Very High

Have you experienced flooding in your neighbourhood?

In the event of a flood, who would you seek help and advice from?

What precautions have you taken to limit flood damage to your home?

Thank you for your participation.

Appendix 2: Questionnaires Information and Consent Form

Part 1: Information Sheet

Thank you for agreeing to take part in this study looking at perceptions of social responsibility. Your participation is completely voluntary and you may withdraw from the study at any time and for any reason. All data you provide will be treated confidentially and you may withdraw from the study at any time up to the point of returning the data to the researcher. As the data will be pooled together and no personal identifying details will be associated with any single questionnaire then it would not be possible to identify individual data after this point.

The study requires you to complete three short, one page questionnaires. Each questionnaire has only 12 statements and you have to place an X in the box for the answer that best fits your response to each statement. If you have any questions about the study please feel free to ask the researchers. Should you have any questions at a later then please contact Aaron Mullins at mullinsa@coventry.ac.uk.

Could you please now read and sign the consent form in Part 2, consider the interview options in Part 3 and complete the three questionnaires. Once completed, could you please post all pages back to the researchers in the stamped addressed envelope provided, or return via email. Thank you again for taking part.

Part 2: Consent Form

I agree that I have read the information sheet and fully understand what is required from me as a participant in the study looking at social responsibility.

Print Name: _____
Sign: _____
Date: _____
Age: _____

Gender (please circle): **M F**

Ethnicity (please circle):

White Black Asian Chinese

Mixed: White/Black Mixed: White/Asian Other (please specify): _____

Part 3: Interview

Please indicate whether you would be willing to take part in an interview at a later stage of the research process. These can be face-to-face at home, by telephone or by email/instant messenger. If you do not wish to take part in an interview in any of these formats, could you please complete the written questions on the final page of the questionnaire. Thank you.

Address: _____
Telephone: _____
Email: _____

Appendix 3: Interviews Information and Consent Form

Part 1: Information Sheet

Thank you for agreeing to take part in this study looking at perceptions of social responsibility. Your participation is completely voluntary and you may withdraw from the study at any time and for any reason.

All data you provide will be treated confidentially and you may withdraw from the study at any time by simply informing the researcher that you do not wish to continue with the interview. As the data will be pooled together and no personal identifying details will be associated with any single interview then it would not be possible to identify individual data after this point.

The study requires you to discuss a number of topics related to perceptions of social responsibility.

If you have any questions about the study please feel free to ask the researchers. Should you have any questions at a later then please contact Aaron Mullins at mullinsa@coventry.ac.uk.

Could you please now read and sign the consent form in Part 2.

Part 2: Consent Form

I agree that I have read the information sheet and fully understand what is required from me as a participant in the study looking at social responsibility.

Print Name: _____

Sign: _____

Date: _____

Age: _____

Gender (please circle): **M F**

Ethnicity (please circle):

White	Black	Asian	Chinese
Mixed: White/Black	Mixed: White/Asian	Other (please specify): _____	

Appendix 4: Self-rated Perceptions of Social Responsibility Questionnaire

Social Responsibility Questionnaire (self-perceptions)

This questionnaire is exploring how you view yourself. It contains 12 short statements and 4 possible answers. Please place an X in the answer box that most accurately reflects your response to each statement.

SA = Strongly Agree **A** = Agree **D** = Disagree **SD** = Strongly Disagree

No.	STATEMENT	SA	A	D	SD
1	It is no use worrying about extreme flooding within the community as I can't do anything about it anyway.				
2	Every person should give some of their time for the good of their local community.				
3	Our country would be a lot better off if we didn't have so many rules.				
4	Letting your neighbours down is not so bad because you can't do good all the time for everybody.				
5	It is the duty of each member of a community to do the very best they can to increase their protection against extreme floods.				
6	People would be a lot better off if they could live far away from other people and have less interaction with each other.				
7	I would like to take part in a community volunteering project.				
8	I feel very bad when I have failed to finish a job I promised I would do.				
9	I feel it is important to always tell the truth to others.				
10	I feel it is important to get on well with your neighbours.				
11	I do not feel that climate change is an important issue that will affect me.				
12	I feel that it is important that people should always obey the law.				

Appendix 5: Householders Perceptions of Social Responsibility Questionnaire

Social Responsibility Questionnaire (perceptions of householders)

This questionnaire is exploring how you view householders. It contains 12 short statements and 4 possible answers. Please place an X in the answer box that most accurately reflects your response to each statement.

SA = Strongly Agree **A** = Agree **D** = Disagree **SD** = Strongly Disagree

No.	STATEMENT	SA	A	D	SD
1	Householders do not worry about extreme flooding within the community as they think they can't do anything about it anyway.				
2	Householders often give some of their time for the good of their local community.				
3	Householders believe the country would be better off if there were fewer rules.				
4	Householders often let their neighbours down.				
5	Householders do the very best they can to increase their protection against extreme floods.				
6	Householders believe they would be better off if they had less interaction with each other.				
7	Householders often take part in community volunteering projects.				
8	Householders do not feel bad if they fail to finish a job they promised they would do.				
9	Householders always tell the truth to others.				
10	Householders feel it is important to get on well with their neighbours.				
11	Householders do not feel that climate change is an important issue that will affect them.				
12	Householders feel it is important that they should always obey the law.				

Appendix 6: SMEs Perceptions of Social responsibility Questionnaire

Social Responsibility Questionnaire (perceptions of local businesses)

This questionnaire is exploring how you view local businesses. It contains 12 short statements and 4 possible answers. Please place an X in the answer box that most accurately reflects your response to each statement.

SA = Strongly Agree **A** = Agree **D** = Disagree **SD** = Strongly Disagree

No.	STATEMENT	SA	A	D	SD
1	Local businesses do not worry about extreme flooding within the community as they think they can't do anything about it anyway.				
2	Local businesses often give some of their time for the good of their local community.				
3	Local businesses believe they would be better off if there were fewer rules.				
4	Local businesses often let their community down.				
5	Local businesses do the very best they can to increase their protection against extreme floods.				
6	Local businesses believe they would be better off if they had less interaction with each other.				
7	Local businesses are often involved with community volunteering projects.				
8	Local businesses do not feel bad if they fail to achieve something that they promised they would do.				
9	Local businesses always tell the truth to their community.				
10	Local businesses feel it is important to get on well with their community.				
11	Local businesses do not feel that climate change is an important issue that will affect them.				
12	Local businesses feel it is important that they should always obey the law.				

Appendix 7: Policy Makers Perceptions of Social Responsibility Questionnaire

Social Responsibility Questionnaire (perceptions of policy makers)

This questionnaire is exploring how you view policy makers. It contains 12 short statements and 4 possible answers. Please place an X in the answer box that most accurately reflects your response to each statement.

SA = Strongly Agree **A** = Agree **D** = Disagree **SD** = Strongly Disagree

No.	STATEMENT	SA	A	D	SD
1	Policy makers do not worry about extreme flooding within the community as they think they can't do anything about it anyway.				
2	Policy makers often give some of their time for the good of their local community.				
3	Policy makers believe the country would be better off if there were fewer rules.				
4	Policy makers often let their neighbours down.				
5	Policy makers do the very best they can to increase community protection against extreme floods.				
6	Policy makers believe they would be better off if they had less interaction with each other.				
7	Policy makers often take part in community volunteering projects.				
8	Policy makers do not feel bad if they fail to achieve something they promised they would do.				
9	Policy makers always tell the truth to their community.				
10	Policy makers feel it is important to get on well with their community.				
11	Policy makers do not feel that climate change is an important issue that will affect them.				
12	Policy makers feel it is important that they should always obey the law.				

Appendix 8: Berkowitz and Lutterman (1968) Social Responsibility Scale

SA = Strongly Agree **A** = Agree **N** = No Opinion **D** = Disagree **SD** = Strongly Disagree

Statement	SA	A	N	D	SD
It is no use worrying about current events or public affairs; I can't do anything about them anyway.					
Every person should give some of his time for the good of his town or country.					
Our country would be a lot better off if we didn't have so many elections and people didn't have to vote so often.					
Letting your friends down is not so bad because you can't do good all the time for everybody.					
It is the duty of each person to do his job the very best he can.					
People would be a lot better off if they could live far away from other people and never have to do anything for them.					
At school I usually volunteered for special projects.					
I feel very bad when I have failed to finish a job I promised I would do.					

Appendix 9: Questionnaires Scoring Matrix

Self-Rating

No.	SA	A	D	SD
1	1	2	3	4
2	4	3	2	1
3	1	2	3	4
4	1	2	3	4
5	4	3	2	1
6	1	2	3	4
7	4	3	2	1
8	4	3	2	1
9	4	3	2	1
10	4	3	2	1
11	1	2	3	4
12	4	3	2	1

SMEs

No.	SA	A	D	SD
1	1	2	3	4
2	4	3	2	1
3	1	2	3	4
4	1	2	3	4
5	4	3	2	1
6	1	2	3	4
7	4	3	2	1
8	1	2	3	4
9	4	3	2	1
10	4	3	2	1
11	1	2	3	4
12	4	3	2	1

Householders

No.	SA	A	D	SD
1	1	2	3	4
2	4	3	2	1
3	1	2	3	4
4	1	2	3	4
5	4	3	2	1
6	1	2	3	4
7	4	3	2	1
8	1	2	3	4
9	4	3	2	1
10	4	3	2	1
11	1	2	3	4
12	4	3	2	1

Policy Makers

No.	SA	A	D	SD
1	1	2	3	4
2	4	3	2	1
3	1	2	3	4
4	1	2	3	4
5	4	3	2	1
6	1	2	3	4
7	4	3	2	1
8	1	2	3	4
9	4	3	2	1
10	4	3	2	1
11	1	2	3	4
12	4	3	2	1

Appendix 10: Cognitive Mapping Semi-structured Long Answer Questions

Written Questions (alternative to interview)

The following open-ended questions are designed to allow you to expand your views. Please write as much or as little as you want to for each answer and use the back of the sheet if necessary.

1. What groups do you feel are **most** able to protect communities from extreme floods and why?

2. What groups do you feel are **least** able to protect communities from extreme floods and why?

3. Do you feel that people and communities are doing enough to protect themselves from extreme floods? Why?

4. What roles and responsibilities do you as a policy maker believe you have in increasing resilience to extreme floods? And what about the other two groups?

5. Do you feel that modern communities are more vulnerable to extreme flooding? Why?

6. Do you feel that climate change is an important issue? Why? Who is most affected by climate change?

7. In relation to climate change and extreme flooding, what do you feel are the most important issues for you personally and for your community?

8. Would you be willing to change your own personal behaviour or that of your agency in order reduce your own impact upon the environment?

9. What does social responsibility mean to you?

10. Are there any final comments you would like to make about social responsibility or any of the other issues discussed?

Appendix 11: Low Risk Ethics Form

Low Risk Research Ethics Approval Checklist

Applicant Details

Name: Aaron Mullins	E-mail: mullinsa@coventry.ac.uk
Department: Built Environment	Date: 4th June 2009
Course: PhD Extreme Event Decision Making	Title of Project: Initial Flooding Research Questionnaire

Project Details

Summary of the project in jargon-free language and in not more than 120 words: Research Objectives Research Design (e.g. Experimental, Desk-based, Theoretical etc) Methods of Data Collection

Participants in your research

Will the project involve human participants?	**Yes**	No

If you answered **Yes** to this questions, this may **not** be a low risk project.
If you are a student, please discuss your project with your Supervisor.
If you are a member of staff, please discuss your project with your Faculty Research Ethics Leader or use the Medium to High Risk Ethical Approval or NHS or Medical Approval Routes.

Risk to Participants

Will the project involve human patients/clients, health professionals, and/or patient (client) data and/or health professional data?	Yes	**No**
Will any invasive physical procedure, including collecting tissue or other samples, be used in the research?	Yes	**No**
Is there a risk of physical discomfort to those taking part?	Yes	**No**
Is there a risk of psychological or emotional distress to those taking part?	Yes	**No**
Is there a risk of challenging the deeply held beliefs of those taking part?	Yes	**No**
Is there a risk that previous, current or proposed criminal or illegal acts will be revealed by those taking part?	Yes	**No**
Will the project involve giving any form of professional, medical or legal advice, either directly or indirectly to those taking part?	Yes	**No**

If you answered **Yes** to **any** of these questions, this may **not** be a low risk project.
If you are a student, please discuss your project with your Supervisor.
If you are a member of staff, please discuss your project with your Faculty Research Ethics Leader or use the Medium to High Risk Ethical Approval or NHS or Medical Approval Routes.

Risk to Researcher

Will this project put you or others at risk of physical harm, injury or death?	Yes	**No**
Will project put you or others at risk of abduction, physical, mental or sexual abuse?	Yes	**No**
Will this project involve participating in acts that may cause psychological or emotional distress to you or to others?	Yes	**No**
Will this project involve observing acts which may cause psychological or emotional distress to you or to others?	Yes	**No**
Will this project involve reading about, listening to or viewing materials that may	Yes	**No**

cause psychological or emotional distress to you or to others?		
Will this project involve you disclosing personal data to the participants other than your name and the University as your contact and e-mail address?	Yes	**No**
Will this project involve you in unsupervised private discussion with people who are not already known to you?	Yes	**No**
Will this project potentially place you in the situation where you may receive unwelcome media attention?	Yes	**No**
Could the topic or results of this project be seen as illegal or attract the attention of the security services or other agencies?	Yes	**No**
Could the topic or results of this project be viewed as controversial by anyone?	Yes	**No**

If you answered **Yes** to **any** of these questions, this is **not** a low risk project. Please:
If you are a student, discuss your project with your Supervisor.
If you are a member of staff, discuss your project with your Faculty Research Ethics Leader or use the Medium to High Risk Ethical Approval route.

Informed Consent of the Participant

Are any of the participants under the age of 18?	Yes	**No**
Are any of the participants unable mentally or physically to give consent?	Yes	**No**
Do you intend to observe the activities of individuals or groups without their knowledge and/or informed consent from each participant (or from his or her parent or guardian)?	Yes	**No**

If you answered **Yes** to **any** of these questions, this may **not** be a low risk project. Please:
If you are a student, discuss your project with your Supervisor.
If you are a member of staff, discuss your project with your Faculty Research Ethics Leader or use the Medium to High Risk Ethical Approval route.

Participant Confidentiality and Data Protection

Will the project involve collecting data and information from human participants who will be identifiable in the final report?	Yes	**No**
Will information not already in the public domain about specific individuals or institutions be identifiable through data published or otherwise made available?	Yes	**No**
Do you intend to record, photograph or film individuals or groups without their knowledge or informed consent?	Yes	**No**
Do you intend to use the confidential information, knowledge or trade secrets gathered for any purpose other than this research project?	Yes	**No**

If you answered **Yes** to **any** of these questions, this may **not** be a low risk project:
If you are a student, discuss your project with your Supervisor.
If you are a member of staff, discuss your project with your Faculty Research Ethics Leader or use the Medium to High Risk Ethical Approval or NHS or Medical Approval routes.

Gatekeeper Risk

Will this project involve collecting data outside University buildings?	**Yes**	No
Do you intend to collect data in shopping centres or other public places?	**Yes**	No
Do you intend to gather data within nurseries, schools or colleges?	Yes	**No**
Do you intend to gather data within National Health Service premises?	Yes	**No**

If you answered **Yes** to **any** of these questions, this is **not** a low risk project. Please:
If you are a student, discuss your project with your Supervisor.
If you are a member of staff, discuss your project with your Faculty Research Ethics Leader or use the Medium to High Risk Ethical Approval or NHS or Medical Approval routes.

Other Ethical Issues

Is there any other risk or issue not covered above that may pose a risk to you or any of the participants?	Yes	**No**
Will any activity associated with this project put you or the participants at an ethical, moral or legal risk?	Yes	**No**

If you answered **Yes** to these questions, this may **not** be a low risk project. Please:
If you are a student, discuss your project with your Supervisor.
If you are a member of staff, discuss your project with your Faculty Research Ethics Leader.

Principal Investigator Certification

If you answered **No** to **all** of the above questions, then you have described a low risk project. Please complete the following declaration to certify your project and keep a copy for your record as you may be asked for this at any time.

Agreed restrictions to project to allow Principal Investigator Certification

Please identify any restrictions to the project, agreed with your Supervisor or Faculty Research Ethics Leader to allow you to sign the Principal Investigator Certification declaration.

Participants will all be over 18 years of age and a householder. Participants will come to our stall to show willingness to complete the questionnaire. Contains no misleading questions or observations unknown to participants. No identifiable or personal information will be taken. Only university contact information given out by researchers. Copy of questionnaire with participant introduction information attached.

Principal Investigator's Declaration

Please ensure that you:
Tick all the boxes below and sign this checklist.
Students must get their Supervisor to countersign this declaration.

I believe that this project **does not require research ethics approval**. I have completed the checklist and kept a copy for my own records. I realise I may be asked to provide a copy of this checklist at any time.	**X**
I confirm that I have answered all relevant questions in this checklist honestly.	**X**
I confirm that I will carry out the project in the ways described in this checklist. I will immediately suspend research and request a new ethical approval if the project subsequently changes the information I have given in this checklist.	**X**

Signatures

If you submit this checklist and any attachments by e-mail, you should type your name in the signature space. An email attachment sent from your University inbox will be assumed to have been signed electronically.

Principal Investigator

Signed: Aaron Mullins (Principal Investigator or Student)
Date: 4th June 2009
Students storing this checklist electronically must append to it an email from your Supervisor confirming that they are prepared to make the declaration above and to countersign this checklist. This-email will be taken as an electronic countersignature.

Student's Supervisor
Countersigned: Robby Soetanto (Supervisor)
Date: 5th June 2009
I have read this checklist and confirm that it covers all the ethical issues raised by this project fully and frankly. I also confirm that these issues have been discussed with the student and will continue to be reviewed in the course of supervision.

Appendix 12: Medium/High Risk Ethics Form

Medium to High Risk Research Ethics Approval Checklist

1 Project Information (Everyone)

Title of Project The Affect of Perceptions of Social Responsibility on Community Resilience
Name of Principal Investigator (PI) or Research or Professional Degree Student Aaron Mullins, PhD Student
Faculty, Department or Institute Faculty of Engineering and Computing, Department of Built Environment, Coventry University
Names of Co-investigators (CIs) and their organisational affiliation Dr Robby Soetanto, Coventry University
How many additional research staff will be employed on the project? None Names and their organisational affiliation (if known) n/a
Proposed project start date (At least three months in the future) January 2010
Estimated project end date March 2011
Who is funding the project? Self-funded by student Has funding been confirmed? Yes
Code of ethical practice and conduct most relevant to your project: British Psychological Society

Students Only

Degree being studied (MSc/MA by Research, MPhil, PhD, EngD, etc) PhD
Name of your Director of Studies Dr Robby Soetanto
Date of Enrolment 22nd September 2008

2. Does this project need ethical approval?

Questions	**Yes**	**No**

Does the project involve collecting primary data from, or about, living human beings?	X	
Does the project involve analysing primary or unpublished data from, or about, living human beings?	X	
Does the project involve collecting or analysing primary or unpublished data about people who have recently died other than data that are already in the public domain?		X
Does the project involve collecting or analysing primary or unpublished data about or from organisations or agencies of any kind other than data that are already in the public domain?	X	
Does the project involve research with non-human vertebrates in their natural settings or behavioural work involving invertebrate species not covered by the Animals Scientific Procedures Act (1986)?[1]		X
Does the project place the participants or the researchers in a dangerous environment, risk of physical harm, psychological or emotional distress?		X
Does the nature of the project place the participant or researchers in a situation where they are at risk of investigation by the police or security services?		X

If you answered **Yes** to **any** of these questions, proceed to **Section 3**.
If you answered **No** to **all** these questions:
You **do not** need to submit your project for peer ethical review and ethical approval.
You should sign the Declaration in **Section 16** and keep a copy for your own records.
Students must ask their Director of Studies to countersign the declaration and they should send a copy for your file to the Registry Research Unit.

3 Does the project require Criminal Records Bureau checks?

Questions	**Yes**	**No**
Does the project involve direct contact by any member of the research team with children or young people under 18 years of age?		X
Does the project involve direct contact by any member of the research team with adults who have learning difficulties?		X
Does the project involve direct contact by any member of the research team with adults who are infirm or physically disabled?		X
Does the project involve direct contact by any member of the research team with adults who are resident in social care or medical establishments?		X
Does the project involve direct contact by any member of the research team with adults in the custody of the criminal justice system?		X
Has a Criminal Records Bureau (CRB) check been stipulated as a condition of access to any source of data required for the project?		X

If you answered **Yes** to **any** of these questions, please:
Explain the nature of the contact required and the circumstances in which contact will be made during the project.

N/A

4 Is this project liable to scrutiny by external ethical review arrangements?

Questions	**Yes**	**No**

[1] The Animals Scientific Procedures Act (1986) was amended in 1993. As a result the common octopus (*Octopus vulgaris*), as an invertebrate species, is now covered by the act.

Has a favourable ethical opinion been given for this project by an external research ethics committee (e.g. social care, NHS or another University)?		X
Will this project be submitted for ethical approval to an external research ethics committee (e.g. social care, NHS or another University)?		X

If you answered **No** to **both** of these questions, please proceed to **Section 5**.
If you answered **Yes** to **either** of these questions:
Sign the Declaration in **Section 16** and send a copy to the Registry Research Unit.
Students must get their Director of Studies to countersign the checklist before submitting it.

5 More detail about the project

What are the aims and objectives of the project?

1. Investigate current self-perceptions of social responsibility of key community groups.
2. Investigate current perceptions of social responsibility between key community groups.
3. Explore the relationship between perceptions of social responsibility and community resilience in relation to extreme flooding events.

Briefly describe the principal methods, the sources of data or evidence to be used and the number and type of research participants who will be recruited to the project.
A mixed methodological approach, with questionnaires providing quantitative data regarding perceptions of social responsibility and open-ended cognitive mapping interviews providing qualitative data to place this data in context. Aiming for a minimum of 150 participants consisting of householders, local businesses and policy makers.

What research instrument(s), validated scales or methods will be used to collect data?
Four versions of a Perceptions of Social Responsibility Questionnaire, one containing questions about the self, one relating to householders, one to local businesses and one to policy makers. Also an open-ended Social Responsibility Interview Schedule consisting of 10 questions designed to facilitate the cognitive mapping interviews.

If you are using an externally validated research instrument, technique or research method, please specify.
The questionnaires used are based upon a modified version of Berkowitz and Lutterman's (1968) Social Responsibility Questionnaire. Modified versions of the original questionnaire have been used in a similar way for research informing social responsibility scales (Reed et al, 2005), exploring ethics and social responsibility in relation to grocery shopping (Megicks, Memery & Williams, 2005), testing attitudes in relation to social involvement models (Freiden & Downs, 1986) and exploring psychosocial factors that influence volunteer work (Chacon et al, 1998).
For the cognitive mapping interviews, cognitive mapping is a technique used to structure and evaluate accounts of problems and previous research has utilised cognitive mapping to examine decision making processes at both a micro level for individual problem solving (Eden, 1991) and at a macro level for strategy development (Eden & Ackermann, 1992), as well as to investigate related issues such as risk (Harris, Daniels & Briner, 2002). Cognitive maps are a widely used validated research tool for exploring representations of knowledge of particular subjects, problem solving, decision making and representing attitudes (González, Morón & Novak, 2001).

If you are not using an externally validated scale or research method, please attach a copy of the research instrument you will use to collect data. For example, a measurement scale, questionnaire, interview schedule, observation protocol for ethnographic work or, in the case of unstructured data collection, a topic list.

6 Confidentiality, security and retention of research data

Questions	Yes	No
Are there any reasons why you cannot guarantee the full security and confidentiality of any personal or confidential data collected for the project?		X
Is there a significant possibility that any of your participants, or people associated with them, could be directly or indirectly identified in the outputs from this project?		X
Is there a significant possibility that confidential information could be traced back to a specific organisation or agency as a result of the way you write up the results of the project?		X
Will any members of the project team retain any personal or confidential data at the end of the project, other than in fully anonymised form?		X
Will you or any member of the team intend to make use of any confidential information, knowledge, trade secrets obtained for any other purpose than this research project?		X

If you answered **No** to **all** of these questions:
Explain how you will ensure the confidentiality and security of your research data, both during and after the project.

The research data will remain confidential as no individual identifying data will be collected by the researchers, making it impossible to trace any piece of data back to any individual participant. The data that is collected in a physical form will be kept in a locked safe, only used for the purposes of this project and destroyed once it has been analysed and the project is completed.

If you answered **Yes** to **any** of these questions:
Explain the reasons why it is essential to breach normal research protocol regarding confidentiality, security and retention of research data.

N/A

7 Informed consent

Questions	Yes	No
Will all participants be fully informed why the project is being conducted and what their participation will involve and will this information be given before the project begins?	X	
Will every participant be asked to give written consent to participating in the project before it begins?	X	
Will all participants be fully informed about what data will be collected and what will be done with these data during and after the project?	X	
Will explicit consent be sought for audio, video or photographic recording of participants?	X	
Will every participant understand what rights they have not to take part, and/or to withdraw themselves and their data from the project if they do take part?	X	
Will every participant understand that they do not need to give you reasons for deciding not to take part or to withdraw themselves and their data from the project and that there will be no repercussions as a result?	X	
If the project involves deceiving or covert observation of participants, will you debrief them at the earliest possible opportunity?	X	

If you answered **Yes** to **all** these questions:
Explain briefly how you will implement the informed consent scheme described in your answers.

Attach copies of your participant information leaflet, informed consent form and participant debriefing leaflet (if required) as evidence of your plans.

The project does not contain any deception or covert observation. Participants will receive a written information sheet which briefs them on the aims of the project and what is expected from them as a participant. It also informs them that they can withdraw from the research for any reason and at any point up to handing in their completed data (after which it will not be possible to identify individual data). Written consent will be obtained for both the questionnaires and interviews.

If you answered **No** to **any** of these questions:
Explain why it is essential for the project to be conducted in a way that will not allow all participants the opportunity to exercise fully-informed consent.
Explain how you propose to address the ethical issues arising from the absence of transparency.
Attach copies of your participant information sheet and consent form as evidence of your plans.

N/A

8 Risk of harm

Questions	**Yes**	**No**
Is there any significant risk that your project may lead to physical harm to participants or researchers?		X
Is there any significant risk that your project may lead to psychological or emotional distress to participants or researchers?		X
Is there any significant risk that your project may place the participants or the researchers in potentially dangerous situations or environments?		X
Is there any significant risk that your project may result in harm to the reputation of participants, researchers, their employers, or other persons or organisations?		X

If you answered **Yes** to **any** of these questions:
Explain the nature of the risks involved and why it is necessary for the participants or researchers to be exposed to such risks.
Explain how you propose to assess, manage and mitigate any risks to participants or researchers.
Explain the arrangements by which you will ensure that participants understand and consent to these risks.
Explain the arrangements you will make to refer participants or researchers to sources of help if they are seriously distressed or harmed as a result of taking part in the project.
Explain the arrangements for recording and reporting any adverse consequences of the research.

N/A

9 Risk of disclosure of harm or potential harm

Questions	**Yes**	**No**
Is there a significant risk that the project will lead participants to disclose evidence of previous criminal offences or their intention to commit criminal offences?		X
Is there a significant risk that the project will lead participants to disclose evidence that children or vulnerable adults have or are being harmed or are at risk of harm?		X
Is there a significant risk that the project will lead participants to disclose evidence of serious risk of other types of harm?		X

If you answered **Yes** to **any** of these questions:
Explain why it is necessary to take the risks of potential or actual disclosure.

Explain what actions you would take if such disclosures were to occur.
Explain what advice you will take and from whom before taking these actions.
Explain what information you will give participants about the possible consequences of disclosing information about criminal or serious risk of harm.

N/A

10 Payment of participants

Questions	**Yes**	**No**
Do you intend to offer participants cash payments or any other kind of inducements or compensation for taking part in your project?		X
Is there any significant possibility that such inducements will cause participants to consent to risks that they might not otherwise find acceptable?		X
Is there any significant possibility that the prospect of payment or other rewards will systematically skew the data provided by participants in any way?		X
Will you inform participants that accepting compensation or inducements does not negate their right to withdraw from the project?		X

If you answered **Yes** to **any** of these questions:
Explain the nature of the inducements or the amount of the payments that will be offered.
Explain the reasons why it is necessary to offer payments.
Explain why you consider it is ethically and methodologically acceptable to offer payments.

N/A

11 Capacity to give informed consent

Questions	**Yes**	**No**
Do you propose to recruit any participants who are under 18 years of age?		X
Do you propose to recruit any participants who have learning difficulties?		X
Do you propose to recruit any participants with communication difficulties including difficulties arising from limited facility with the English language?		X
Do you propose to recruit any participants who are very elderly or infirm?		X
Do you propose to recruit any participants with mental health problems or other medical problems that may impair their cognitive abilities?		X
Do you propose to recruit any participants who may not be able to understand fully the nature of the research and the implications for them of participating in it?		X

If you answered **Yes** to **only the last two** questions, proceed to **Section 16** and then apply using the online NHS Research Ethics Committee approval form.
If you answered **Yes** to **any** of the **first four** questions:
Explain how you will ensure that the interests and wishes of participants are understood and taken in to account.
Explain how in the case of children the wishes of their parents or guardians are understood and taken into account.

N/A

12 Is participation genuinely voluntary?

Questions	**Yes**	**No**
Are you proposing to recruit participants who are employees or students of Coventry University or of organisation(s) that are formal collaborators in the project?		X

Are you proposing to recruit participants who are employees recruited through other business, voluntary or public sector organisations?		X
Are you proposing to recruit participants who are pupils or students recruited through educational institutions?		X
Are you proposing to recruit participants who are clients recruited through voluntary or public services?		X
Are you proposing to recruit participants who are living in residential communities or institutions?		X
Are you proposing to recruit participants who are in-patients in a hospital or other medical establishment?		X
Are you proposing to recruit participants who are recruited by virtue of their employment in the police or armed services?		X
Are you proposing to recruit participants who are being detained or sanctioned in the criminal justice system?		X
Are you proposing to recruit participants who may not feel empowered to refuse to participate in the research?		X

If you answered **Yes** to **any** of these questions:
Explain how your participants will be recruited.
Explain what steps you will take to ensure that participation in this project is genuinely voluntary.

N/A

13 On-line and Internet Research

Questions	**Yes**	**No**
Will any part of your project involve collecting data by means of electronic media such as the Internet or e-mail?	X	
Is there a significant possibility that the project will encourage children under 18 to access inappropriate websites or correspond with people who pose risk of harm?		X
Is there a significant possibility that the project will cause participants to become distressed or harmed in ways that may not be apparent to the researcher(s)?		X
Will the project incur risks of breaching participant confidentiality and anonymity that arise specifically from the use of electronic media?		X

If you answered **Yes** to **any** of these questions:
Explain why you propose to use electronic media.
Explain how you propose to address the risks associated with online/internet research.
Ensure that your answers to the previous sections address any issues related to online research.

It may become necessary to use electronic databases to facilitate the questionnaire aspect of the data collection only. These responses will be sent to a secure and private email address accessible only by the research team and the questionnaires will be printed off and the email deleted immediately upon receipt of the questionnaire to ensure confidentiality.

14 Other ethical risks

Question	**Yes**	**No**
Are there any other ethical issues or risks of harm raised by your project that have not been covered by previous questions?		X

If you answered **Yes** to **this** question:
Explain the nature of these ethical issues and risks.

Explain why you need to incur these ethical issues and risks.
Explain how you propose to deal with these ethical issues and risks.

N/A

15 Research with non-human vertebrates[2]

Questions	Yes	No
Will any part of your project involve the study of animals in their natural habitat?		X
Will your project involve the recording of behaviour of animals in a non-natural setting that is outside the control of the researcher?		X
Will your field work involve any direct intervention other than recording the behaviour of the animals available for observation?		X
Is the species you plan to research endangered, locally rare or part of a sensitive ecosystem protected by legislation?		X
Is there any significant possibility that the welfare of the target species or those sharing the local environment/habitat will be detrimentally affected?		X
Is there any significant possibility that the habitat of the animals will be damaged by the project such that their health and survival will be endangered?		X
Will project work involve intervention work in a non-natural setting in relation to invertebrate species other than *Octopus vulgaris*?		X

If you answered **Yes** to **any** of these questions:
Explain the reasons for conducting the project in the way you propose and the academic benefits that will flow from it.
Explain the nature of the risks to the animals and their habitat.
Explain how you propose to assess, manage and mitigate these risks.

N/A

16 Principal Investigator Certification

Please ensure that you:
Tick all the boxes below that are relevant to your project and sign this checklist.
Students must get their Director of Studies to countersign this declaration.

I believe that this project **does not require research ethics peer review**. I have completed Sections 1-2 and kept a copy for my own records. I realise I may be asked to provide a copy of this checklist at any time.	
I request that this project is **exempt from internal research ethics peer review** because it will be, or has been, reviewed by an external research ethics committee. I have completed Sections 1-4 and have attached/will attach a copy of the favourable ethical review issued by the external research ethics committee. Please give the name of the external research ethics committee here: Send to ethics.uni@coventry.ac.uk	
I **request an ethics peer review** and confirm that I have answered all relevant questions in this checklist honestly. Send to ethics.uni@coventry.ac.uk	X
I confirm that I will carry out the project in the ways described in this checklist. I will immediately suspend research and request new ethical approval if the project subsequently changes the information I have given in this checklist.	X

[2] The Animals Scientific Procedures Act (1986) was amended in 1993. As a result the common octopus (*Octopus vulgaris*), as an invertebrate species, is now covered by the act.

I confirm that I, and all members of my research team (if any), have read and agreed to abide by the Code of Research Ethics issued by the relevant national learned society.	
I confirm that I, and all members of my research team (if any), have read and agreed to abide by the University's Research Ethics, Governance and Integrity Framework.	X

Signatures
If you submit this checklist and any attachments by e-mail, you should type your name in the signature space. An email attachment sent from your University inbox will be assumed to have been signed electronically.

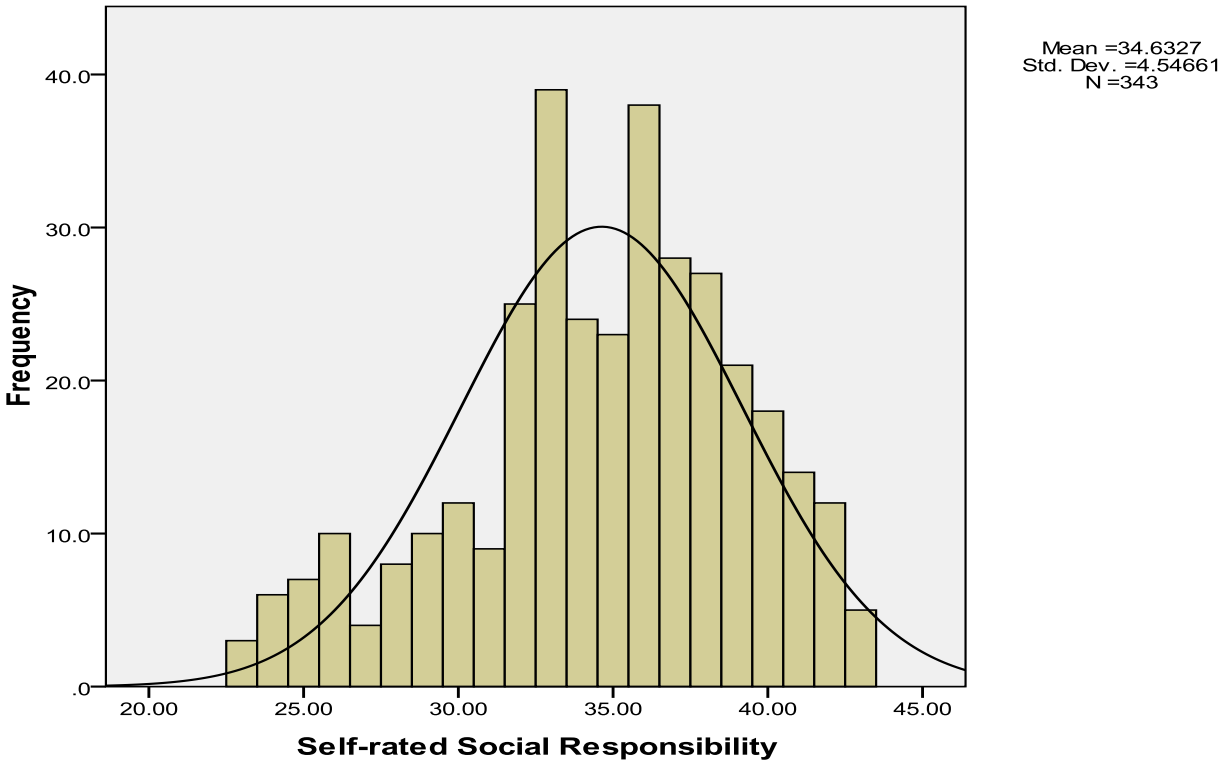
Principal Investigator
Signed Aaron Mullins (Principal Investigator or Student)
Date 28 August 2009
Students submitting this checklist by email must append to it an email from their Director of Studies confirming that they are prepared to make the declaration above and to countersign this checklist. This email will be taken as an electronic countersignature.

Student's Director of Studies
Countersigned Robby Soetanto(Director of Studies)
Date 2 September 2009
I have read this checklist and confirm that it covers all the ethical issues raised by this project fully and frankly. I also confirm that these issues have been discussed with the student and will continue to be reviewed in the course of supervision.

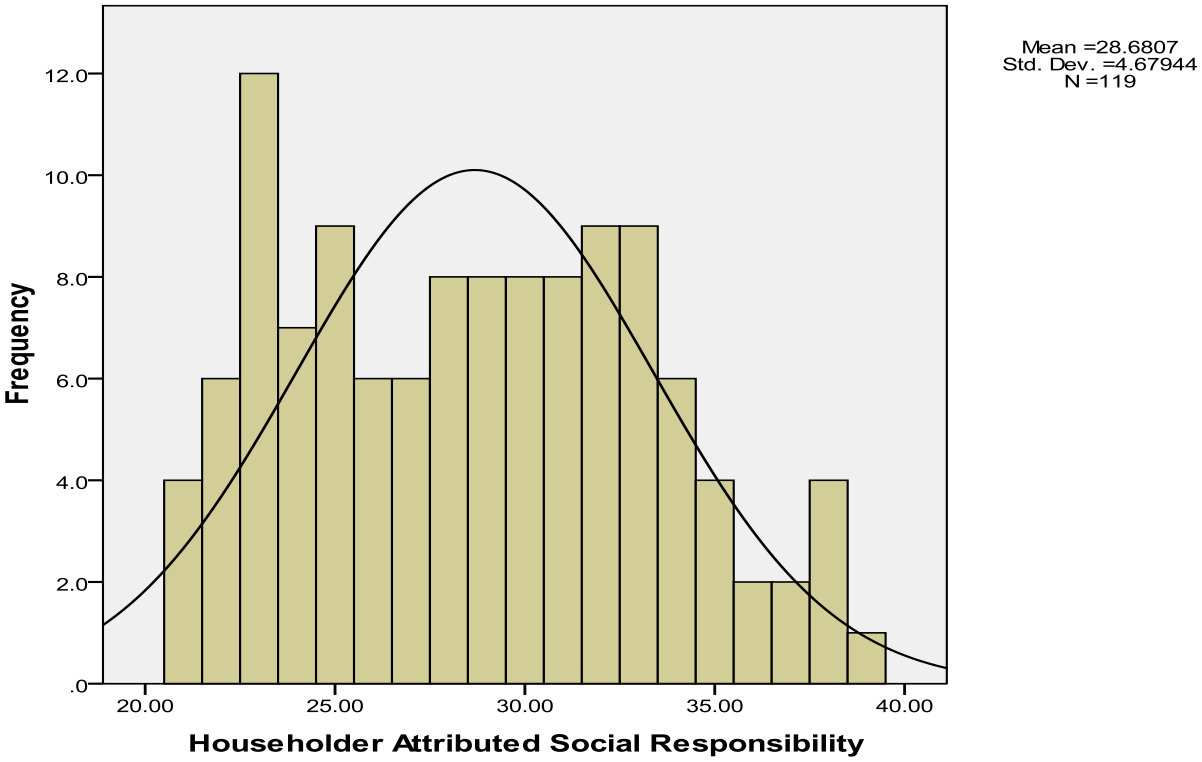
Note: This checklist is based on an ethics approval form produced by Research Office of the College of Business, Law and Social Sciences at Nottingham Trent University. Copyright is acknowledged.

Appendix 13: Birmingham Distribution Histograms for Self Perception Scores

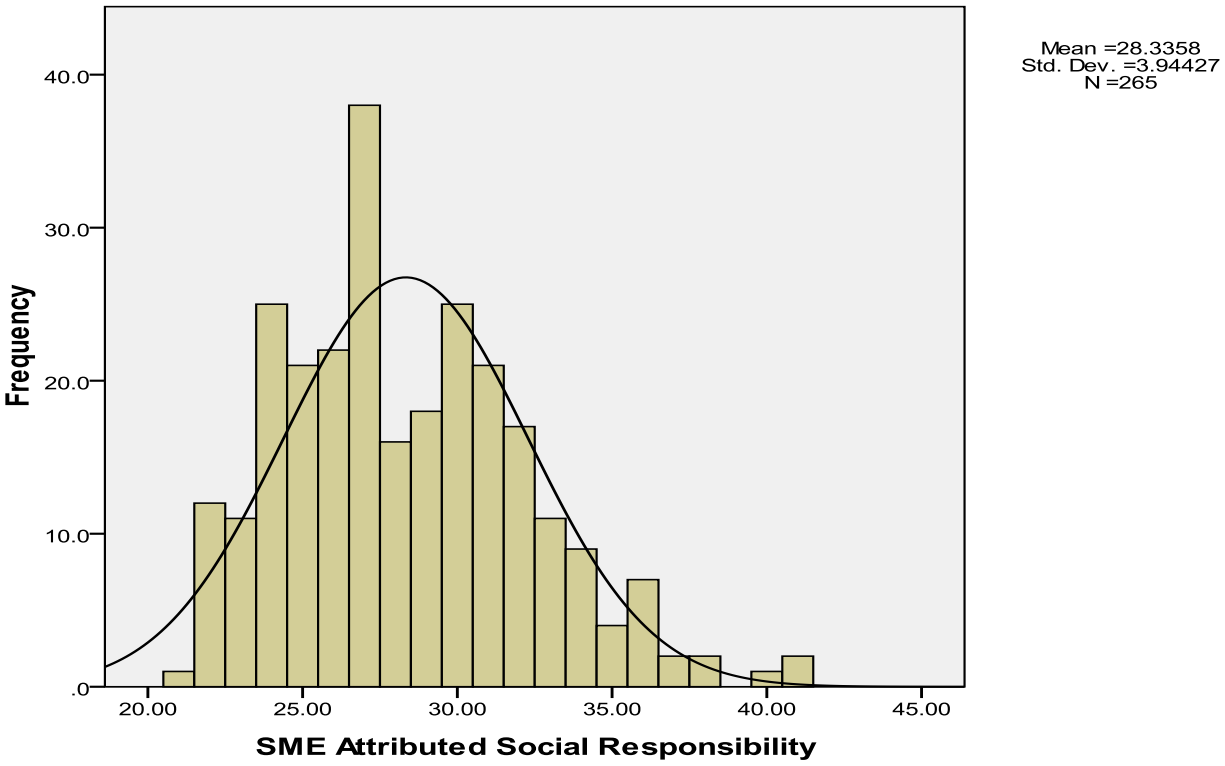
Birmingham Self-rated Perception of Social Responsibility Scores



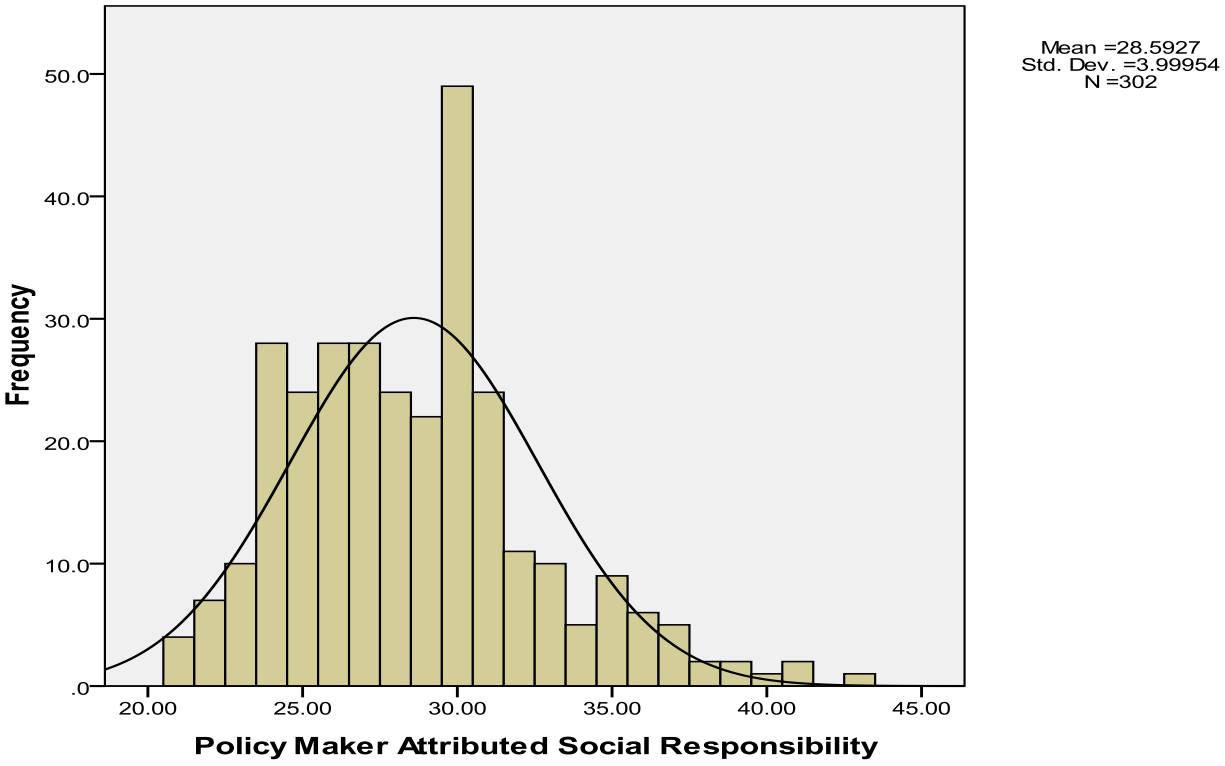
Birmingham Householder Attributed Perception of Social Responsibility Scores



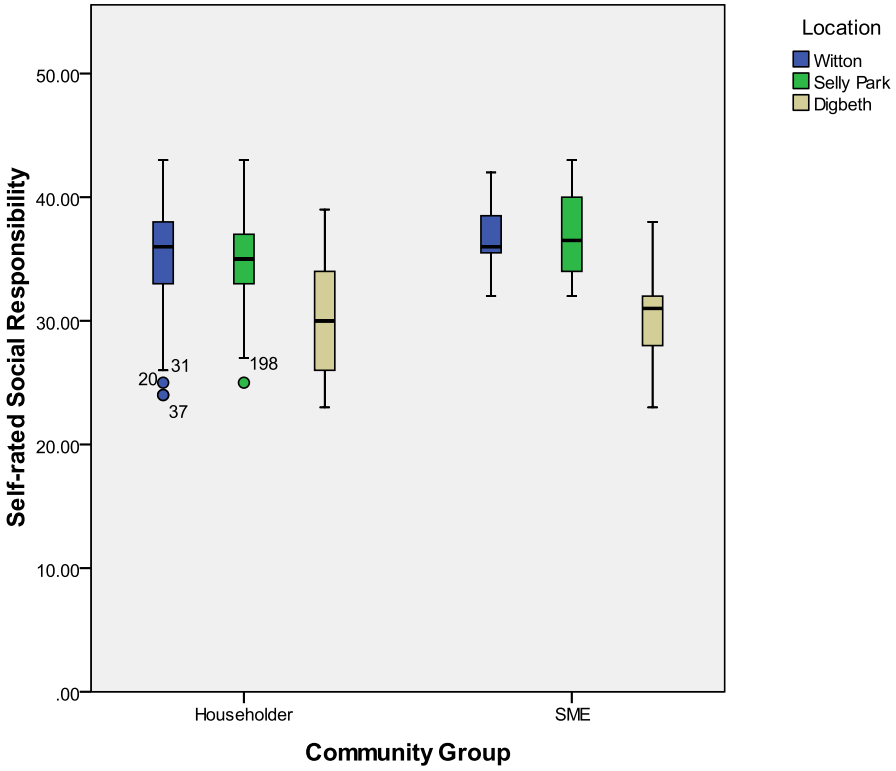
Birmingham SME Attributed Perception of Social Responsibility Scores



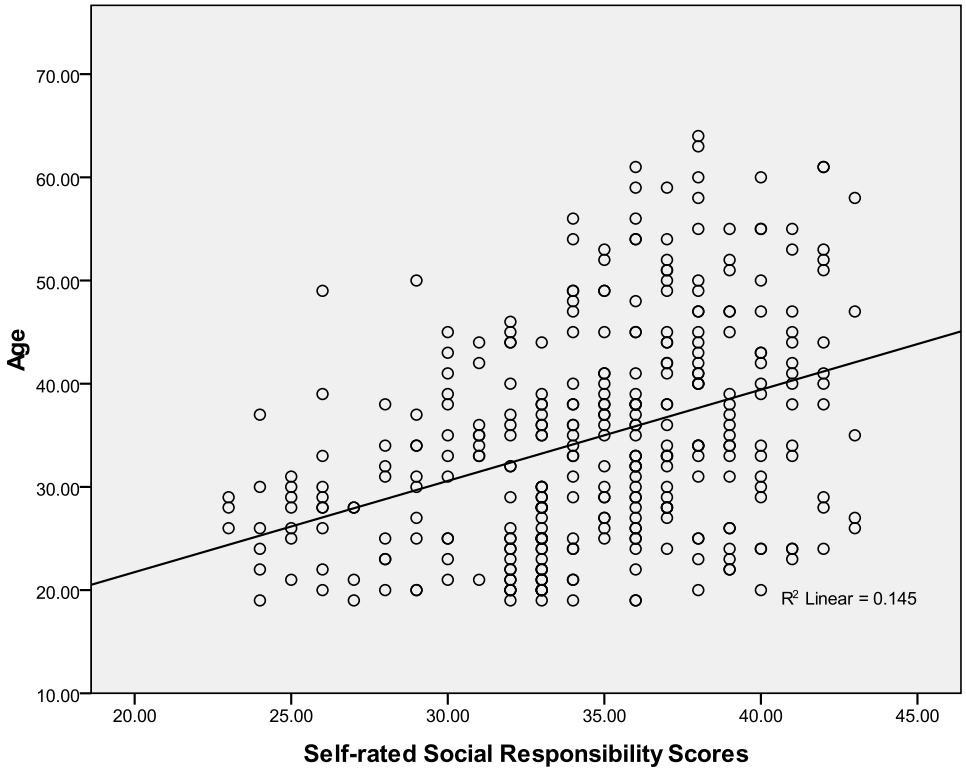
Birmingham Policy Maker Attributed Perception of Social Responsibility Scores



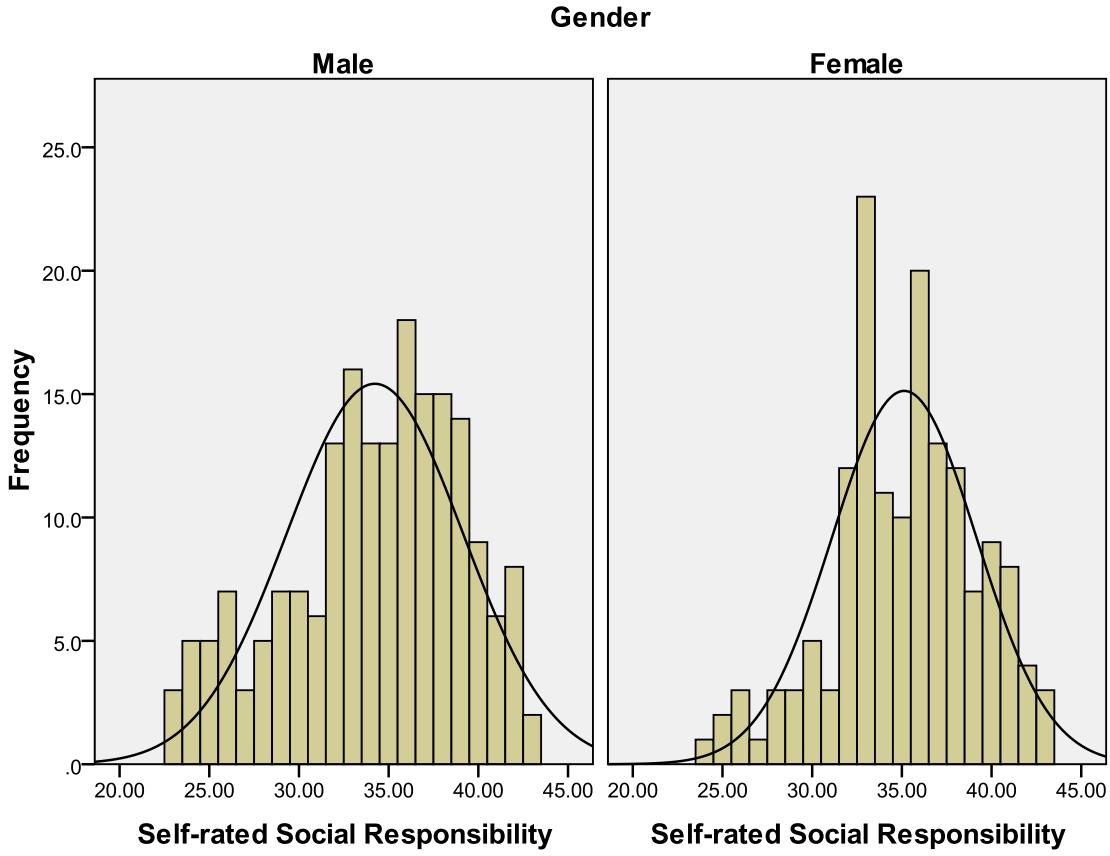
Appendix 14: Clustered boxplot of self-rated social responsibility scores sorted by location and community group for Birmingham communities



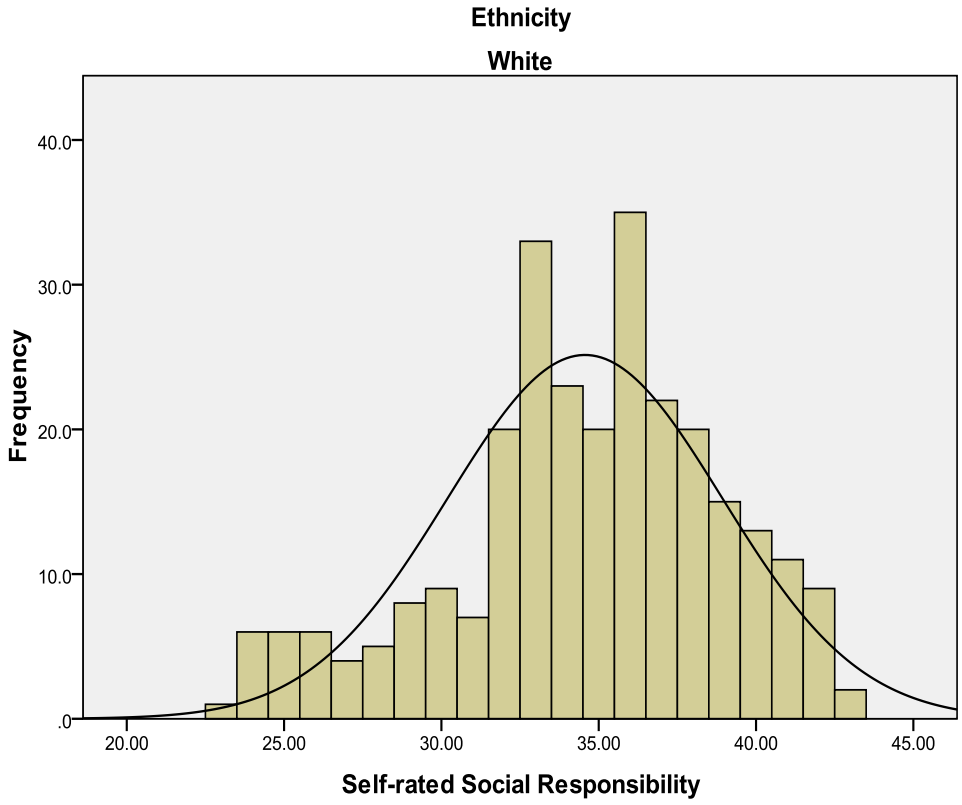
Appendix 15: Scatterplot of relationship between age and self-rated social responsibility for all three Birmingham community groups

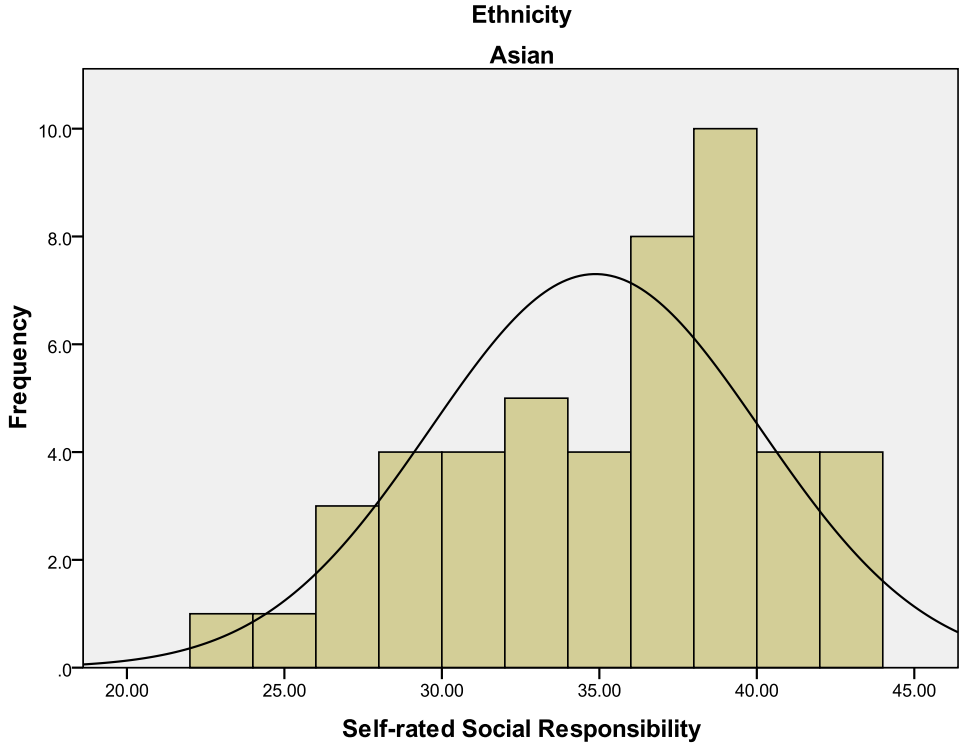


Appendix 16: Histograms of male and female self-rated social responsibility scores for all three Birmingham community groups



Appendix 17: Histograms for White British and Asian ethnic groups within all three Birmingham community groups





Appendix 18: Birmingham PASW Regression Outputs

Self-rated Social Responsibility, Age and Ethnicity for Witton and Selly Park Householders and SMEs

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.462[a]	.213	.210	3.39679
2	.514[b]	.265	.258	3.29128

a. Predictors: (Constant), Age

b. Predictors: (Constant), Age, Asian

Correlations

		Self SR	Age	White	Black	Asian	Chinese	White Black	White Asian	Other
Sig. (1-tailed)	Self SR	.	.000	.016	.153	.000	.314	.000	.127	.357
	Age	.000	.	.047	.231	.403	.032	.000	.049	.398
	White	.016	.047	.	.000	.000	.000	.000	.001	.000
	Black	.153	.231	.000	.	.215	.370	.000	.408	.355
	Asian	.000	.403	.000	.215	.	.260	.000	.326	.236
	Chinese	.314	.032	.000	.370	.260	.	.000	.425	.381
	WhiteBlack	.000	.000	.000	.000	.000	.000	.	.000	.000
	WhiteAsian	.127	.049	.001	.408	.326	.425	.000	.	.416
	Other	.357	.398	.000	.355	.236	.381	.000	.416	.

Self-rated Social Responsibility and Experience of Flooding for Witton, Selly Park and Digbeth Householders and SMEs

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.522[a]	.272	.270	3.92587
2	.667[b]	.445	.442	3.43286
3	.691[c]	.477	.472	3.33761

a. Predictors: (Constant), Nonflooded

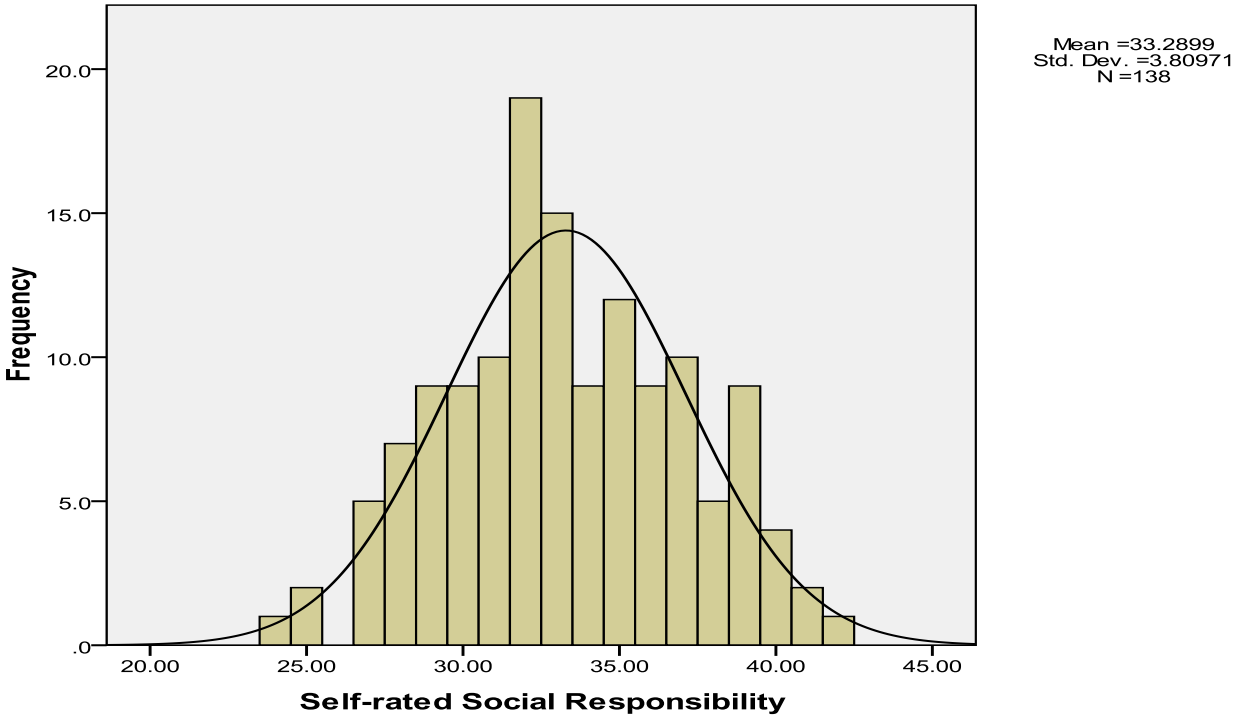
b. Predictors: (Constant), Nonflooded, Age

c. Predictors: (Constant), Nonflooded, Age, Asian

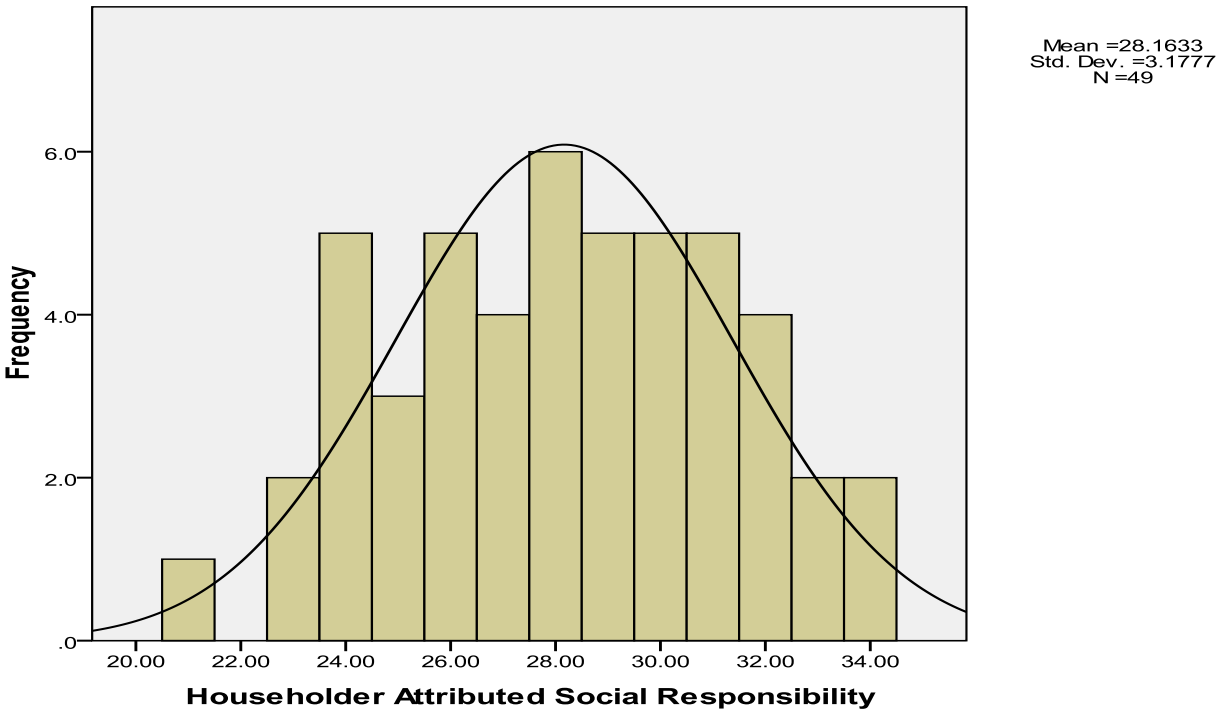
		Self SR	Age	White	Black	Asian	Chinese	White Black	White Asian	Other	Flooded	Non-flooded
Sig. (1-tailed)	Self SR	.	.000	.477	.088	.377	.156	.000	.301	.163	.000	.000
	Age	.000	.	.013	.233	.156	.021	.000	.035	.372	.210	.267
	White	.477	.013	.	.000	.000	.000	.000	.004	.000	.026	.031
	Black	.088	.233	.000	.	.060	.329	.000	.378	.310	.049	.056
	Asian	.377	.156	.000	.060	.	.207	.000	.282	.180	.000	.000
	Chinese	.156	.021	.000	.329	.207	.	.000	.435	.397	.116	.122
	White Black	.000	.000	.000	.000	.000	.000	.	.000	.000	.000	.000
	White Asian	.301	.035	.004	.378	.282	.435	.000	.	.427	.200	.206
	Other	.163	.372	.000	.310	.180	.397	.000	.427	.	.090	.096
	Flooded	.000	.210	.026	.049	.000	.116	.000	.200	.090	.	.000
	Non-flooded	.000	.267	.031	.056	.000	.122	.000	.206	.096	.000	.

Appendix 19: SE London Distribution Histograms for Self-rated Perceptions of Social Responsibility Scores

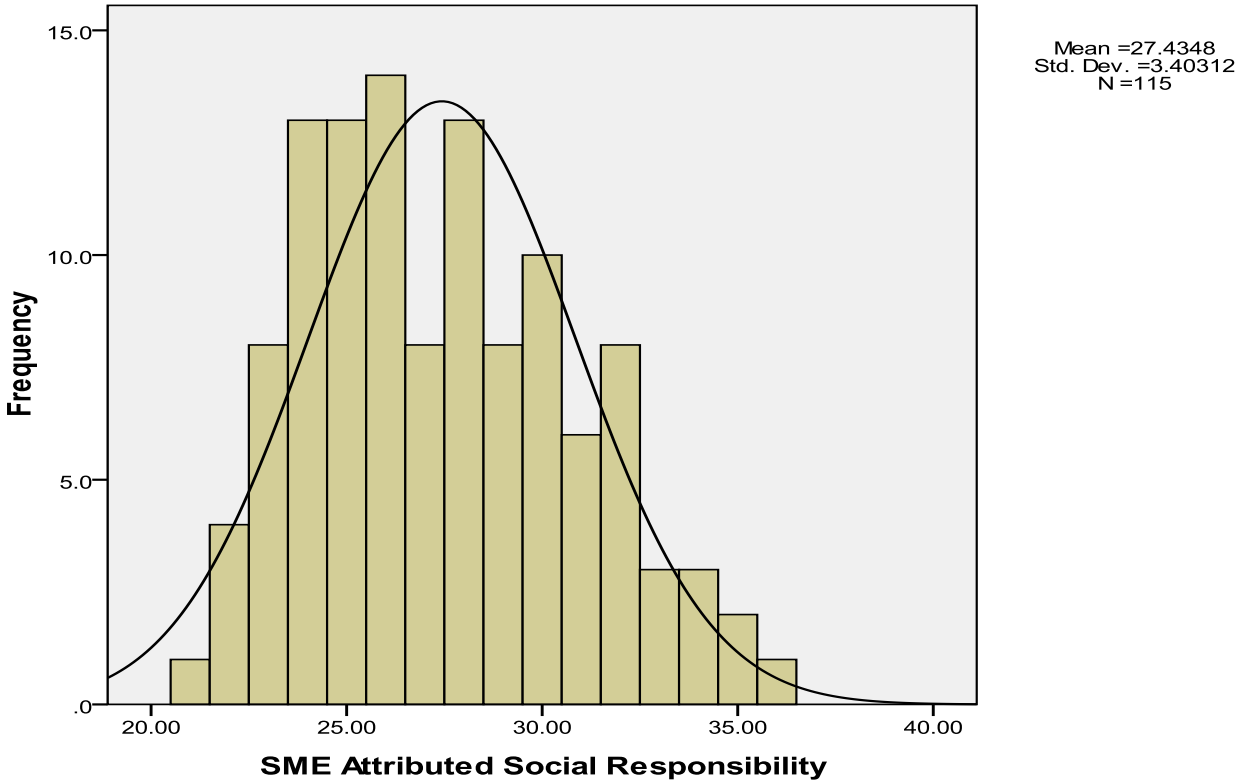
SE London Self-rated Perception of Social Responsibility Scores



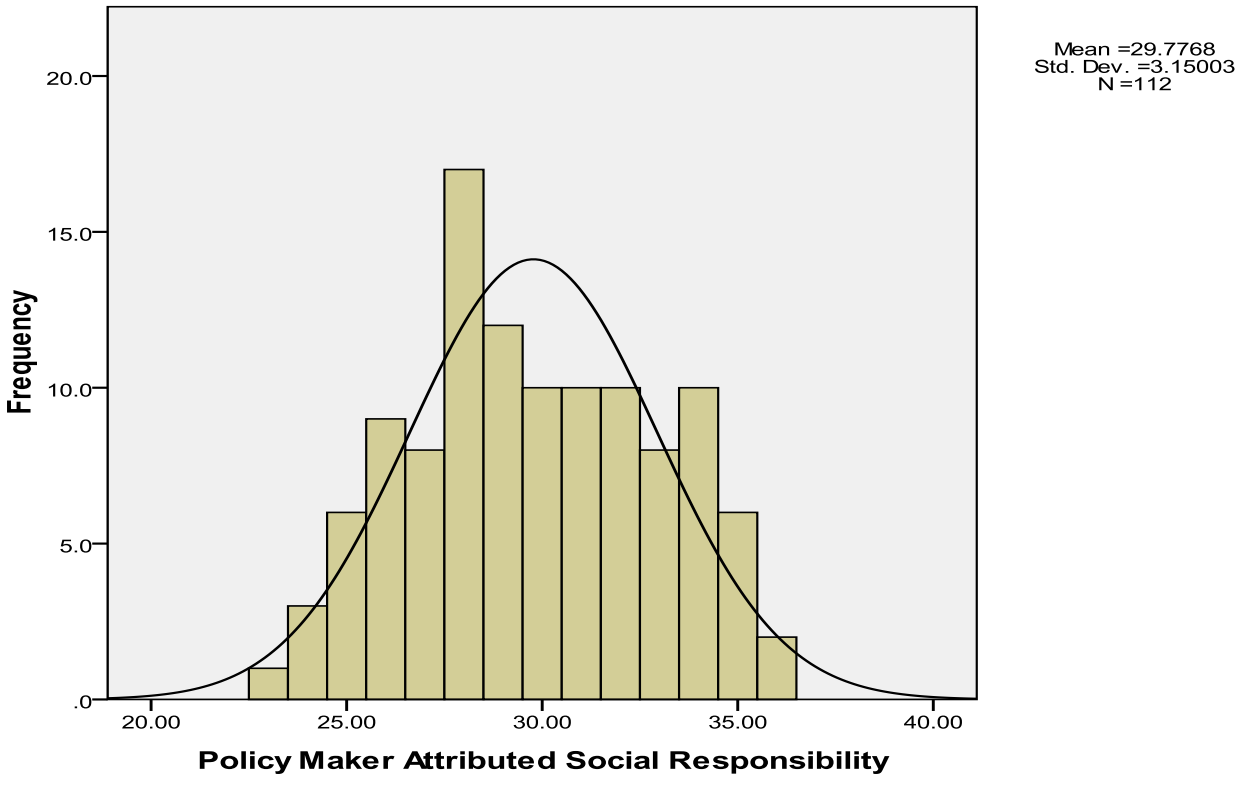
SE London Householder Attributed Perception of Social Responsibility Scores



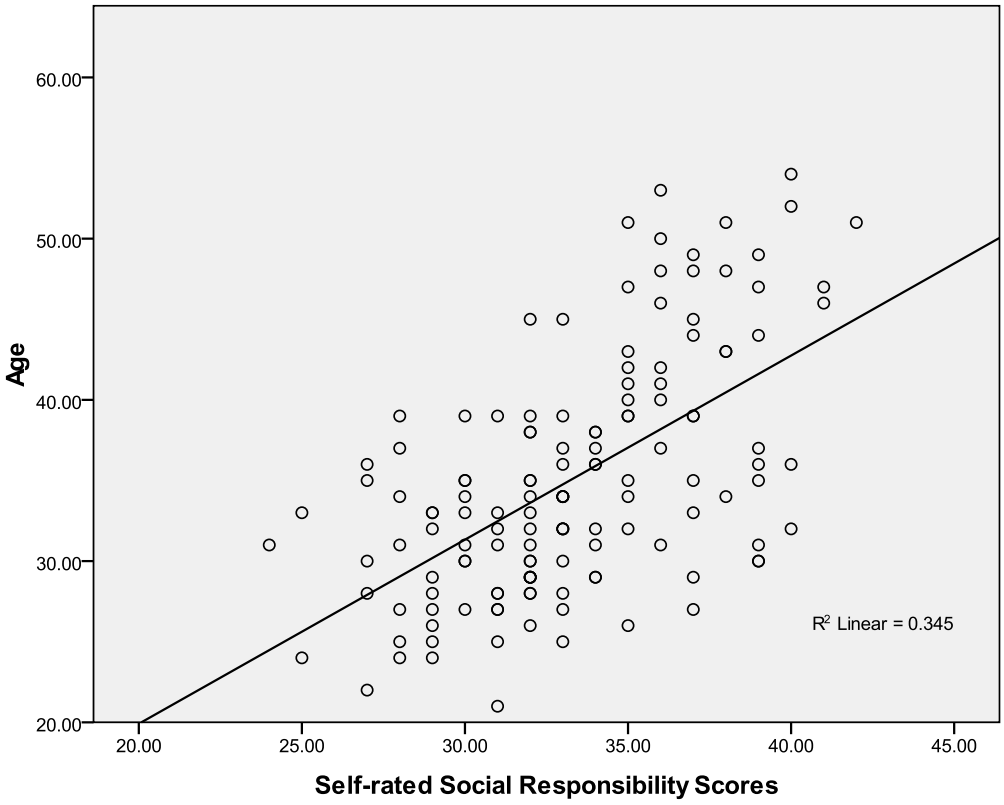
SE London SME Attributed Perception of Social Responsibility Scores



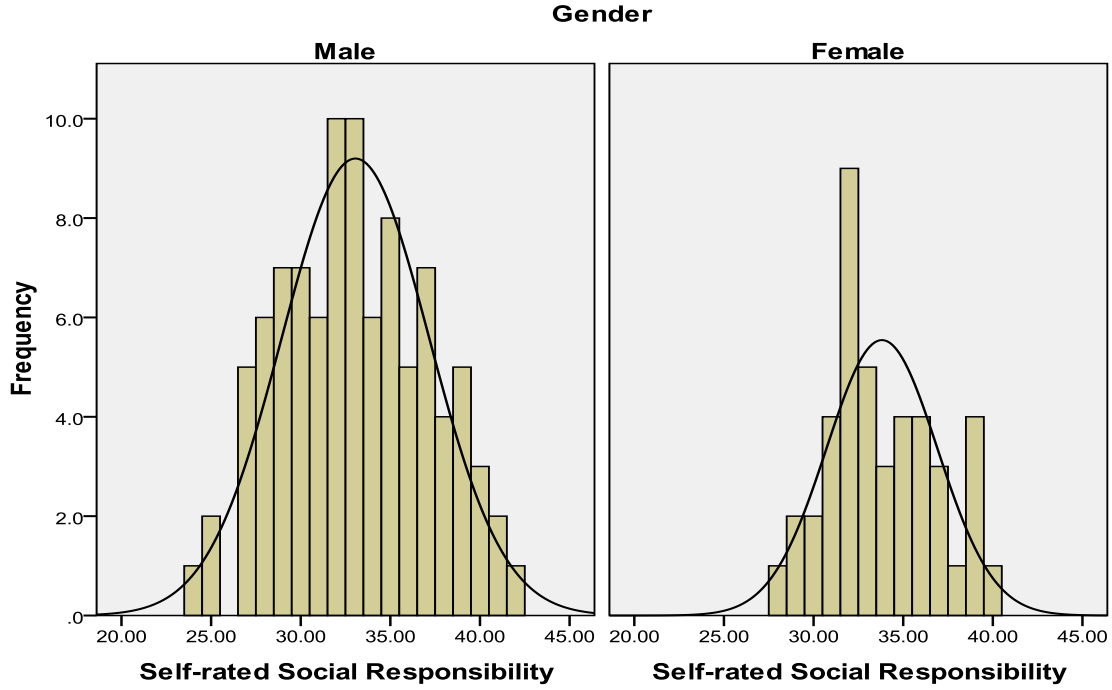
SE London Policy Maker Attributed Perception of Social Responsibility Scores



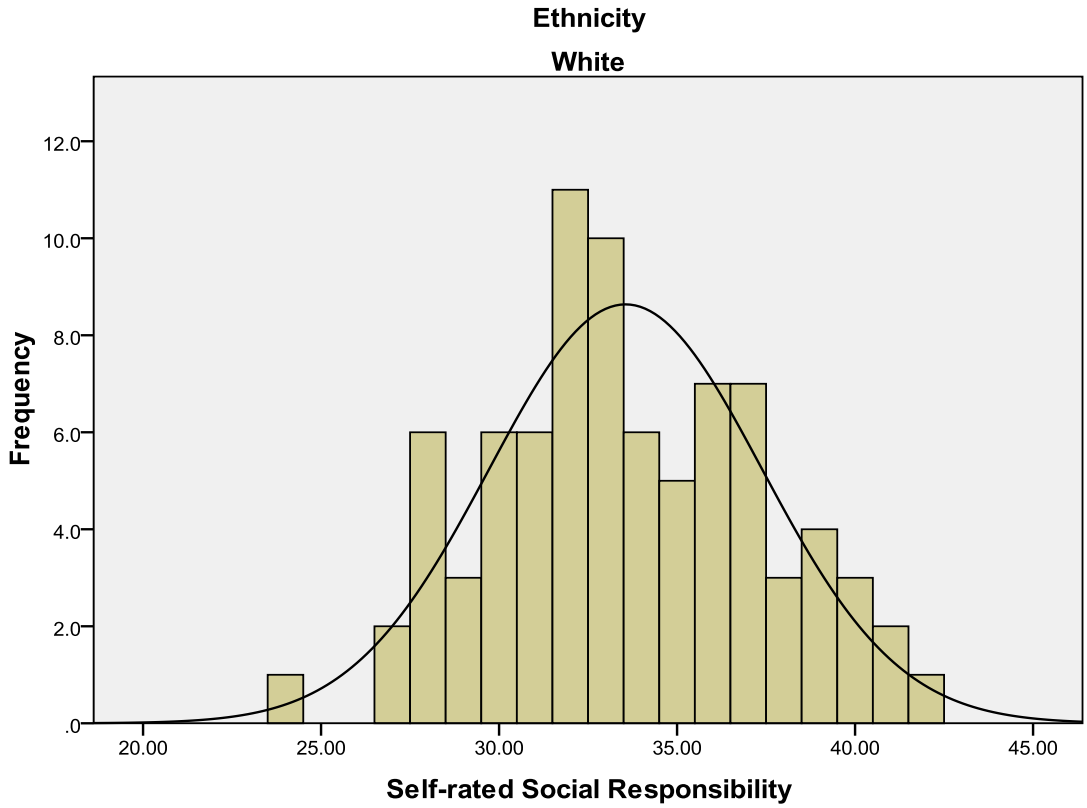
Appendix20: Scatterplot of relationship between age and self-rated social responsibility scores for all three SE London community groups

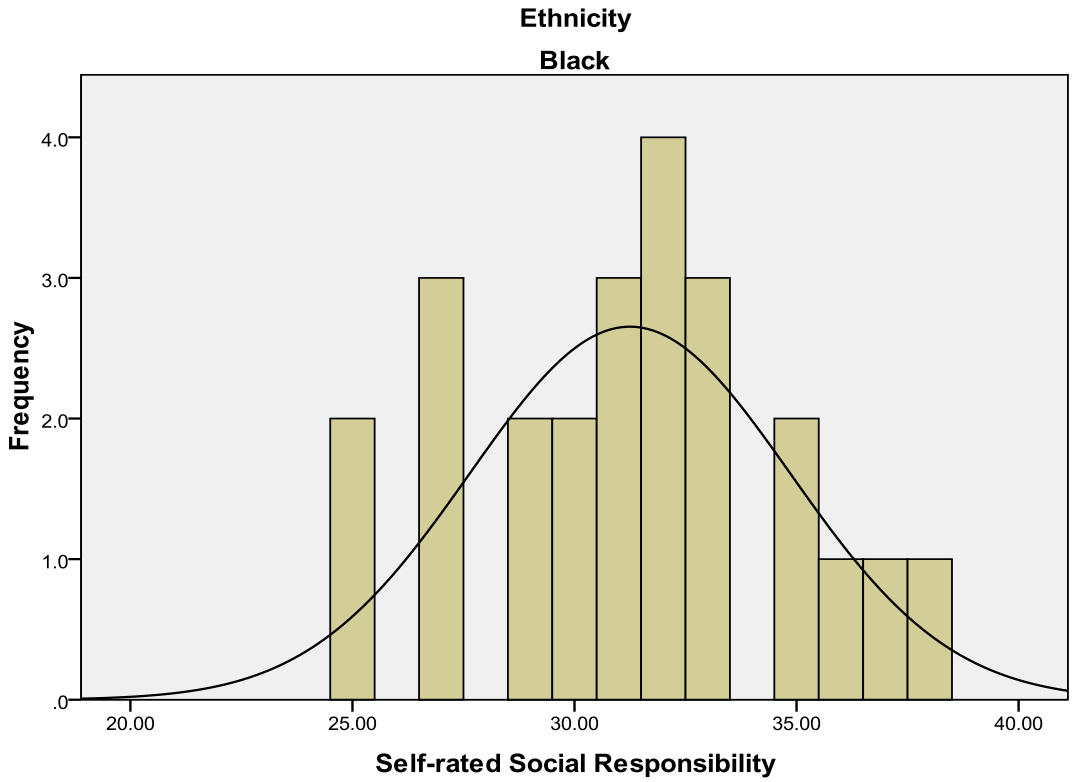


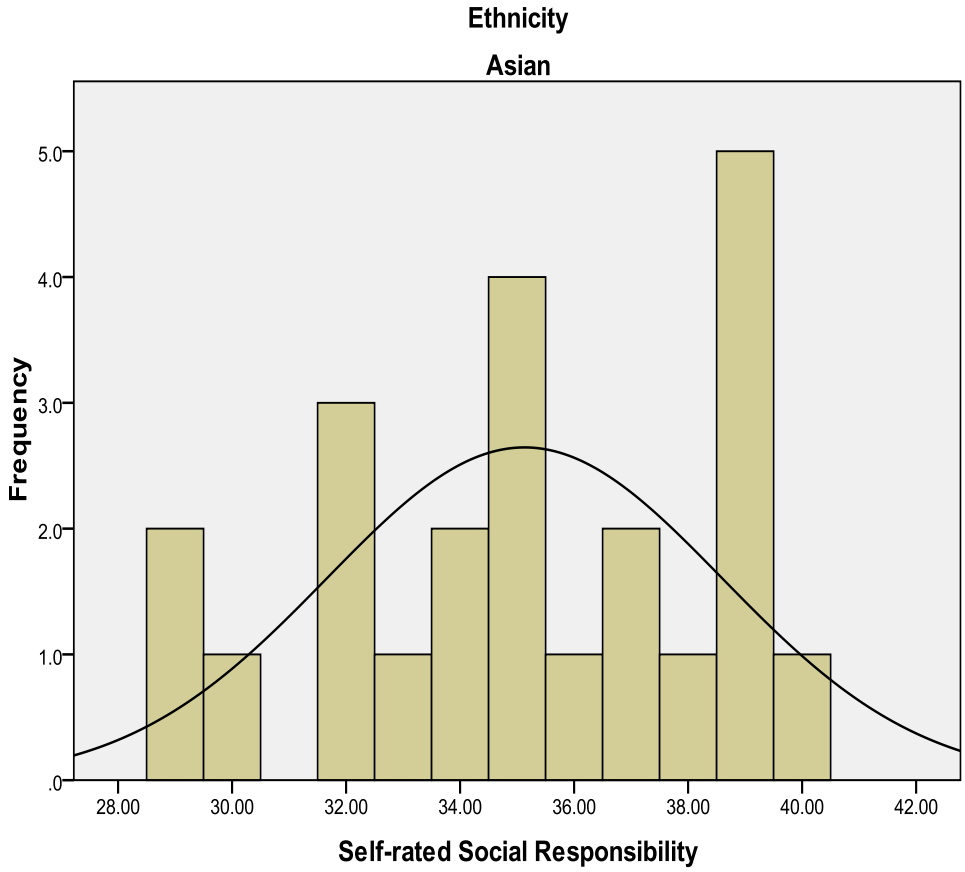
Appendix 21: Histograms of male and female self-rated social responsibility scores for all three SE London community groups



Appendix 22: Histograms for SE London White, Black and Asian ethnic groups






Ethnicity
Asian
Frequency
5.0
4.0
3.0
2.0
1.0
.0
28.00
30.00
32.00
34.00
36.00
38.00
40.00
42.00
Self-rated Social Responsibility

Appendix 23: SE London PASW Regression Outputs

Self-rated Social Responsibility, Age and Ethnicity for Thornton Heath Householders and SMEs

Model Summary

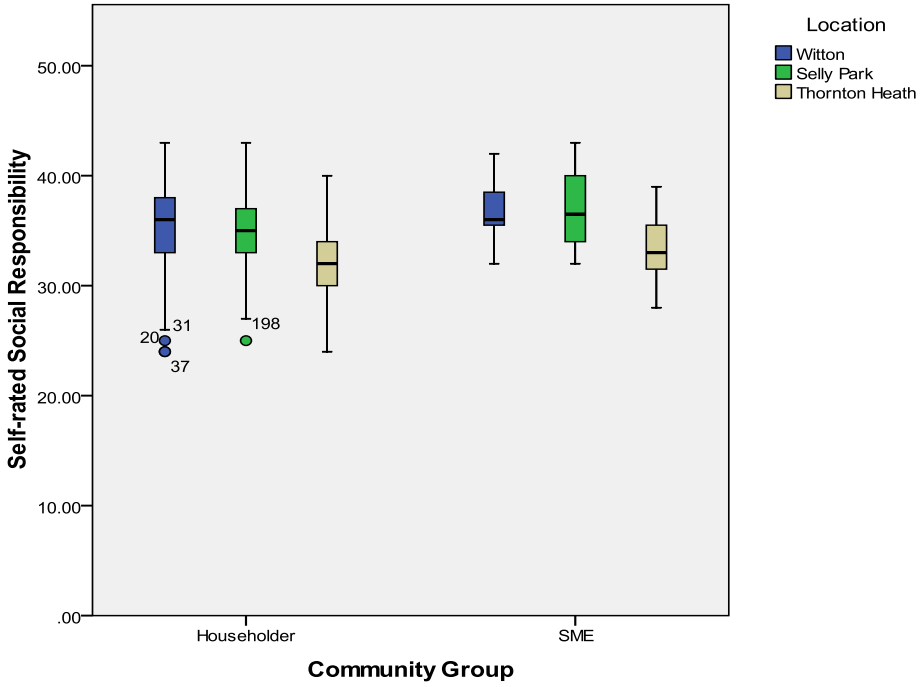
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.633[a]	.400	.395	2.60449
2	.657[b]	.431	.421	2.54759

a. Predictors: (Constant), Age

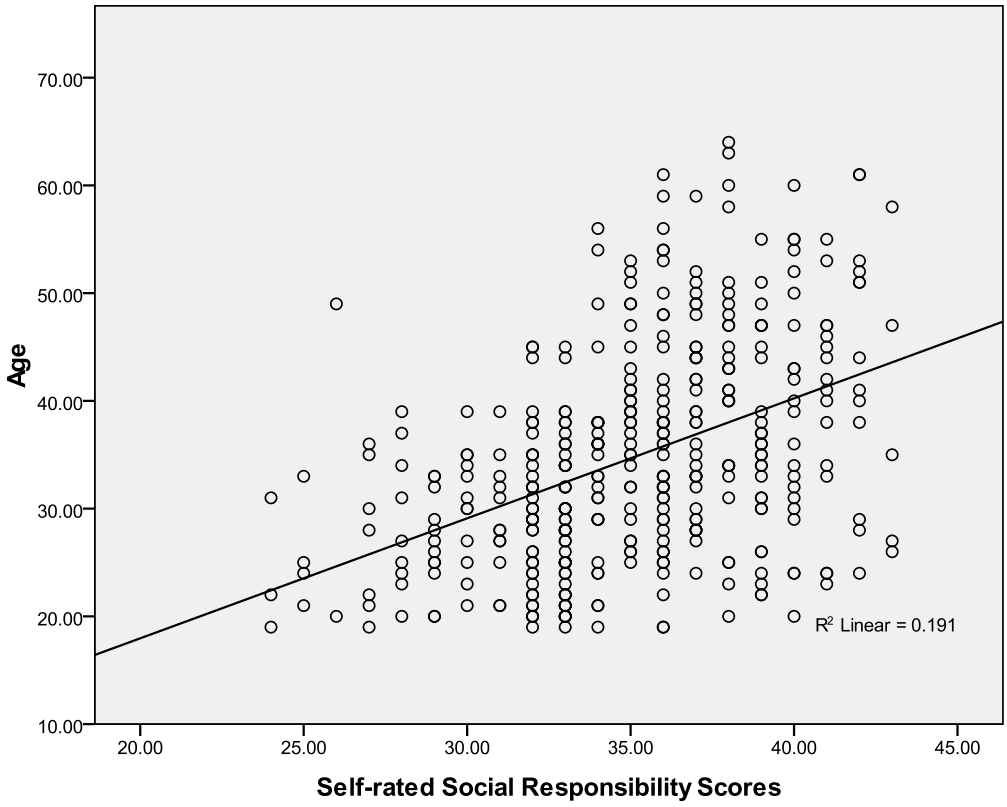
b. Predictors: (Constant), Age, Asian

		Self SR	Age	White	Black	Asian	Chinese	White Black	White Asian	Other
Sig. (1-tailed)	Self SR	.	.000	.282	.001	.001	.307	.080	.000	.289
	Age	.000	.	.075	.004	.031	.428	.049	.000	.156
	White	.282	.075	.	.000	.000	.112	.006	.000	.041
	Black	.001	.004	.000	.	.015	.327	.181	.000	.262
	Asian	.001	.031	.000	.015	.	.327	.181	.000	.262
	Chinese	.307	.428	.112	.327	.327	.	.424	.000	.447
	White Black	.080	.049	.006	.181	.181	.424	.	.000	.393
	White Asian	.000	.000	.000	.000	.000	.000	.000	.	.000
	Other	.289	.156	.041	.262	.262	.447	.393	.000	.

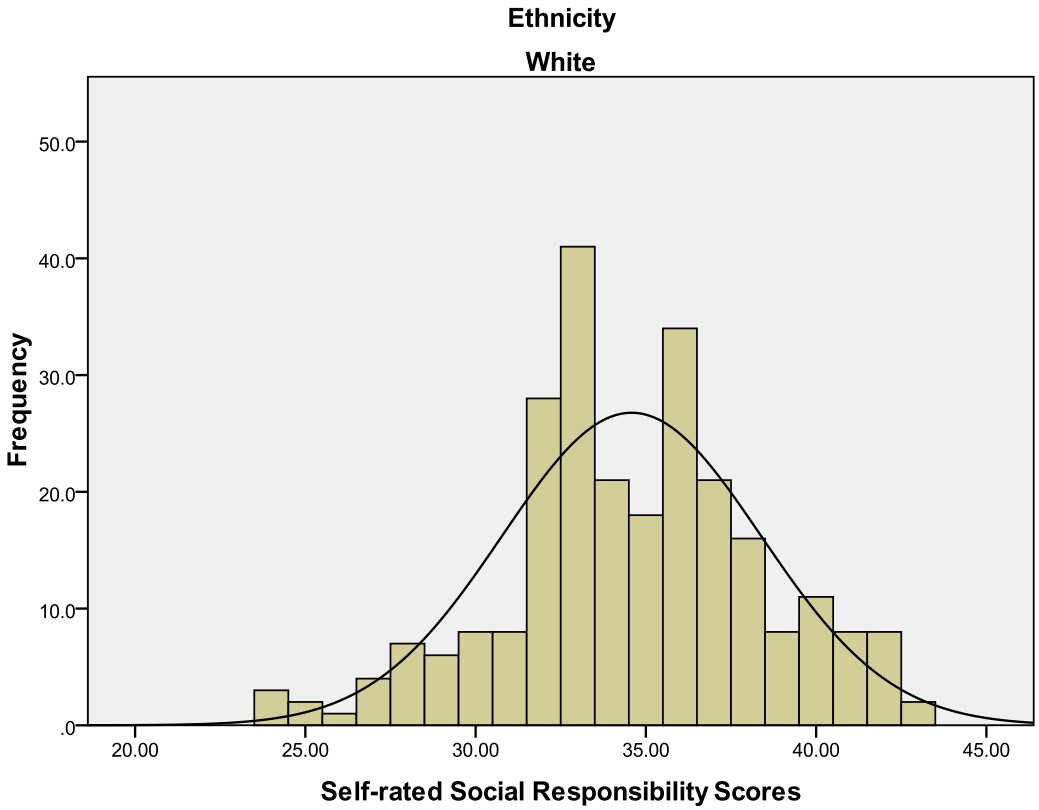
Appendix 24: Clustered boxplot of self-rated social responsibility scores sorted by location and community group for Witton, Selly Park and Thornton Heath (Householders and SMEs only)

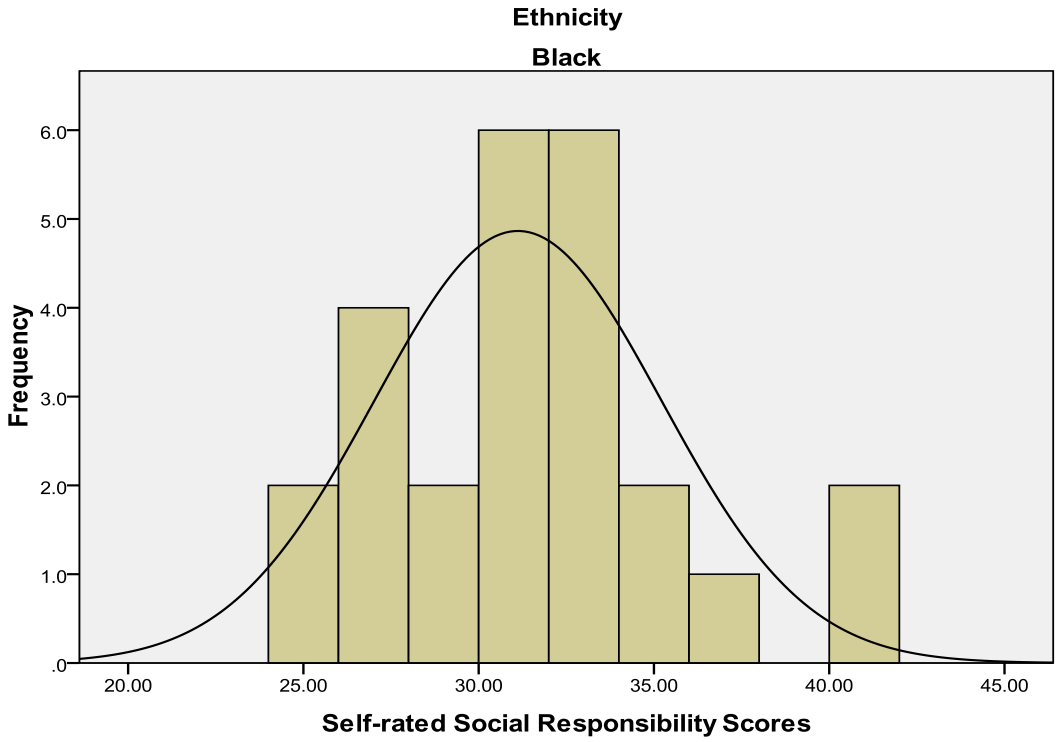


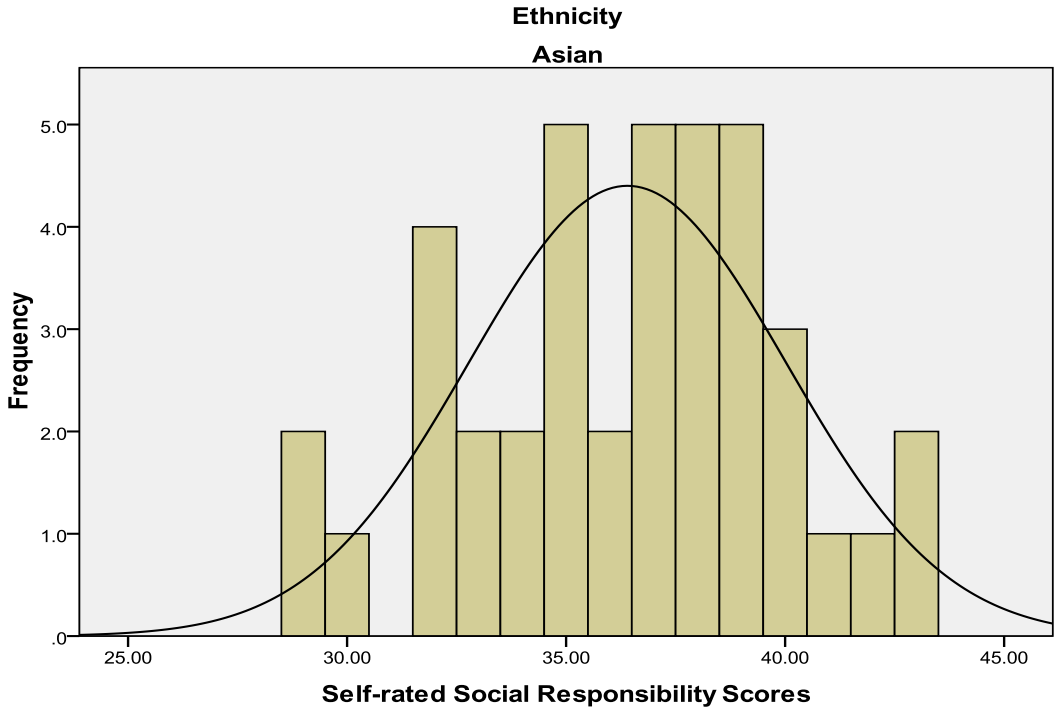
Appendix 25: Scatterplot of relationship between age and self-rated social responsibility for Witton, Selly Park and Thornton Heath community groups



Appendix 26: Histograms for White, Black and Asian ethnic groups for householders and SMES in Witton, Selly park and Thornton Heath

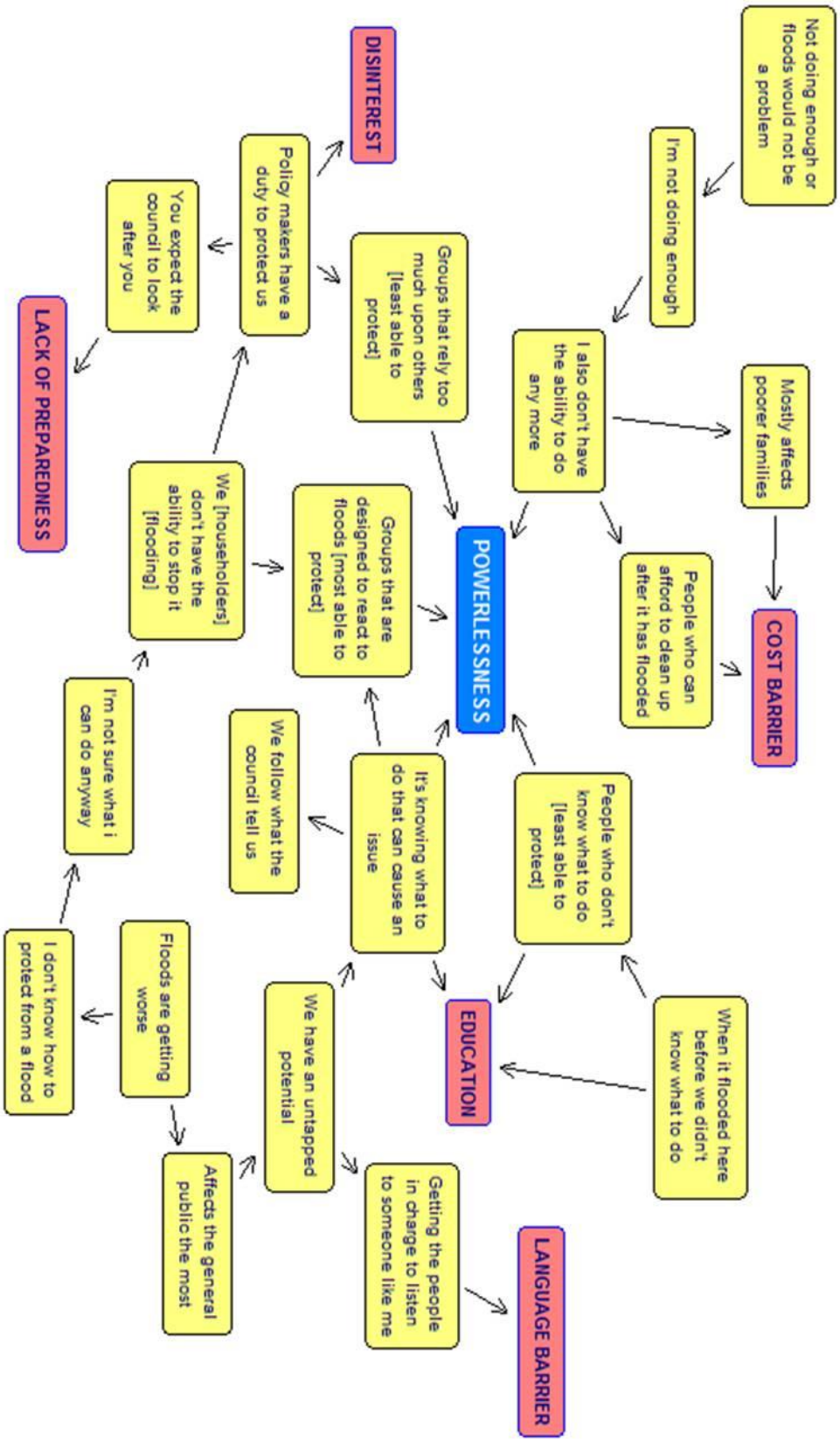




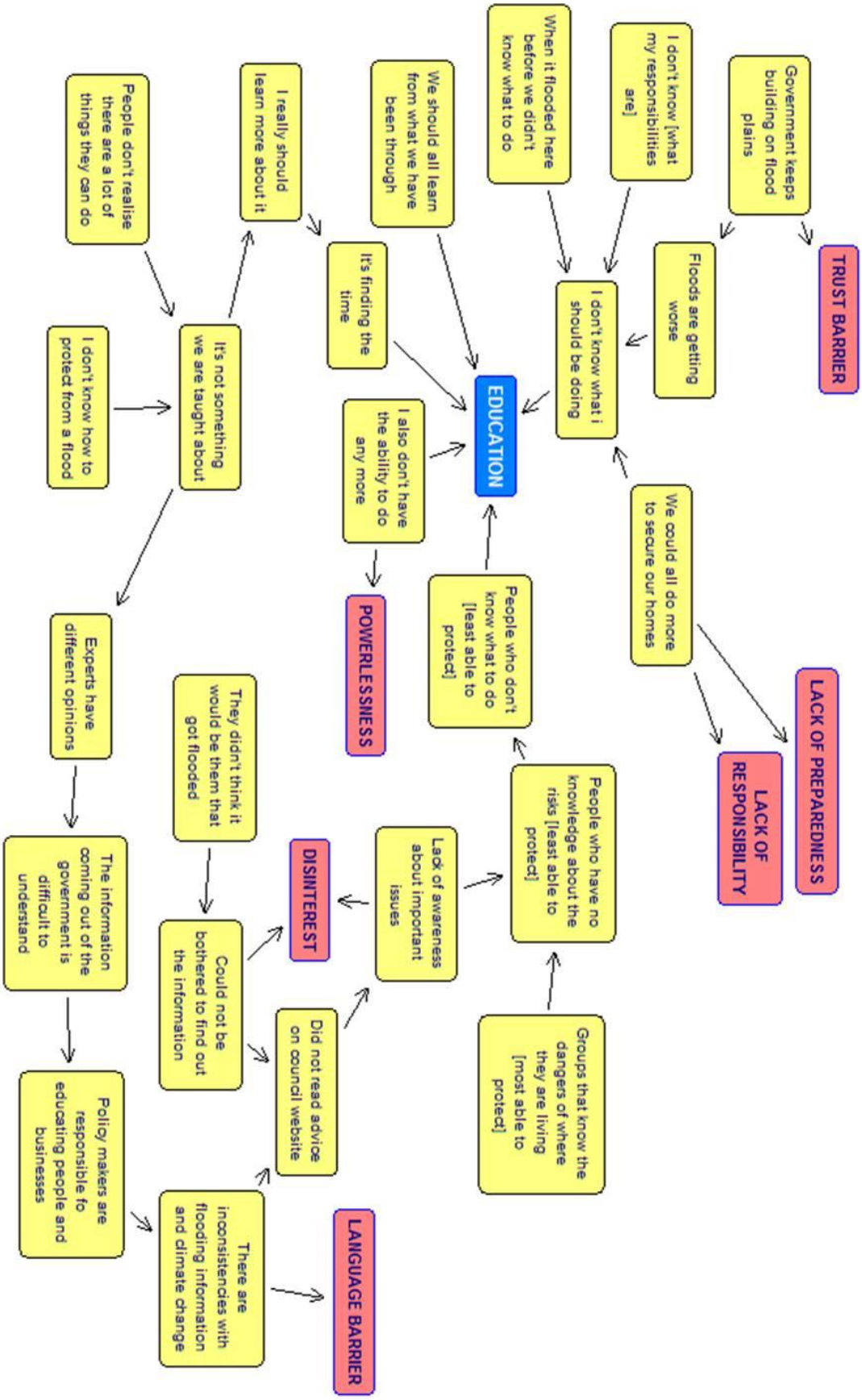

Ethnicity
Asian
Frequency
5.0
4.0
3.0
2.0
1.0
.0
25.00
30.00
35.00
40.00
45.00
Self-rated Social Responsibility Scores

Appendix 27: Cognitive Maps of the Remaining 8 Themes for Witton and Selly Park Householders

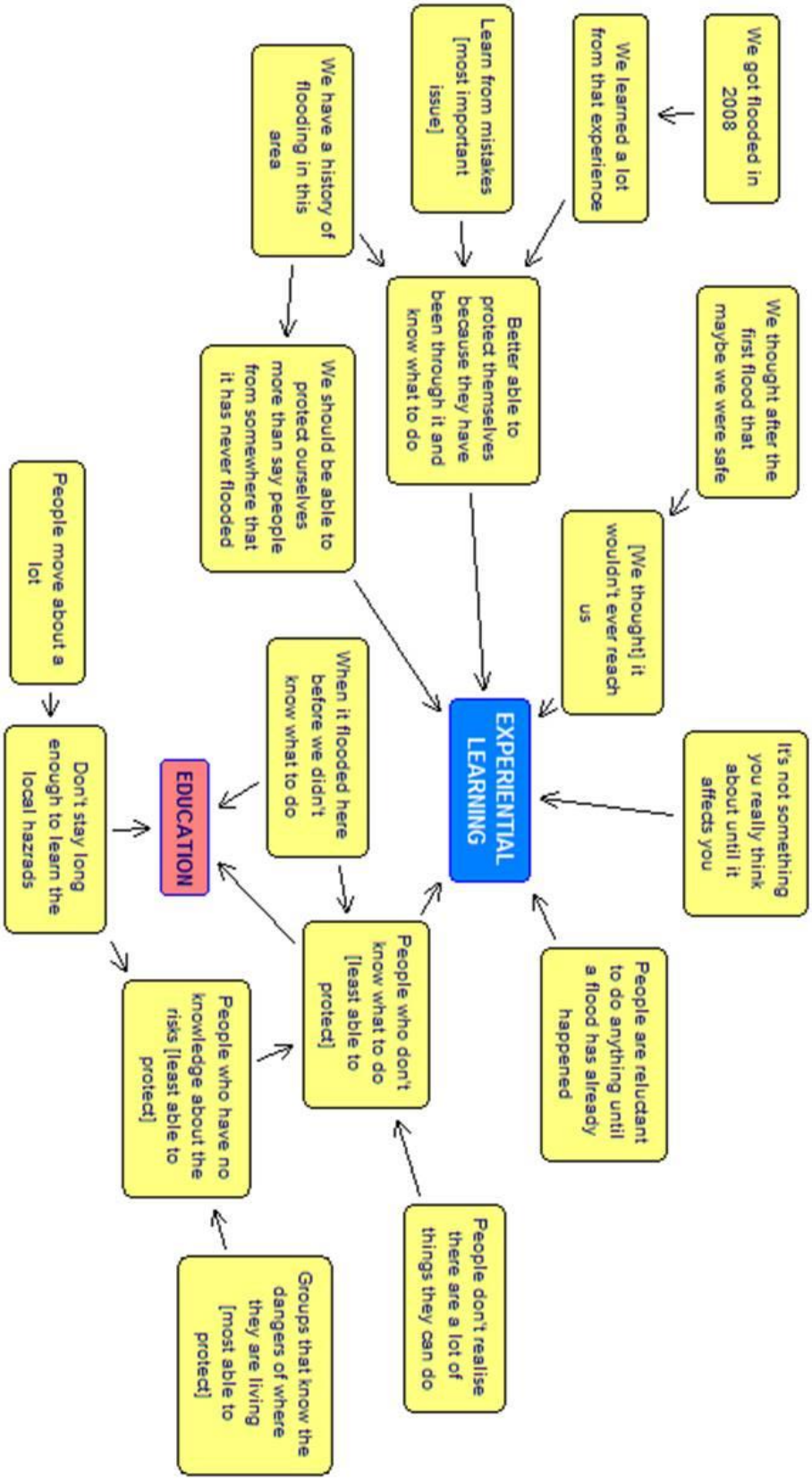
1. Powerlessness



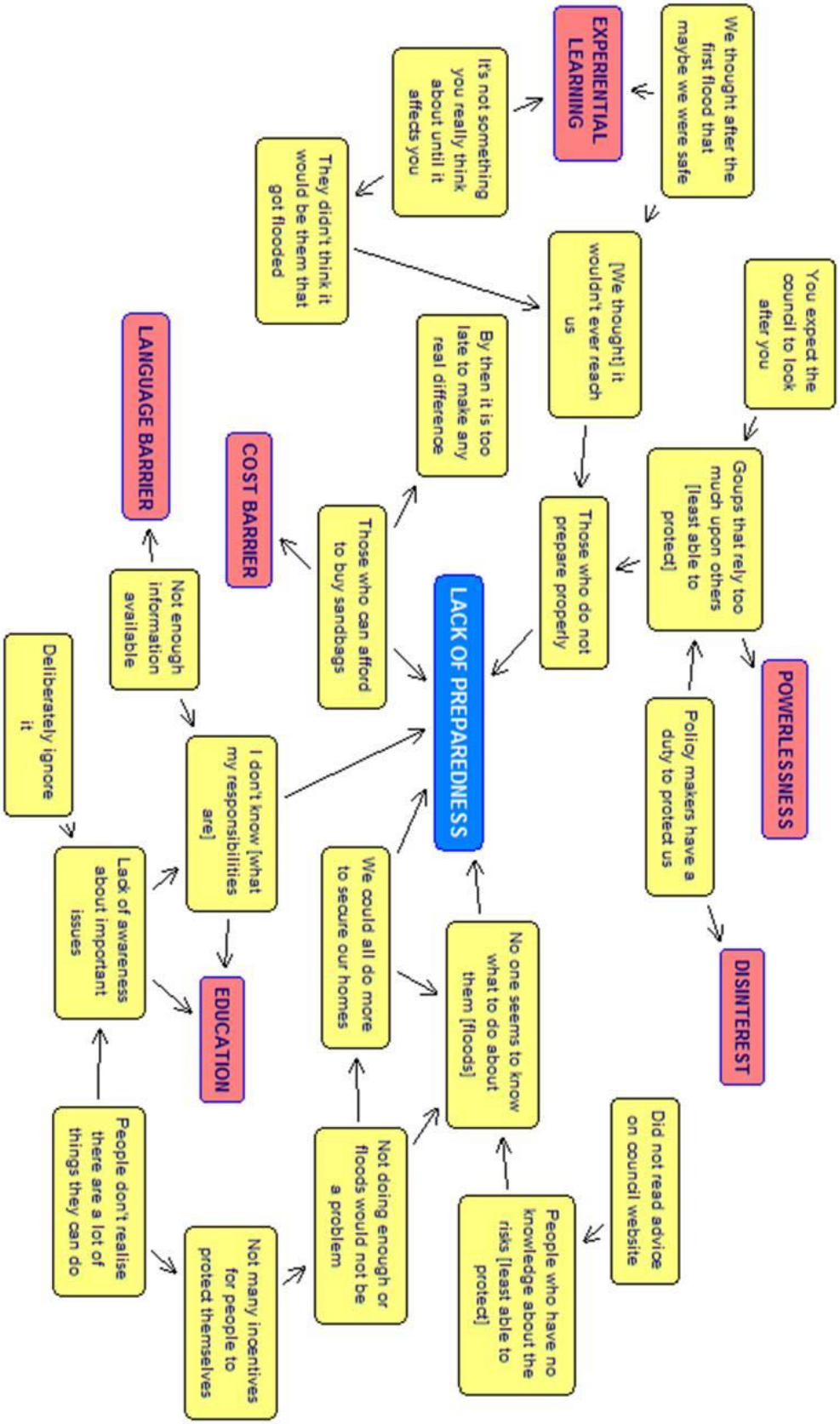
2. Education


Government keeps building on flood plains
I don't know [what my responsibilities are]
When it flooded here before we didn't know what to do
We should all learn from what we have been through
I really should learn more about it
People don't realise there are a lot of things they can do
TRUST BARRIER
Floods are getting worse
I don't know what i should be doing
It's finding the time
EDUCATION
I also don't have the ability to do any more
I don't know how to protect from a flood
It's not something we are taught about
We could all do more to secure our homes
LACK OF PREPAREDNESS
LACK OF RESPONSIBILITY
People who don't know what to do [least able to protect]
POWERLESSNESS
Experts have different opinions
They didn't think it would be them that got flooded
People who have no knowledge about the risks [least able to protect]
Lack of awareness about important issues
DISINTEREST
The information coming out of the government is difficult to understand
Could not be bothered to find out the information
Groups that know the dangers of where they are living [most able to protect]
Did not read advice on council website
Policy makers are responsible fo educating people and businesses
There are inconsistencies with flooding information and climate change
LANGUAGE BARRIER

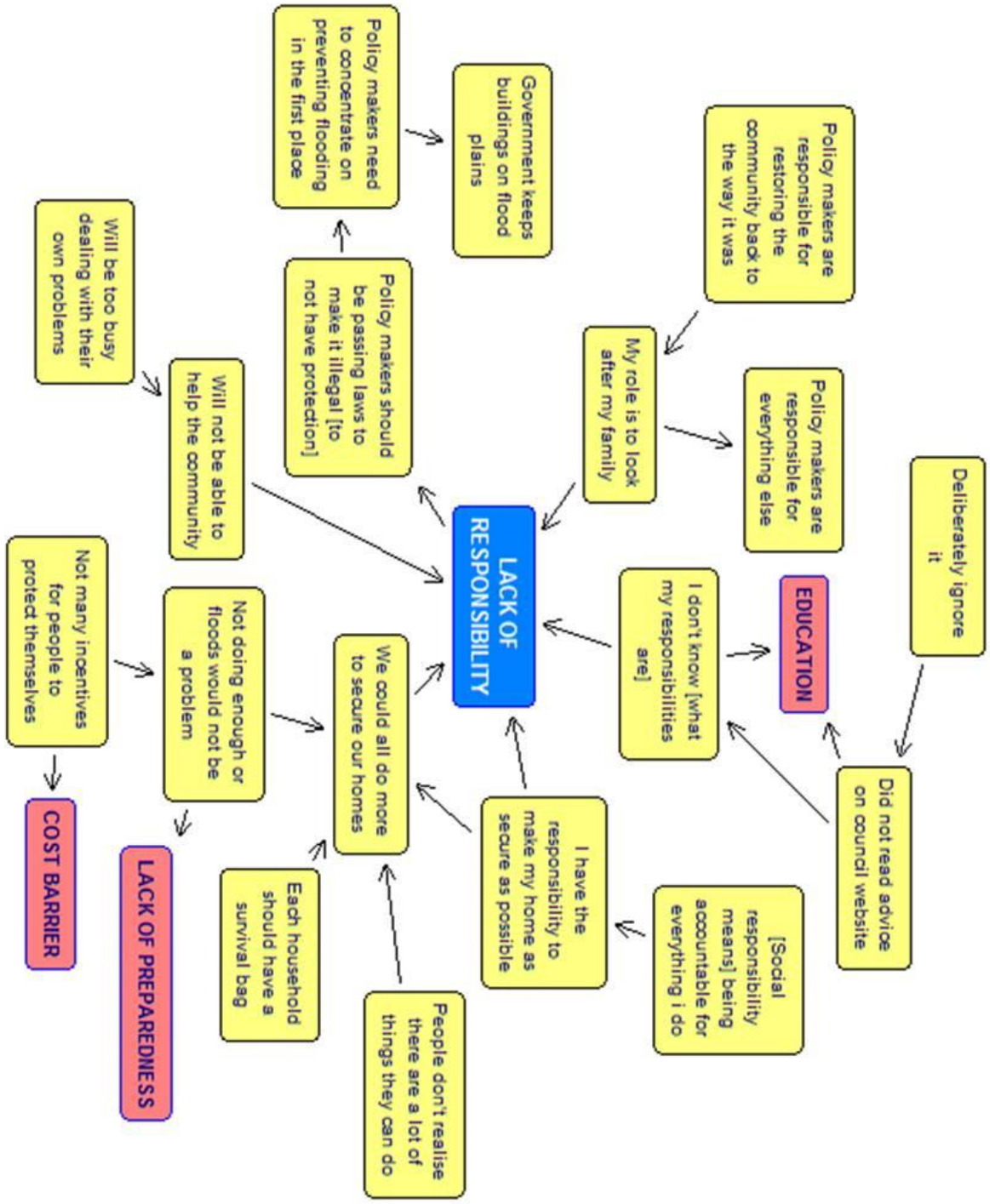
3. Experiential Learning



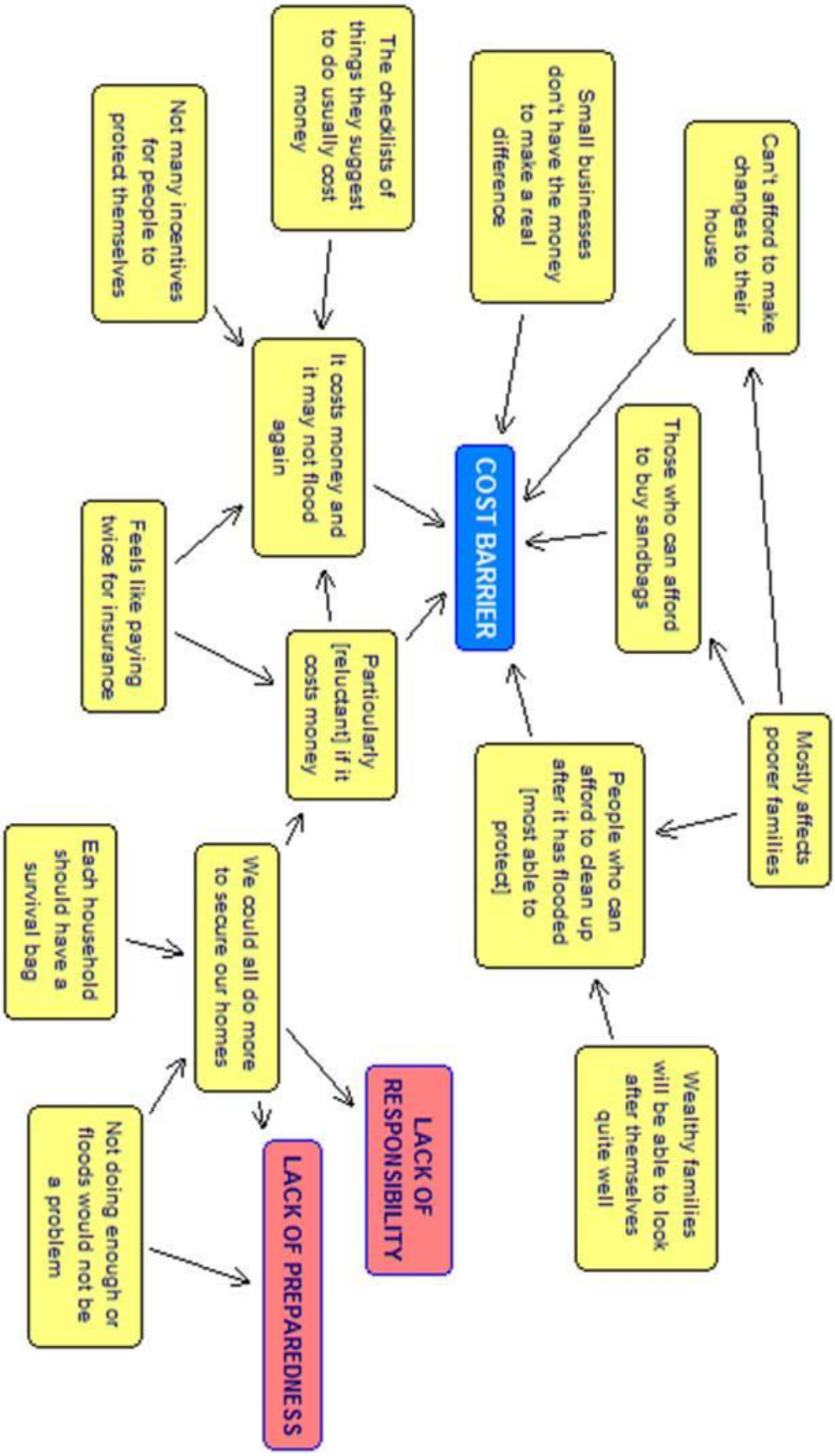
4. Lack of Preparedness



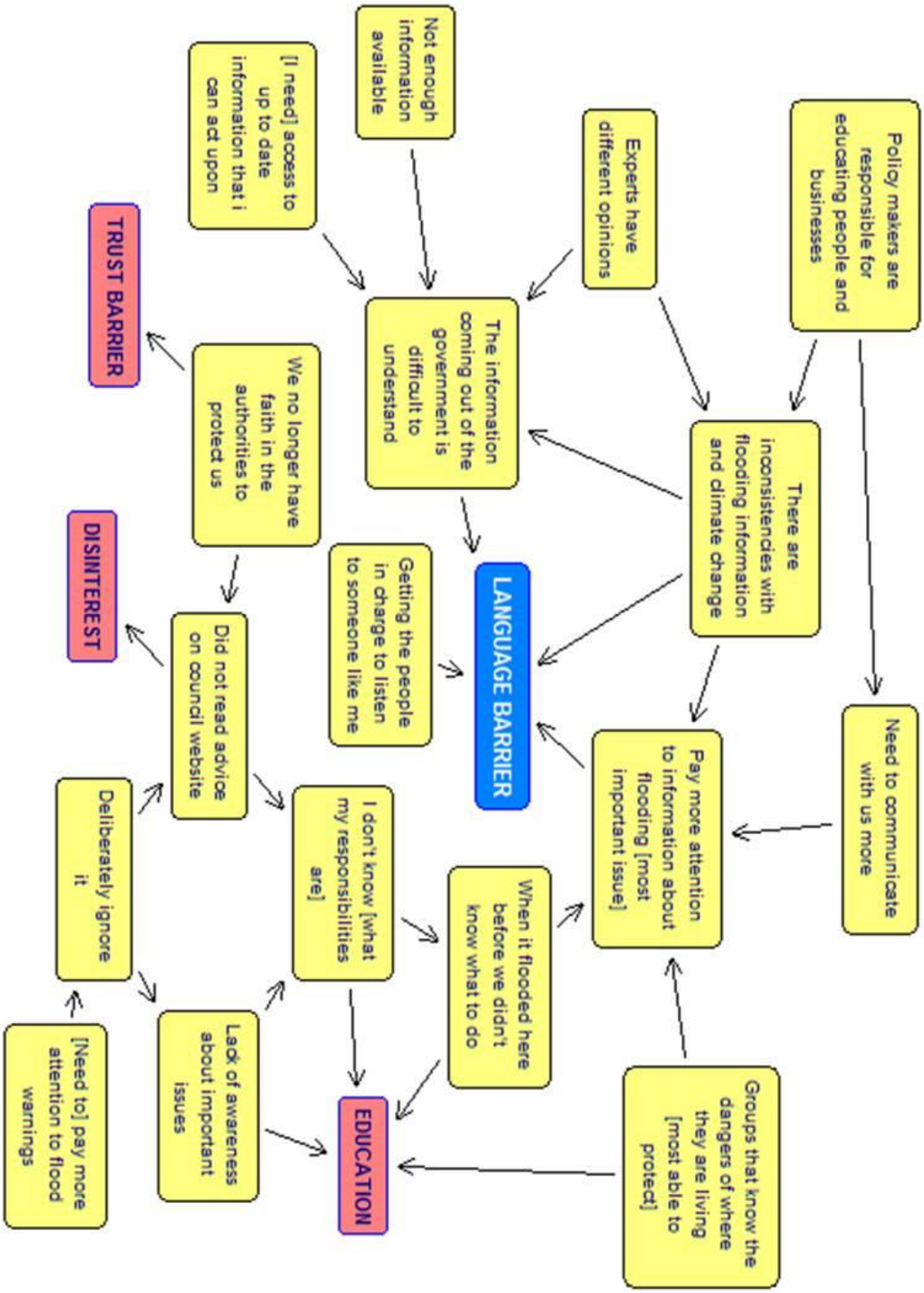
5. Lack of Responsibility



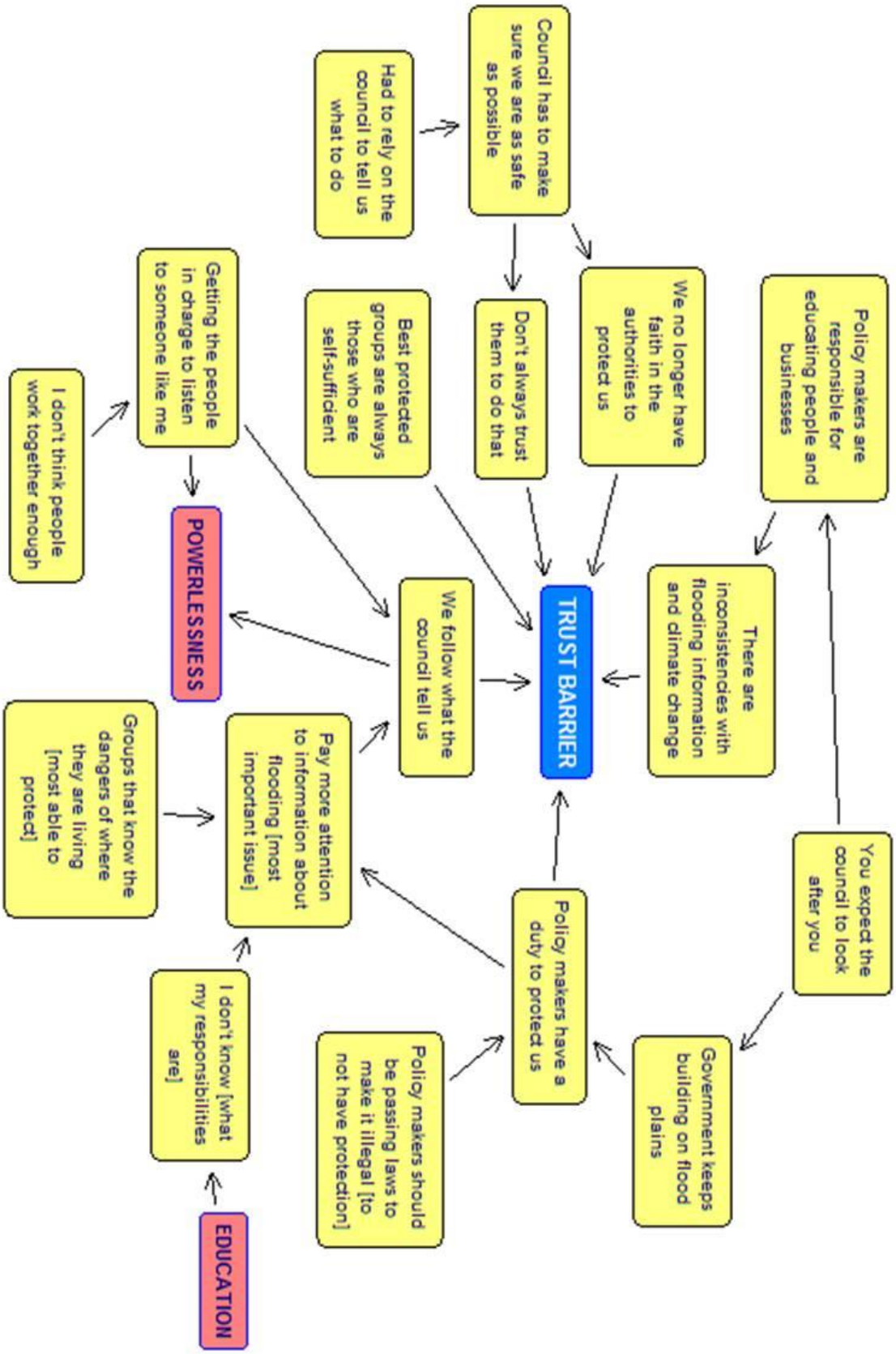
6. Cost Barrier



7. Language Barrier

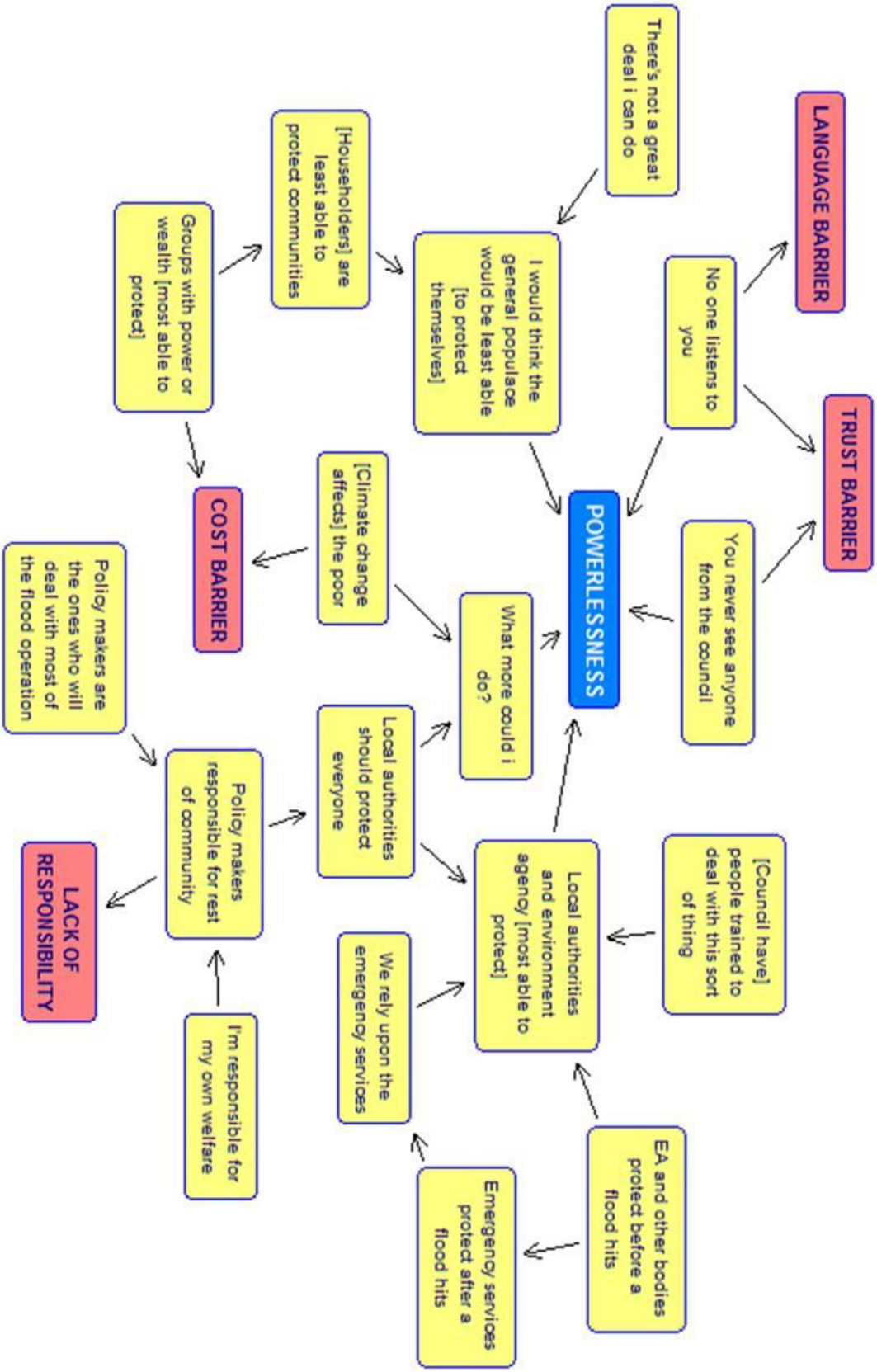


8. Trust Barrier

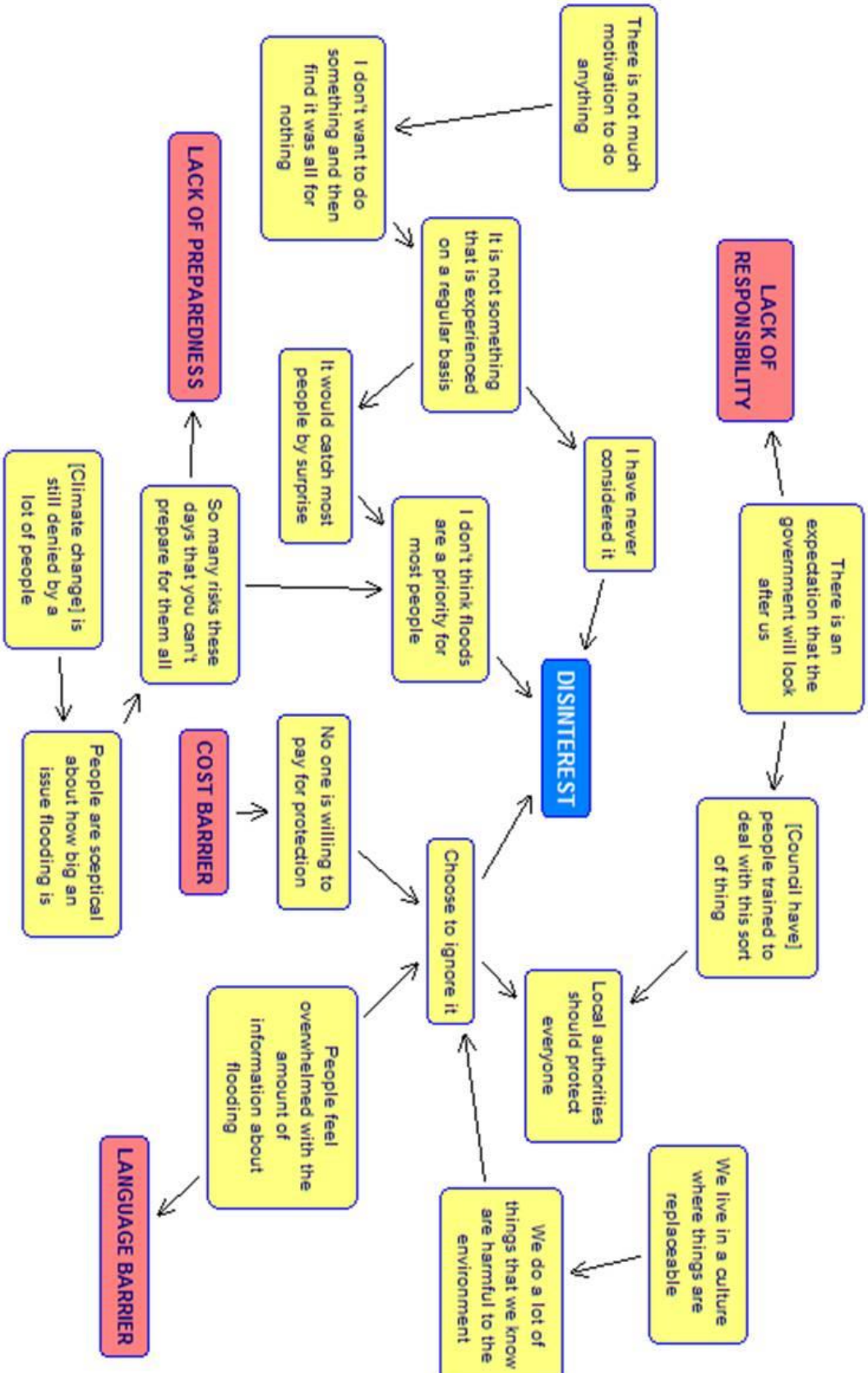


Appendix 28: Cognitive Maps of the Remaining 7 Themes for Digbeth Householders

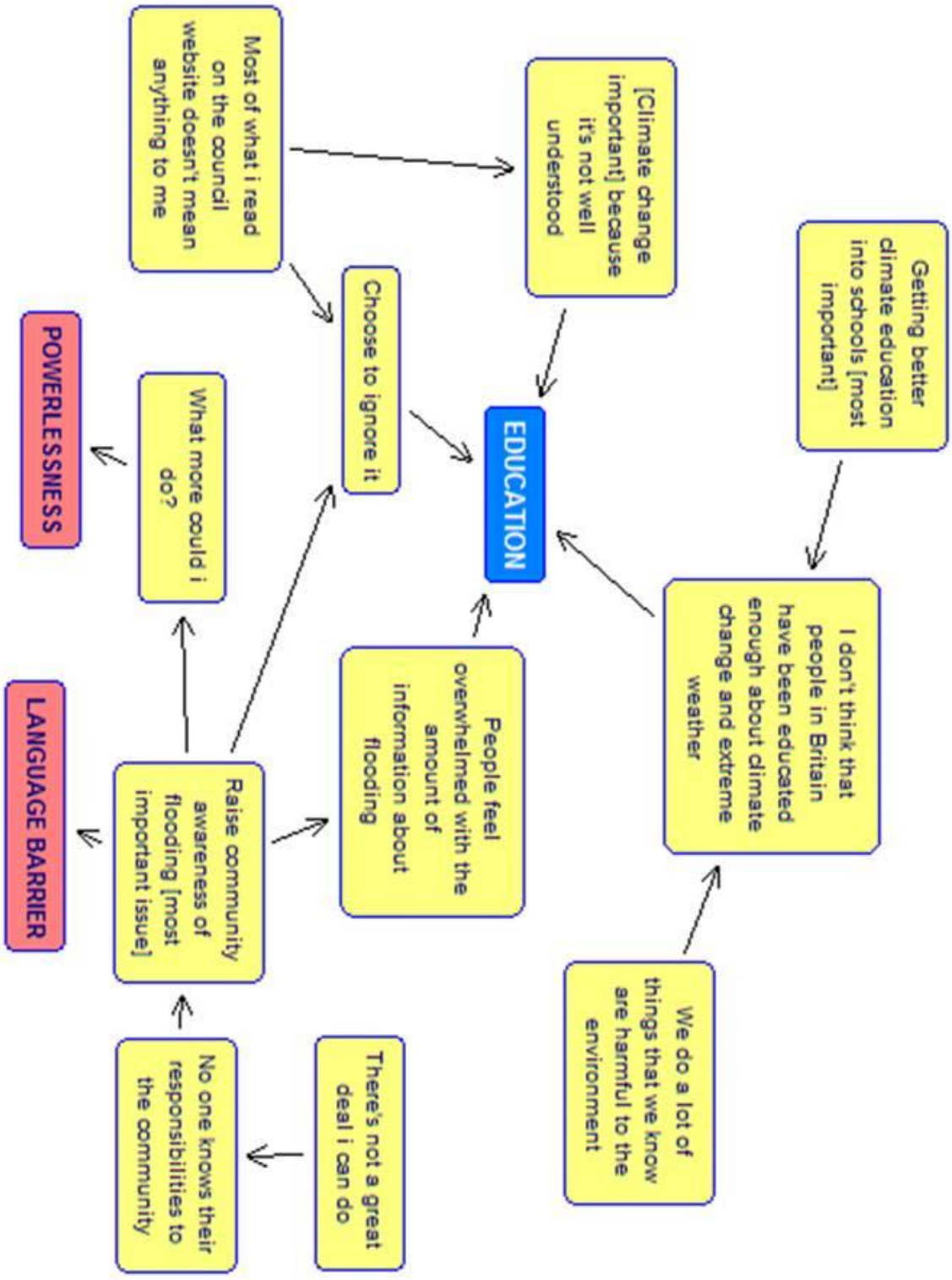
1. Powerlessness



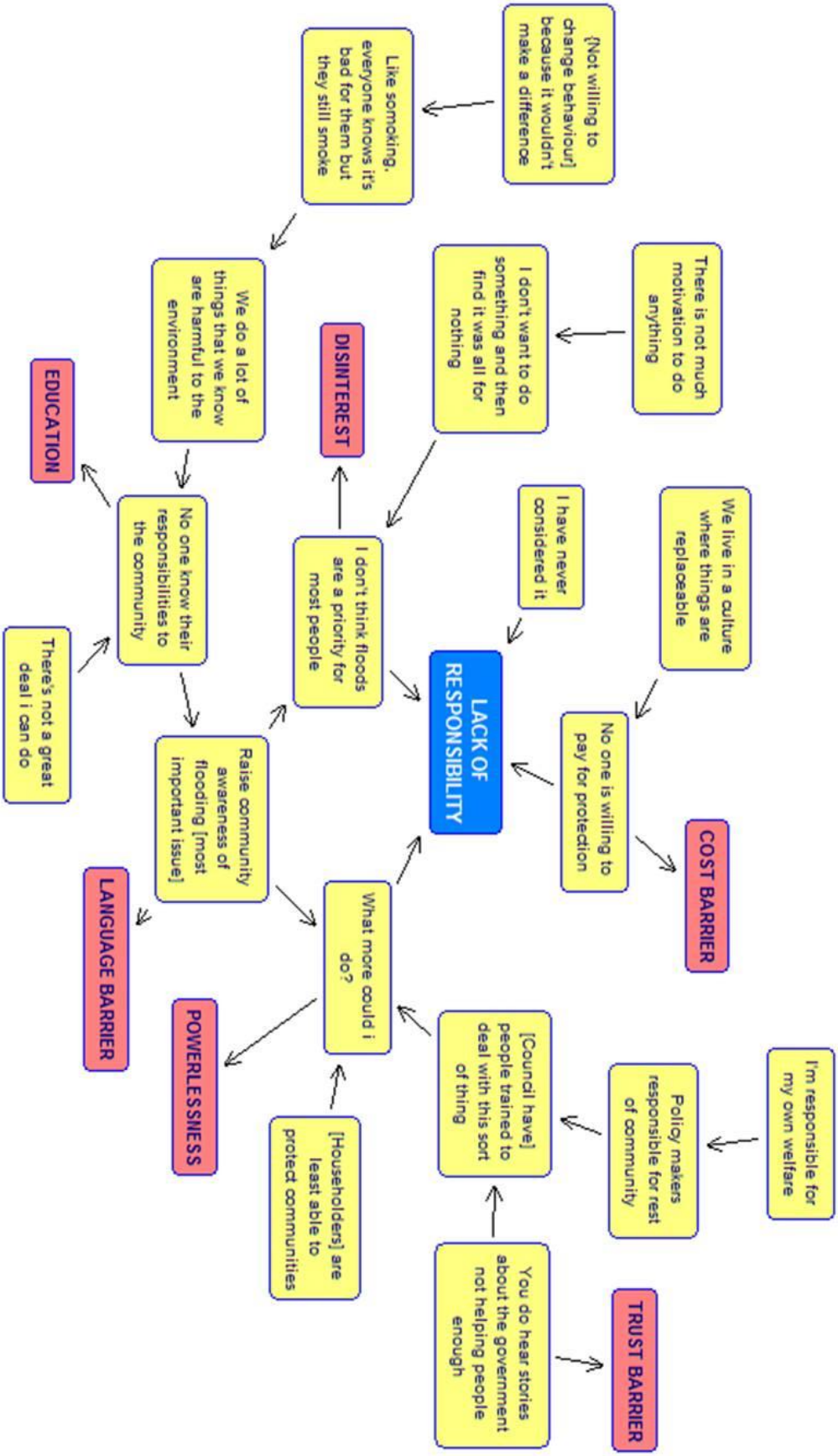
2. Disinterest



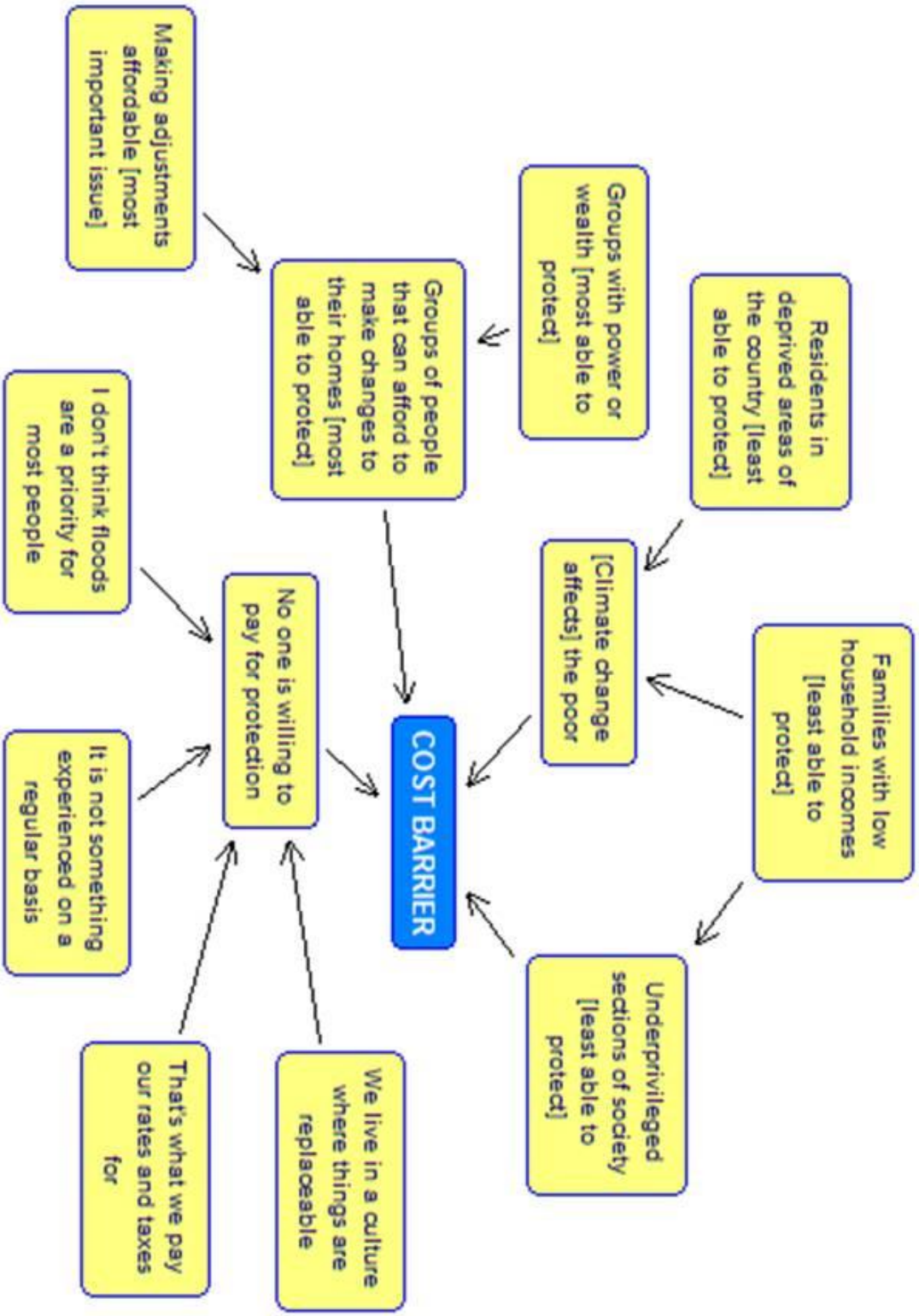
3.Education


Most of what i read on the council website doesn't mean anything to me
[Climate change important] because it's not well understood
Getting better climate education into schools [most important]
Choose to ignore it
EDUCATION
POWERLESSNESS
What more could i do?
I don't think that people in Britain have been educated enough about climate change and extreme weather
People feel overwhelmed with the amount of information about flooding
LANGUAGE BARRIER
Raise community awareness of flooding [most important issue]
We do a lot of things that we know are harmful to the environment
No one knows their responsibilities to the community
There's not a great deal i can do

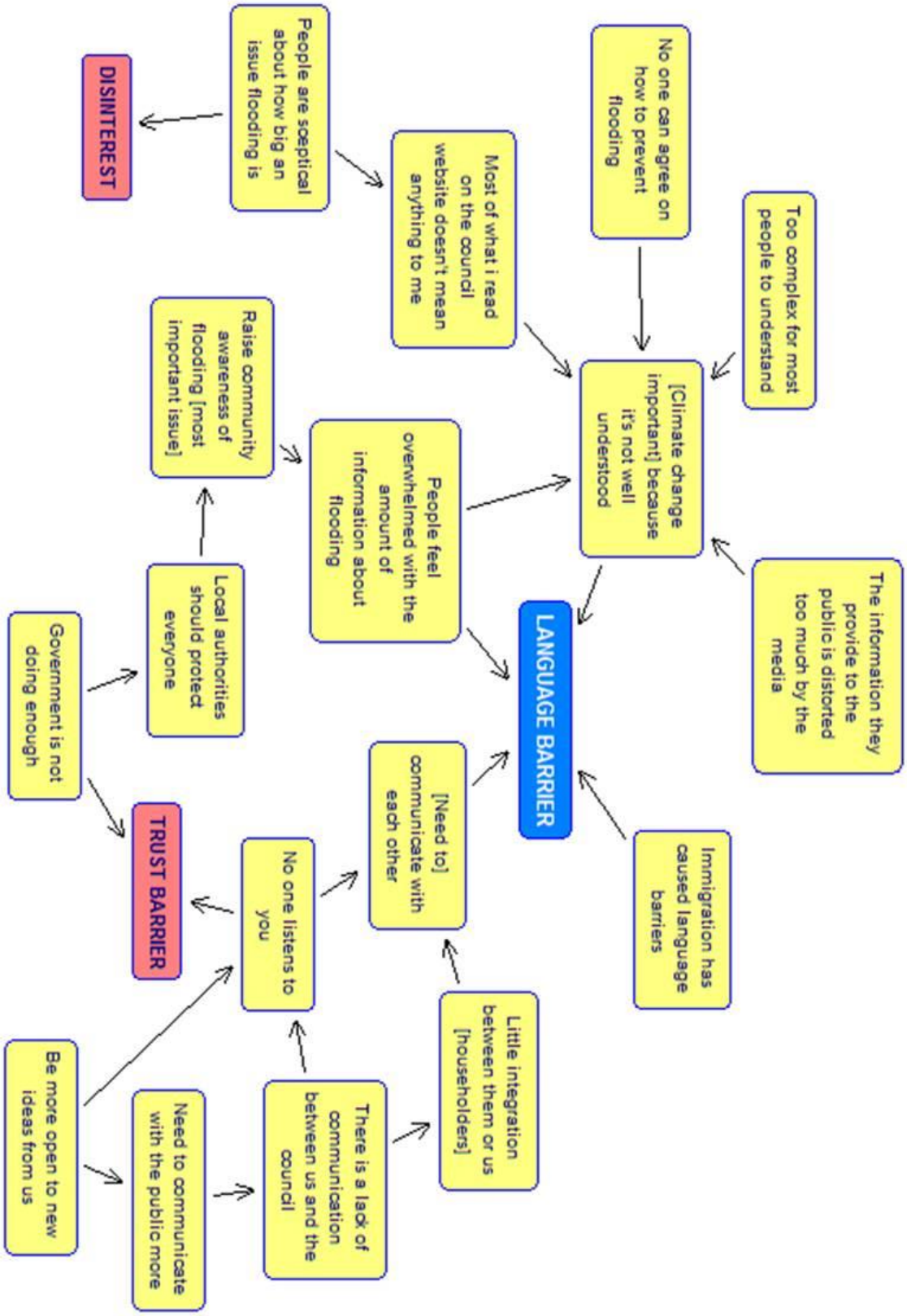
4. Lack of Responsibility



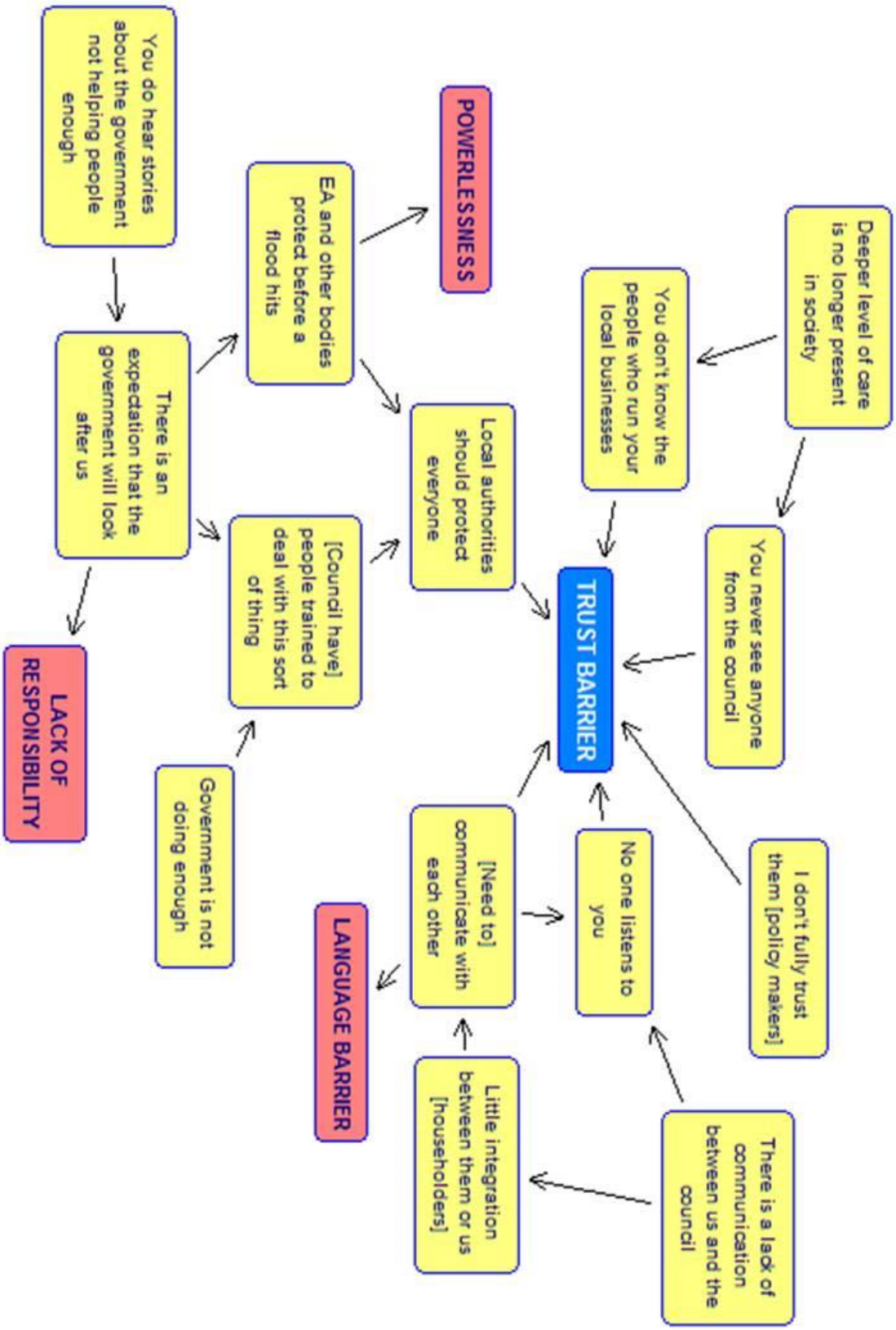
5. Cost Barrier



6. Language Barrier

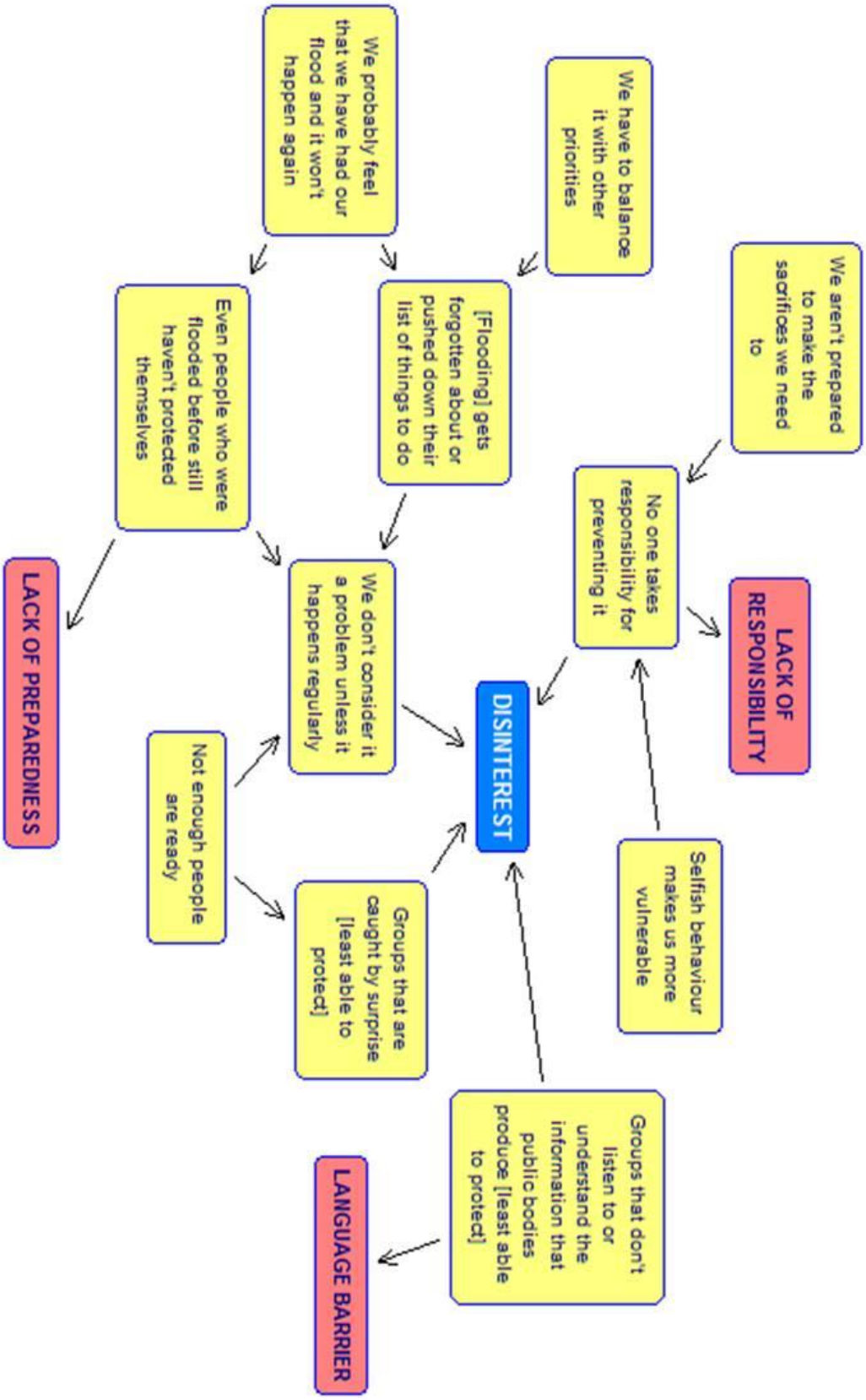


7. Trust Barrier

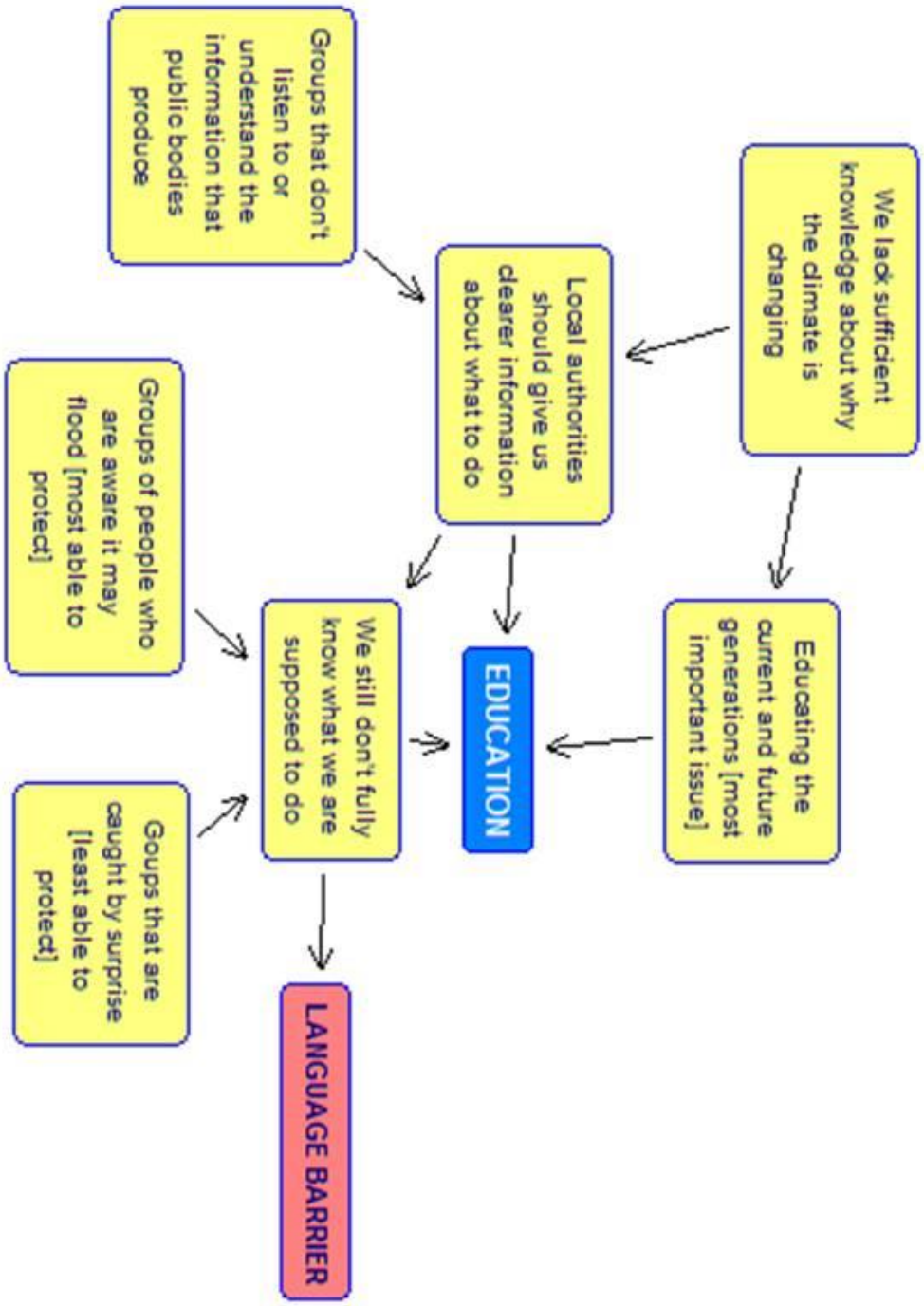


Appendix 29: Cognitive Maps of the Remaining 8 Themes for Witton and Selly Park SMEs

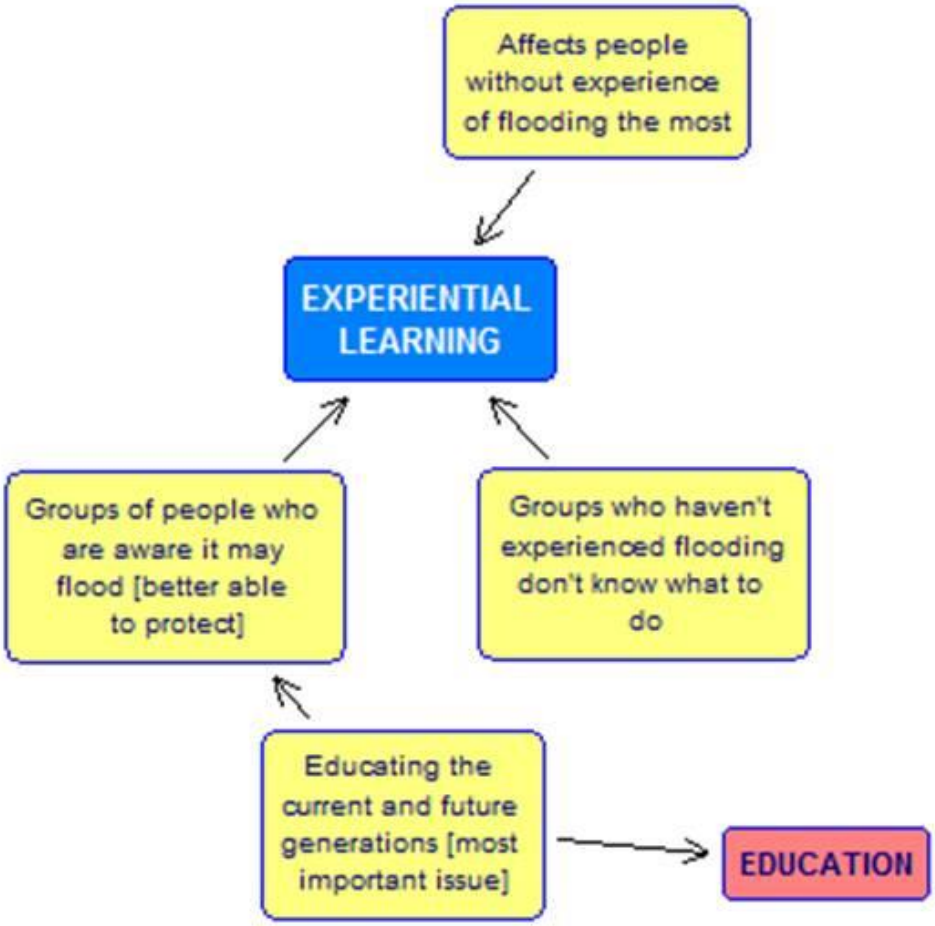
1. Disinterest



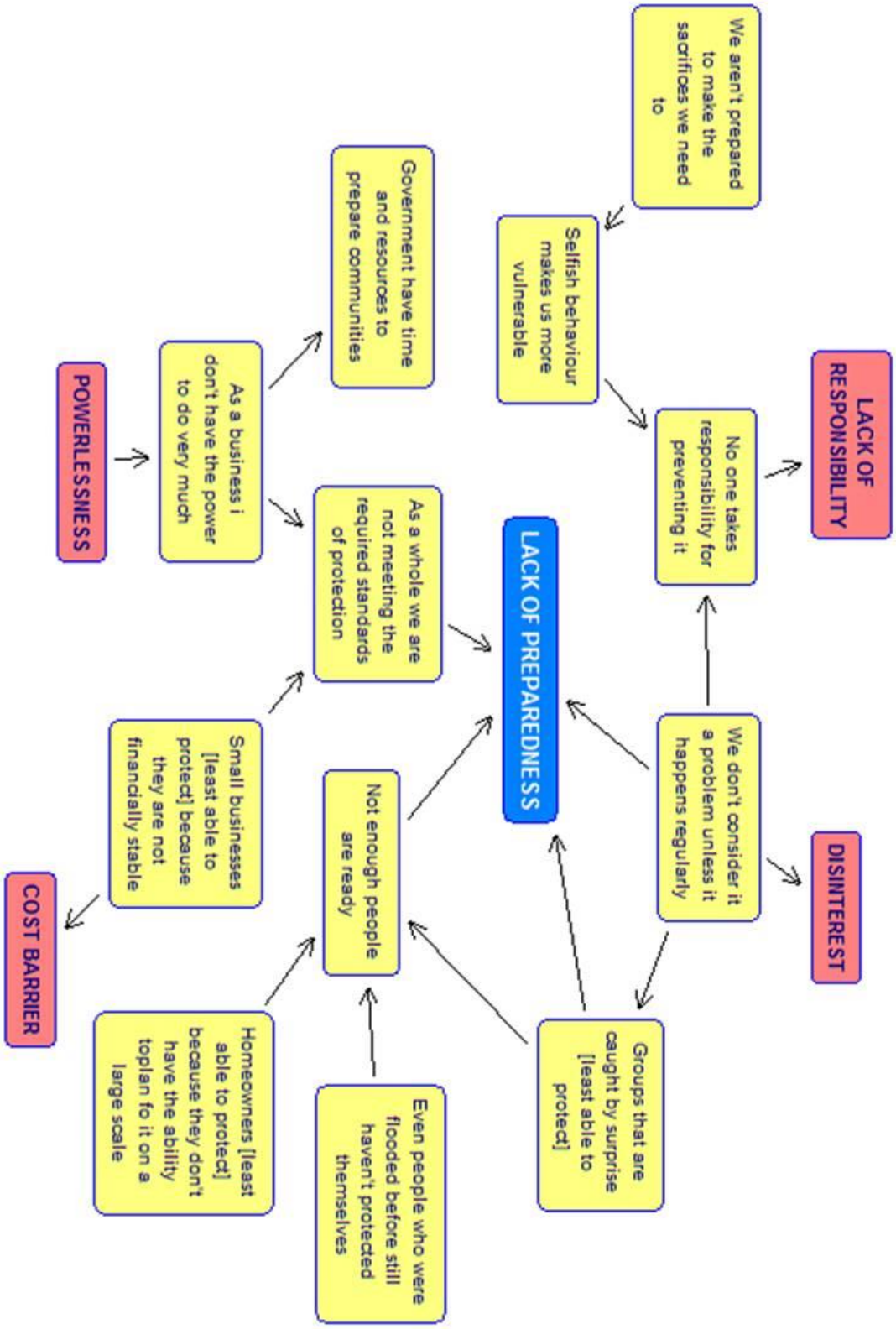
2. Education


We lack sufficient knowledge about why the climate is changing
Groups that don't listen to or understand the information that public bodies produce
Local authorities should give us clearer information about what to do
Educating the current and future generations [most important issue]
Groups of people who are aware it may flood [most able to protect]
We still don't fully know what we are supposed to do
EDUCATION
Goups that are caught by surprise [least able to protect]
LANGUAGE BARRIER

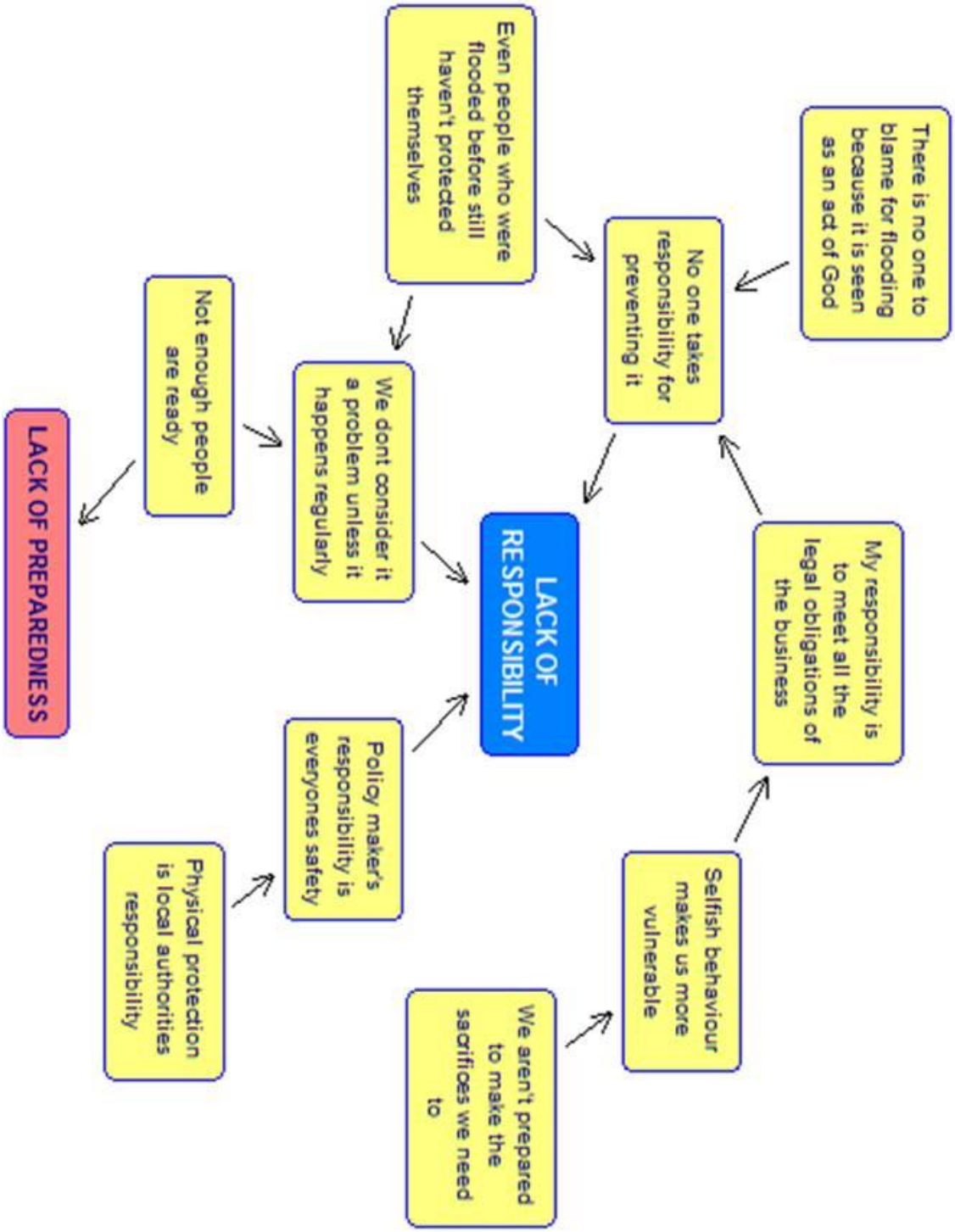
3. Experiential Learning



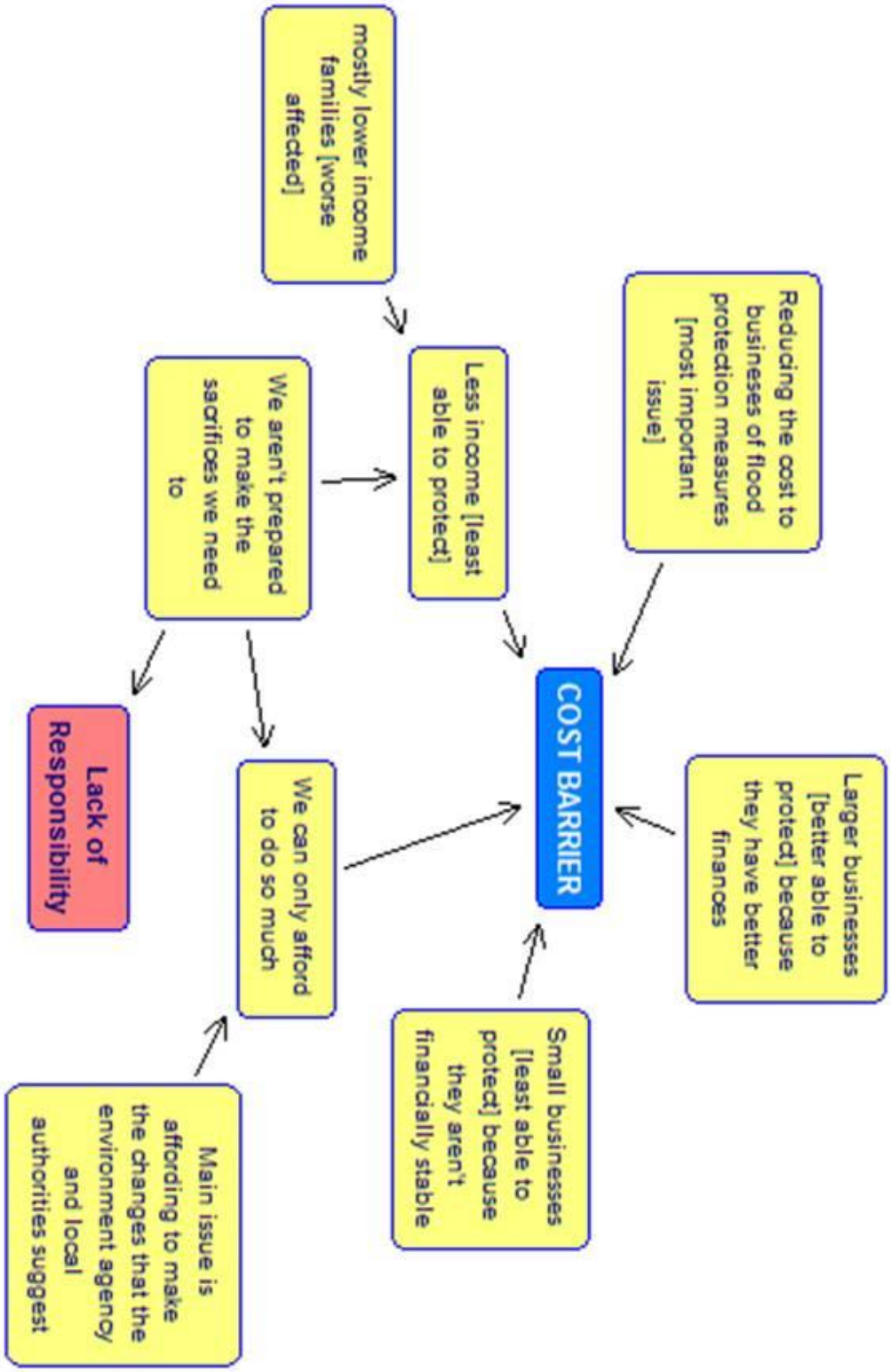
4. Lack of Preparedness



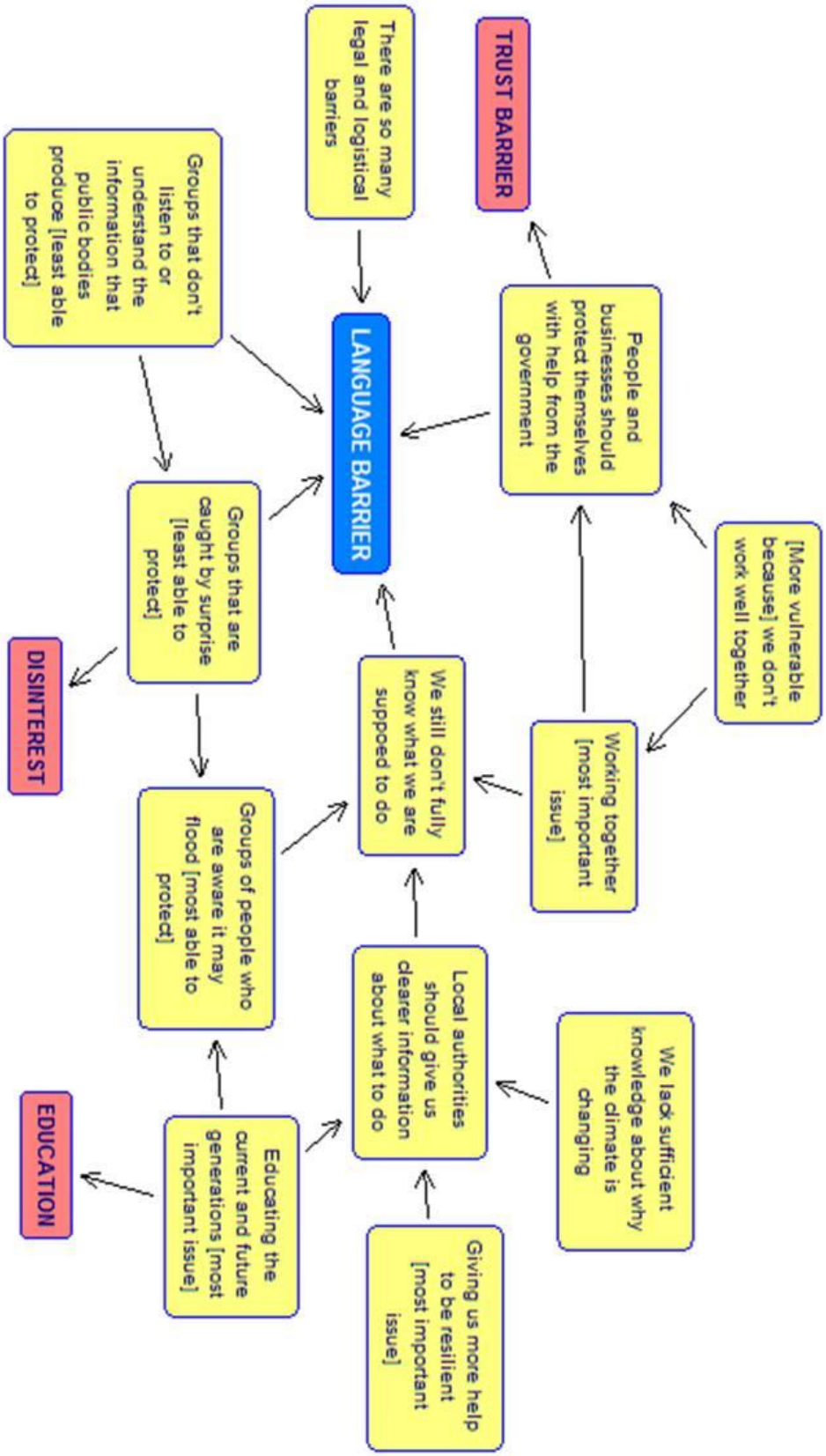
5. Lack of Responsibility



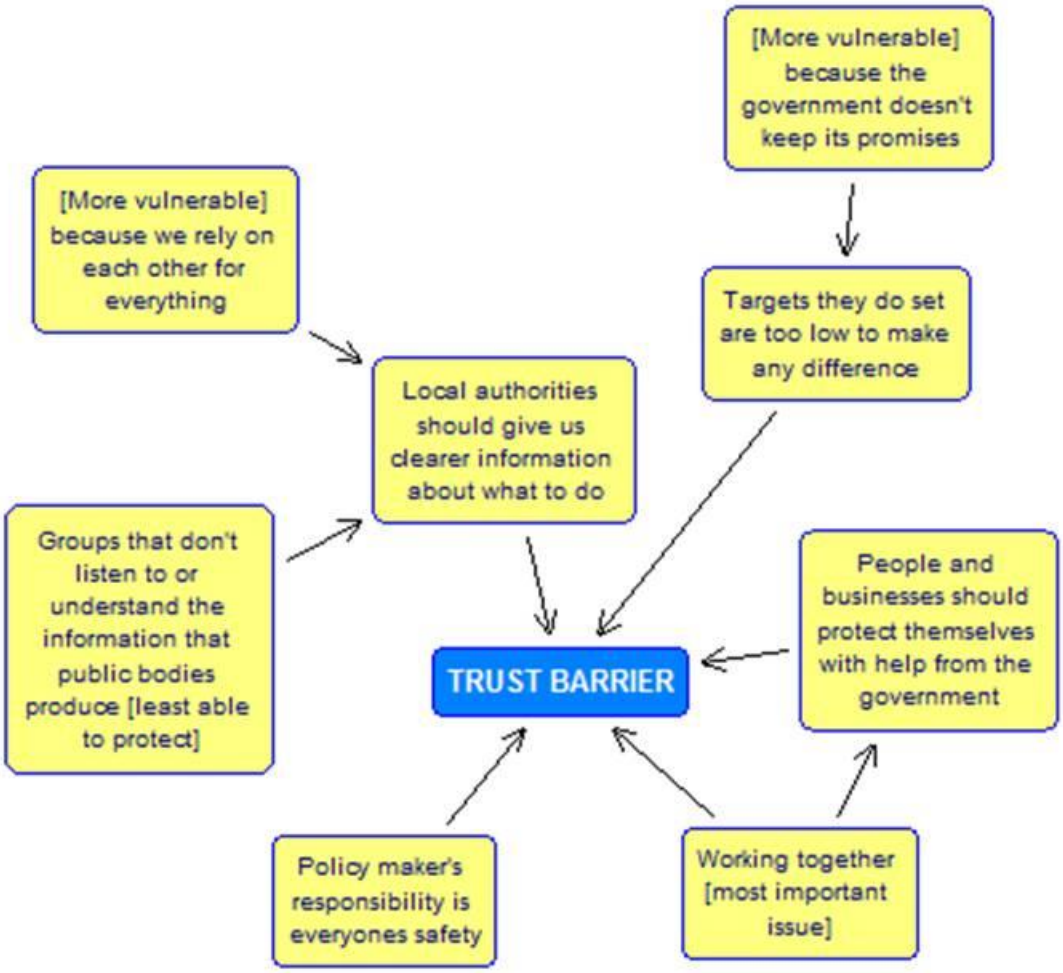
6. Cost Barrier



7. Language Barrier

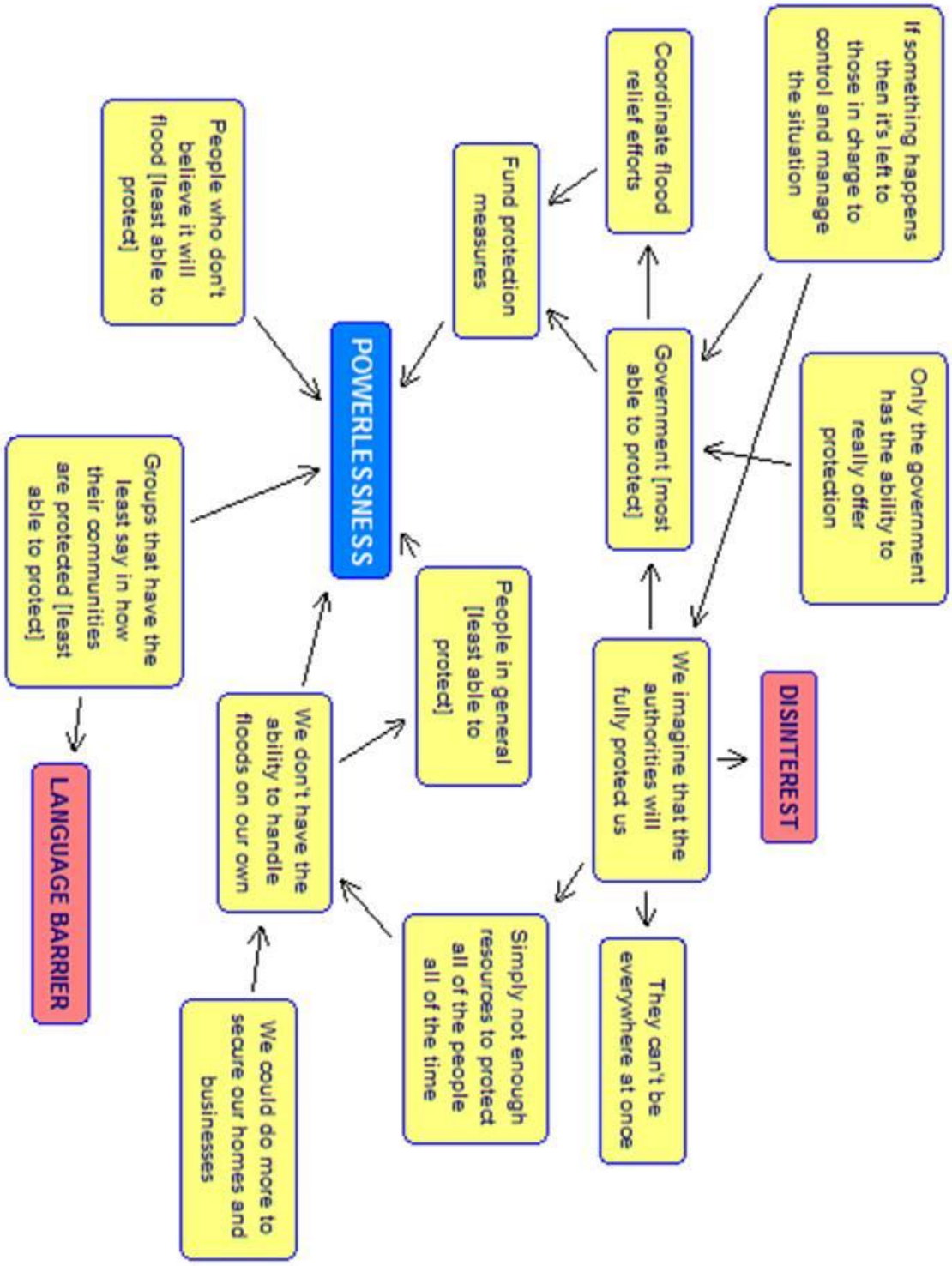


8. Trust Barrier

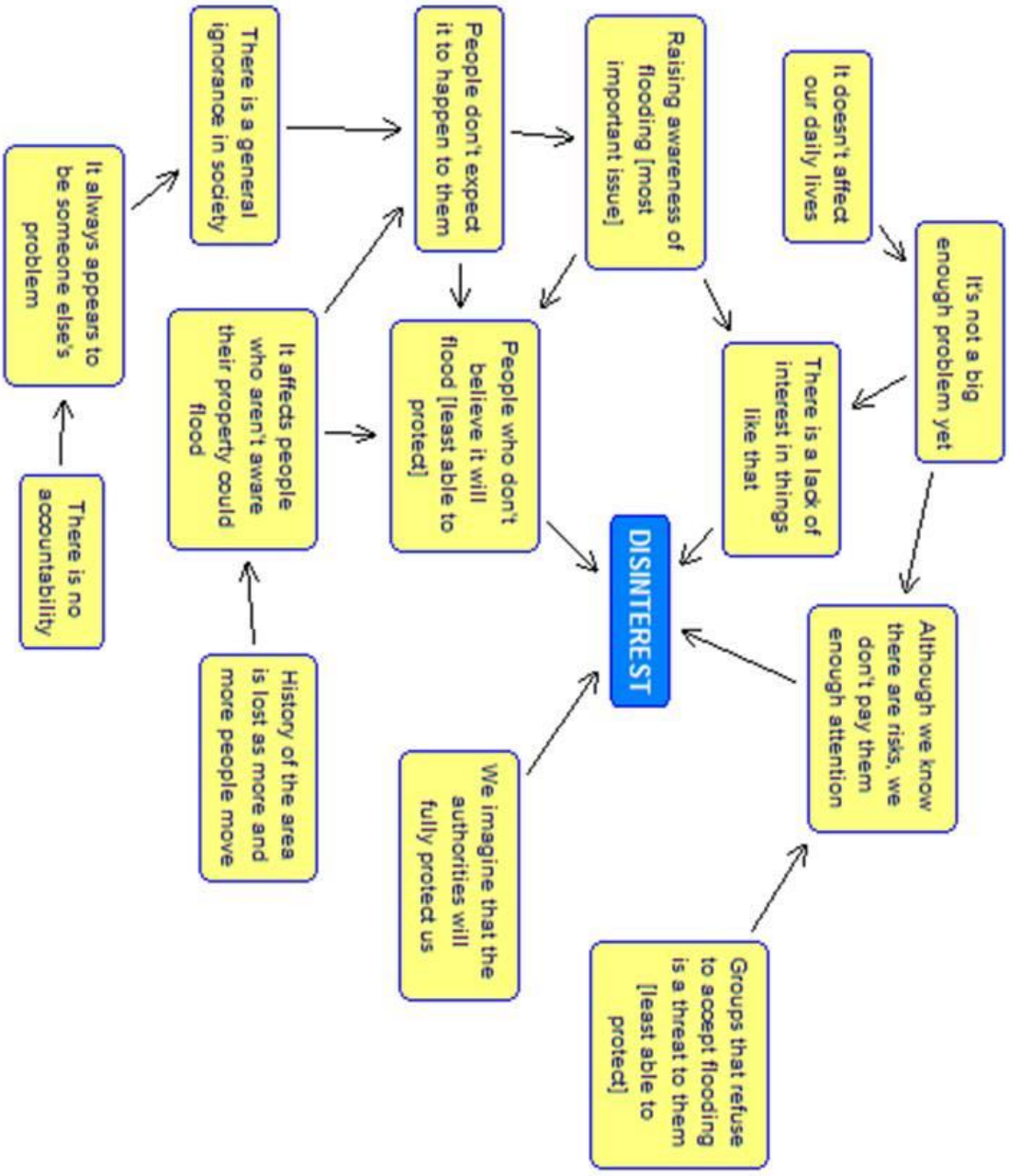


Appendix 30: Cognitive Maps of the Remaining 4 Themes for Digbeth SMEs

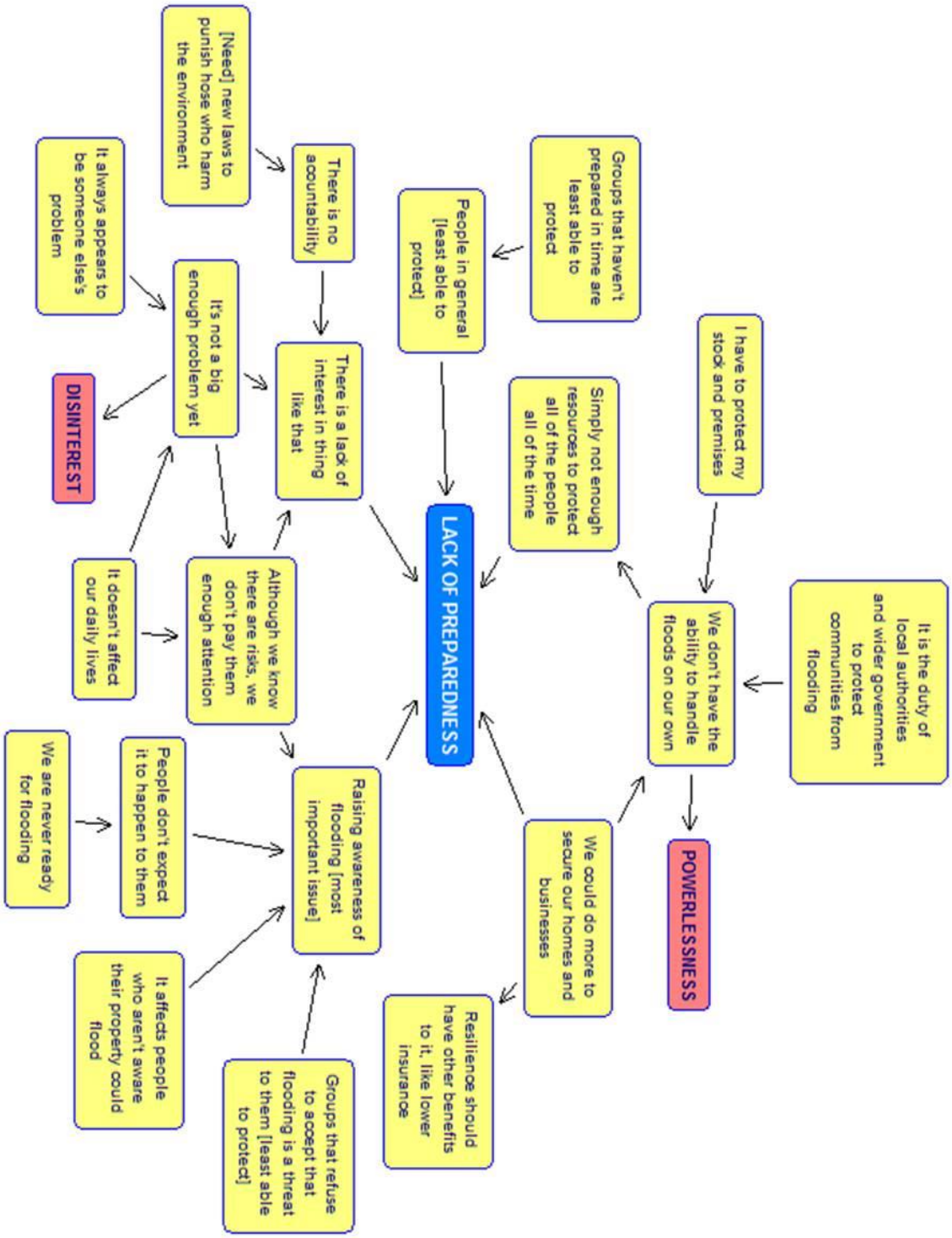
1. Powerlessness



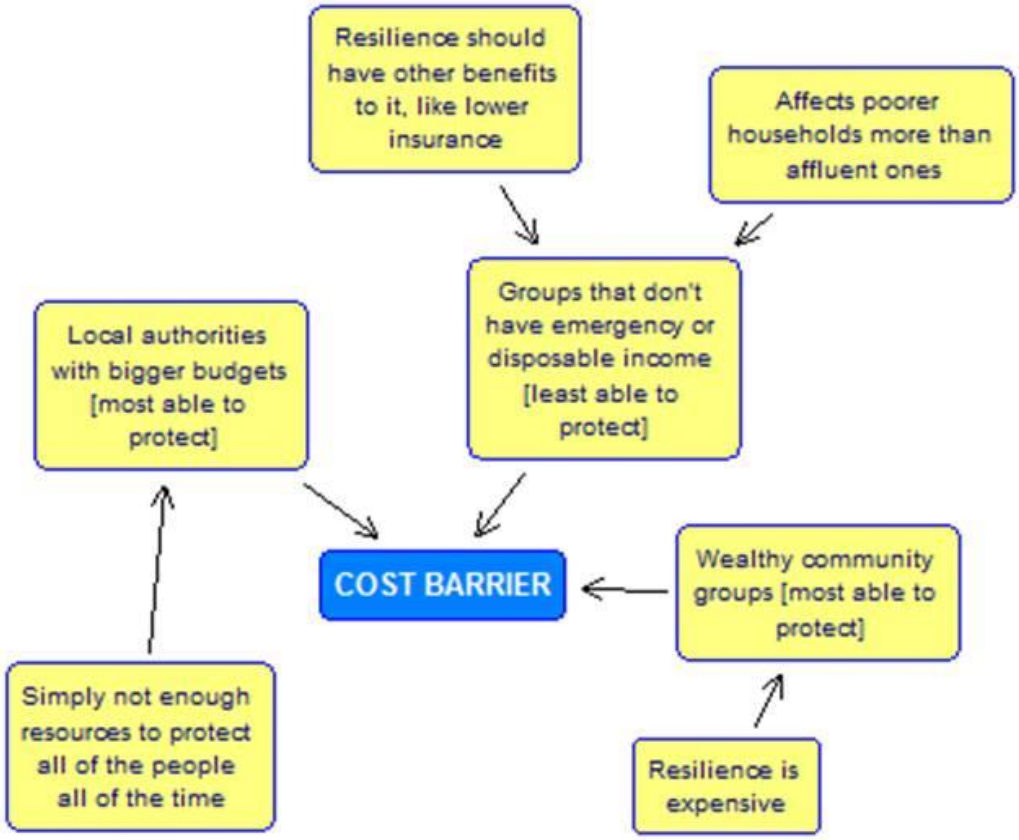
2. Disinterest



3. Lack of Preparedness

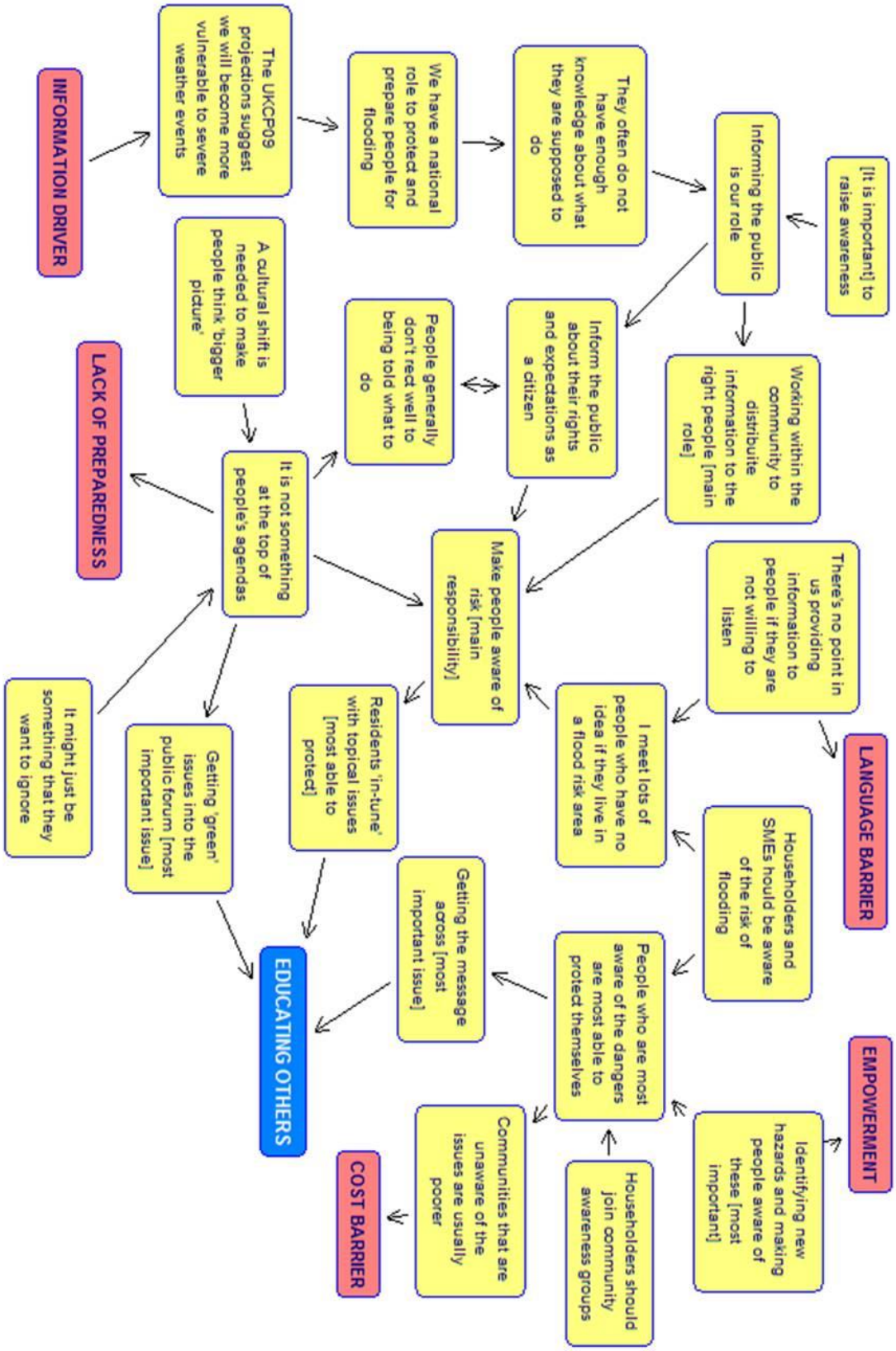


4. Cost Barrier

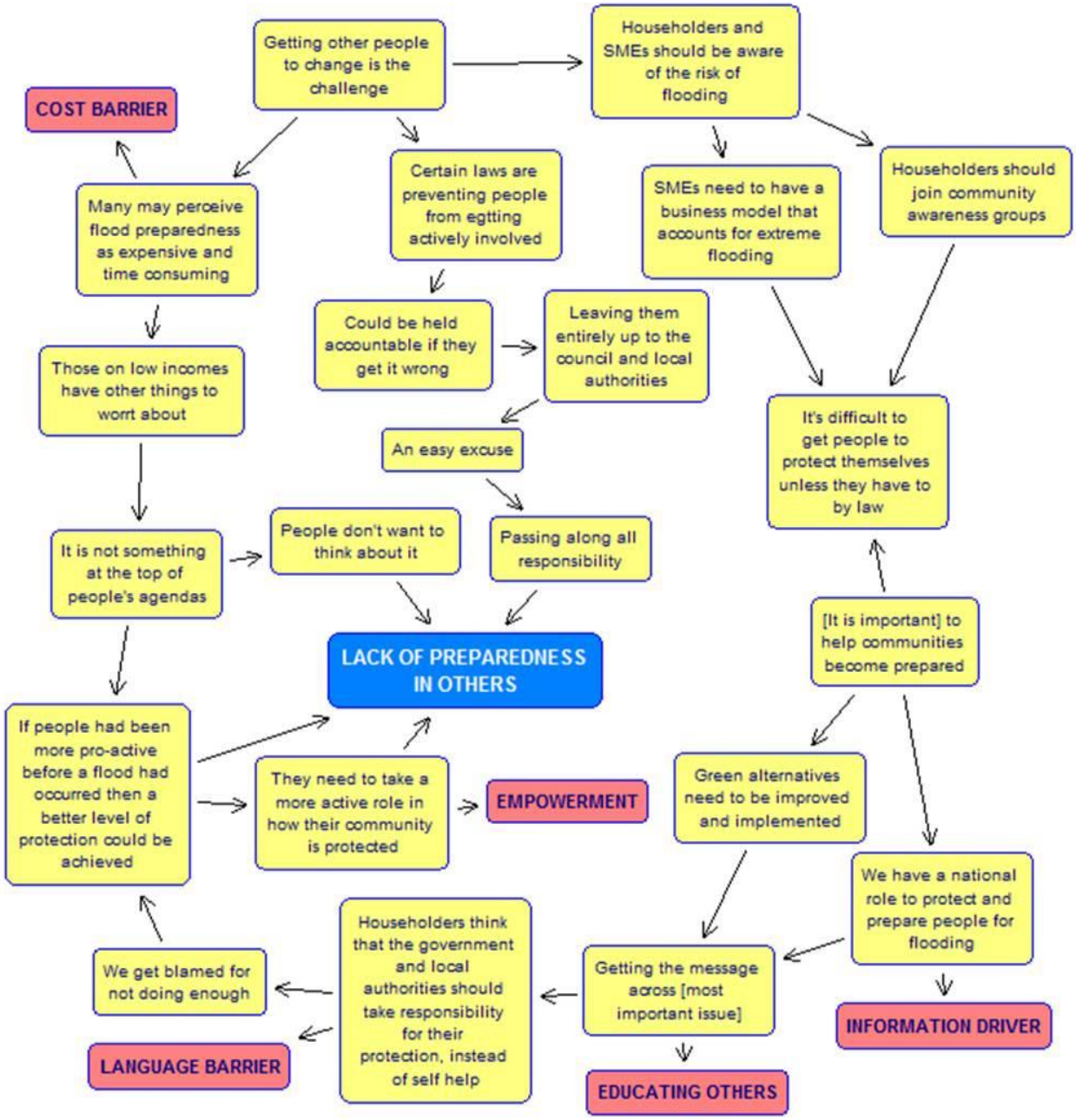


Appendix 31: Cognitive Maps of the Remaining 5 Themes for Birmingham Policy Makers

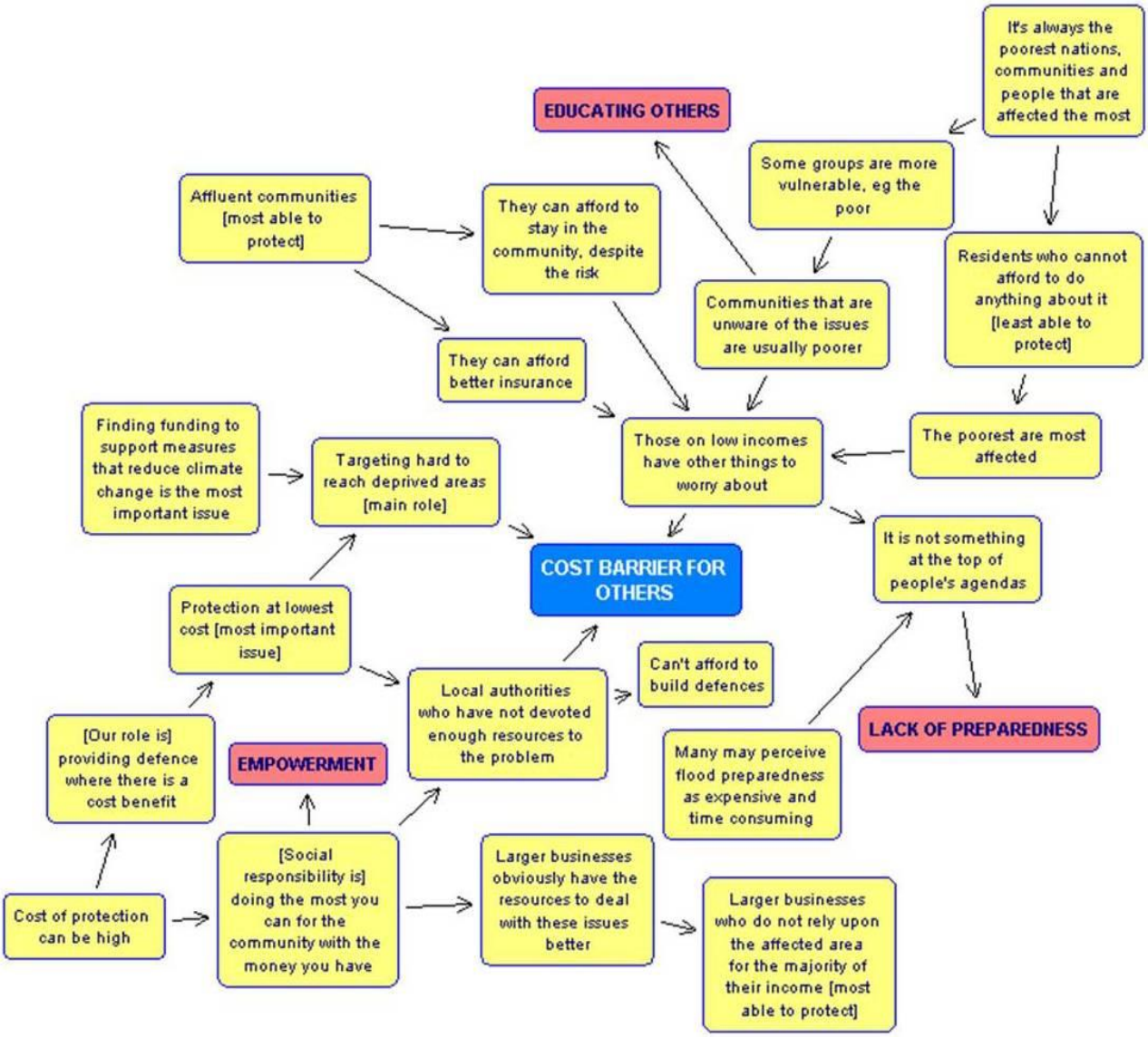
1. Educating Others



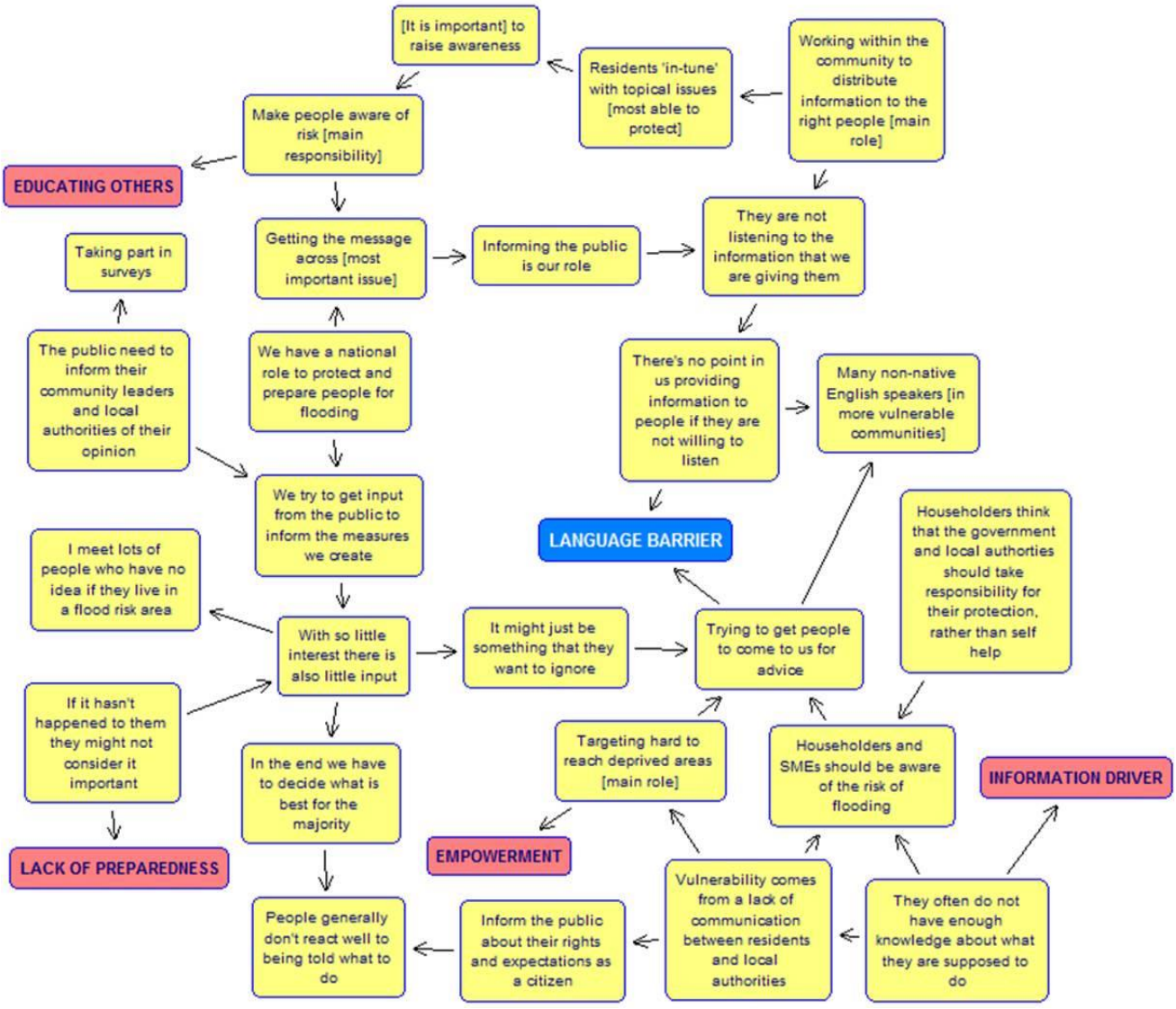
2. Lack of Preparedness in Others



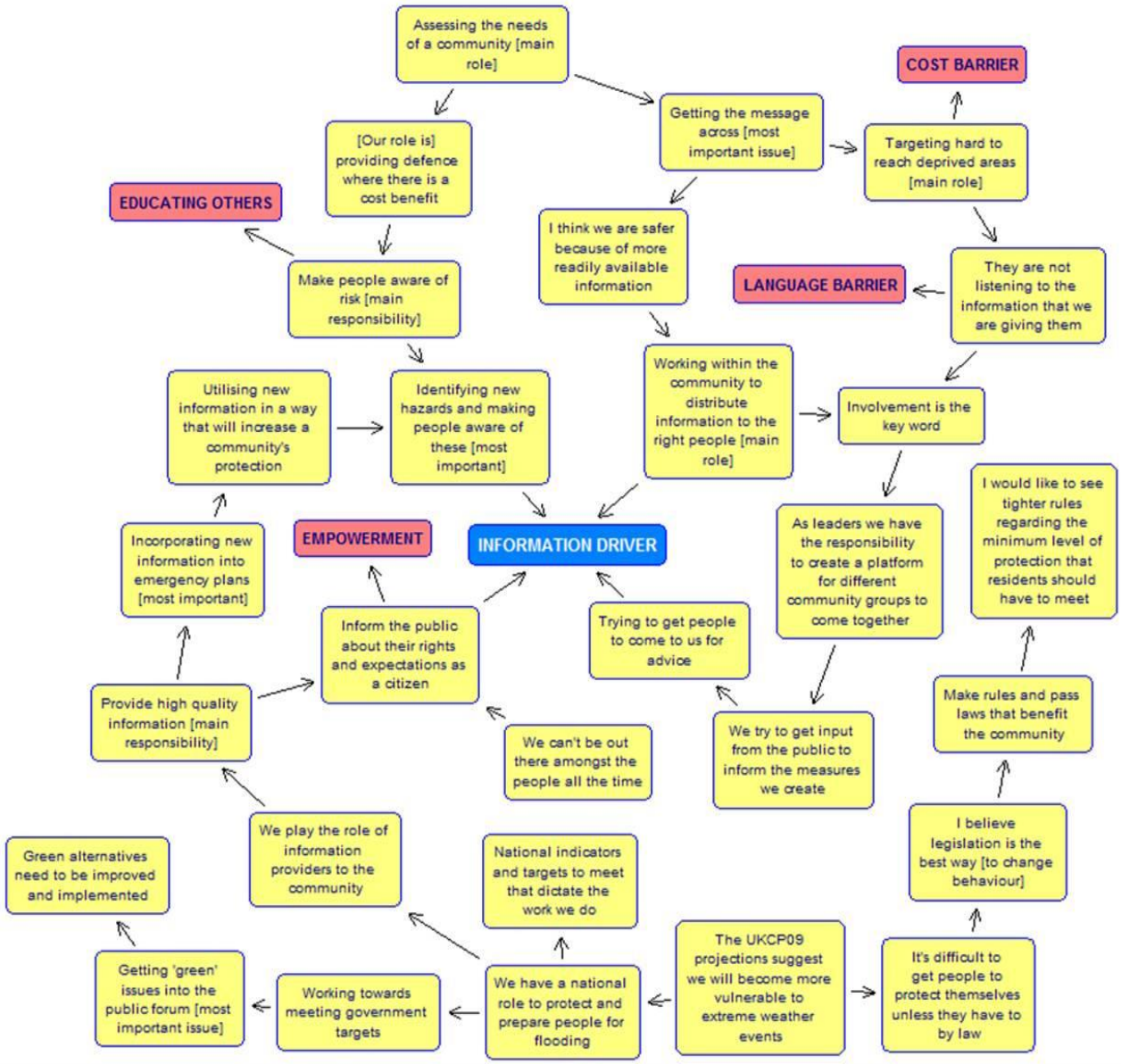
3. Cost Barrier for Others



4. Language Barrier

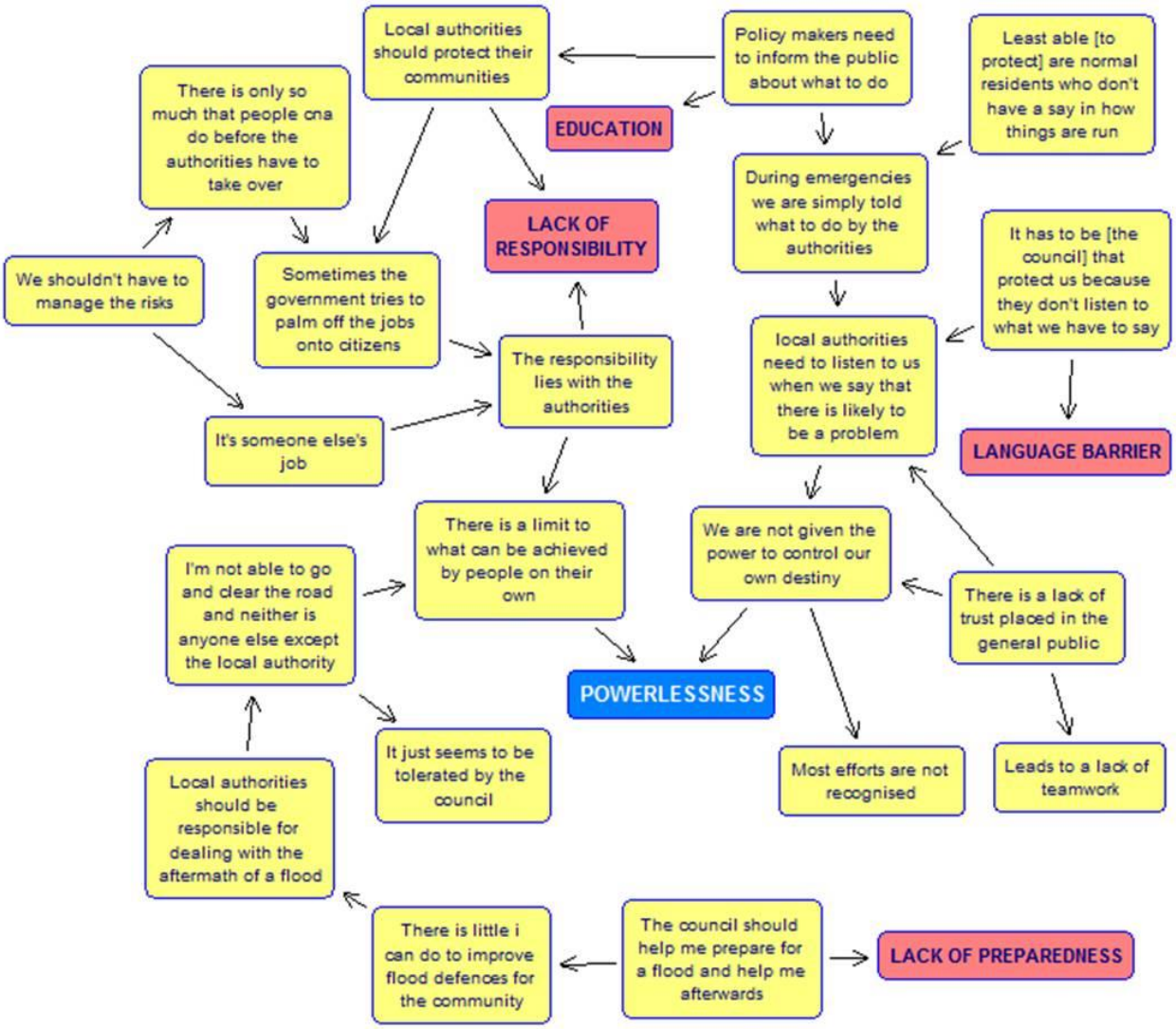


5. Information Driver

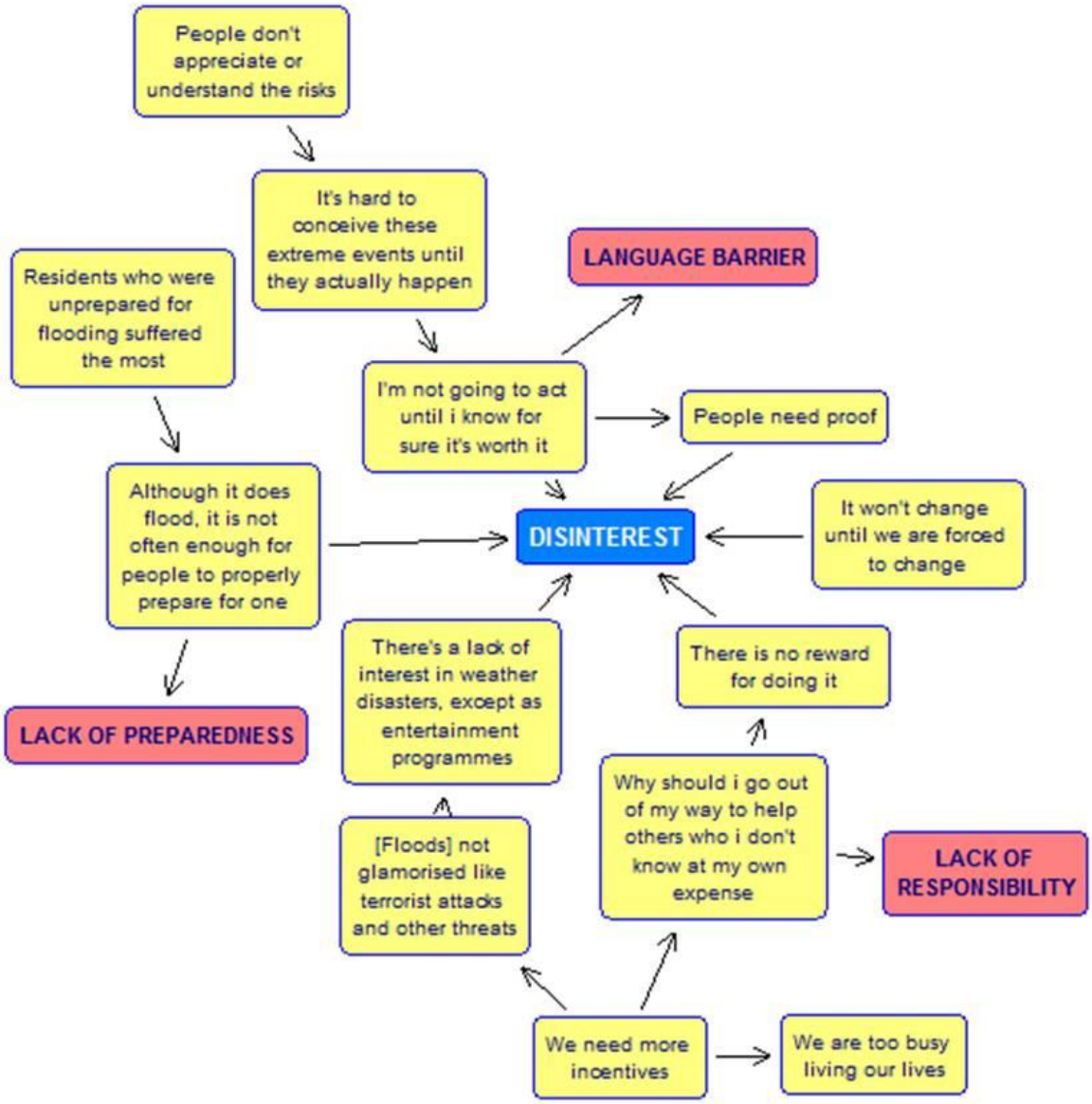


Appendix 32: Cognitive Maps of the Remaining 6 Themes for Thornton Heath Householders

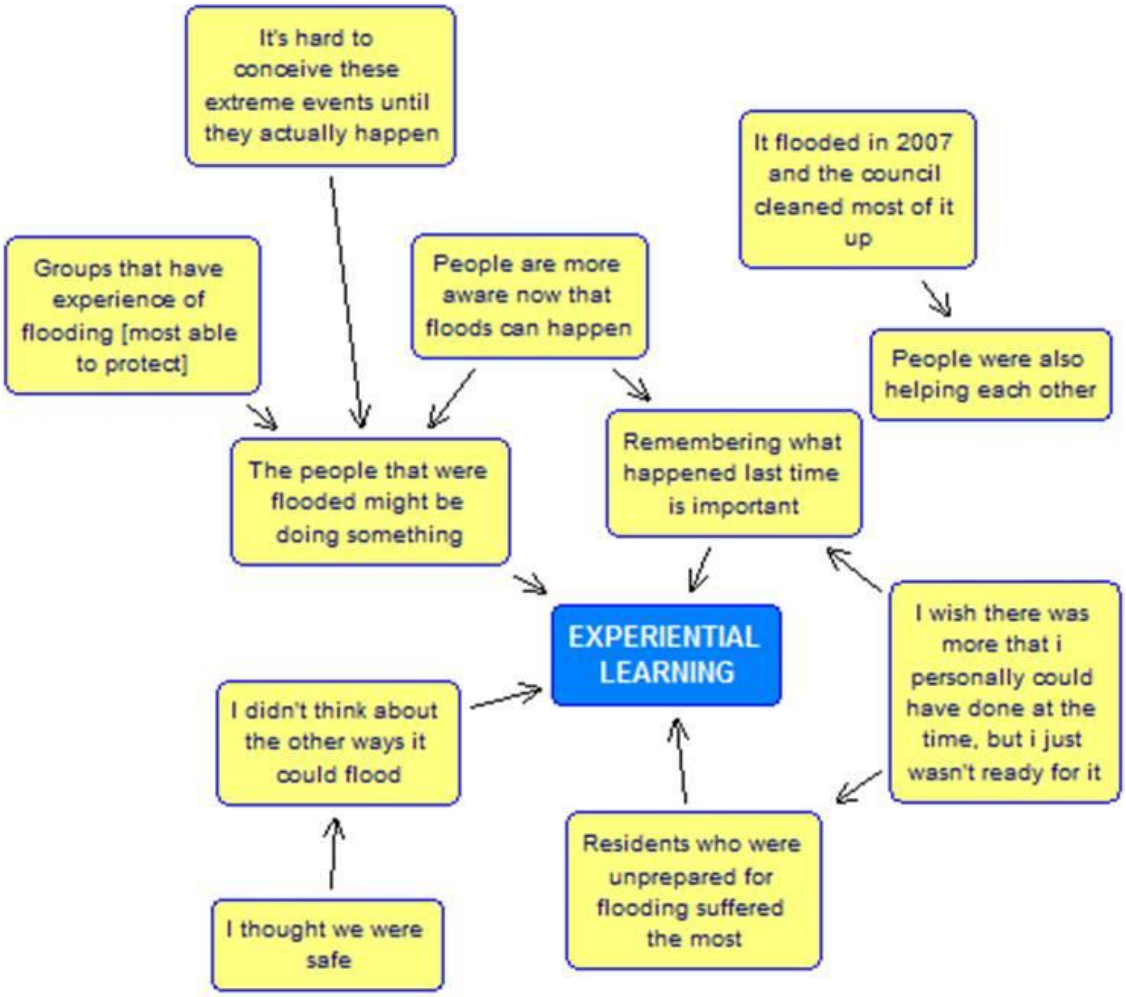
1. Powerlessness



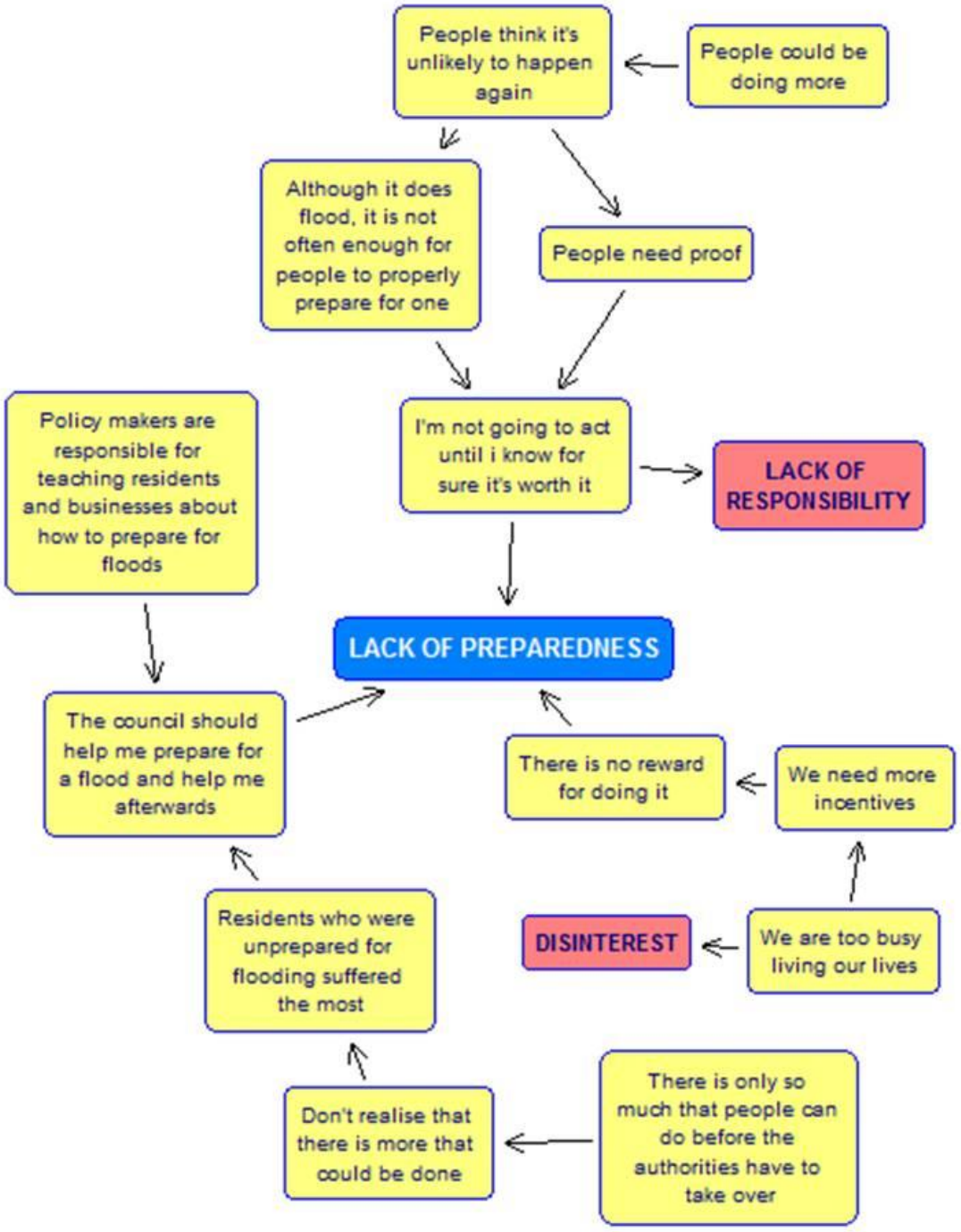
2. Disinterest



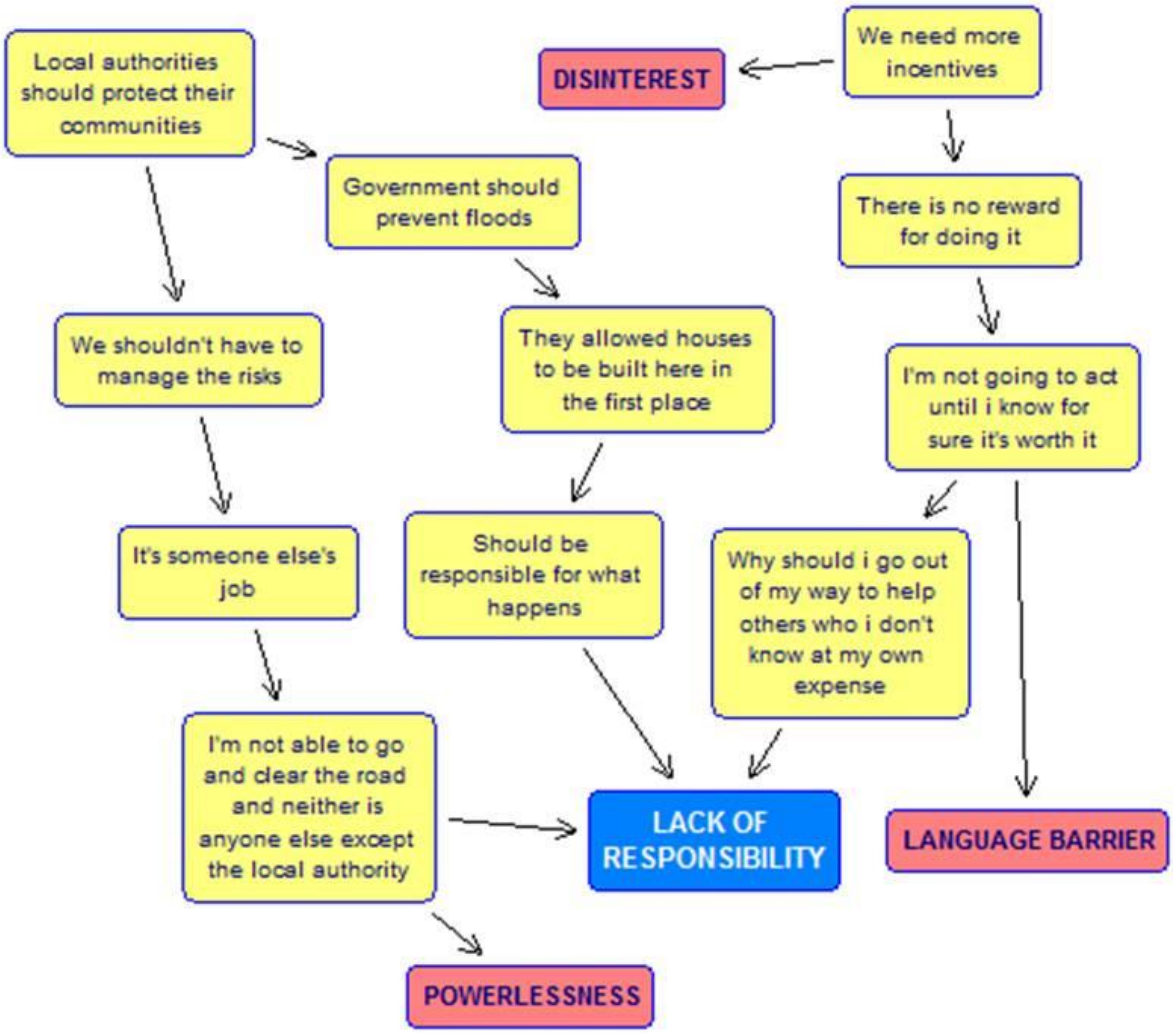
3. Experiential Learning



4. Lack of Preparedness



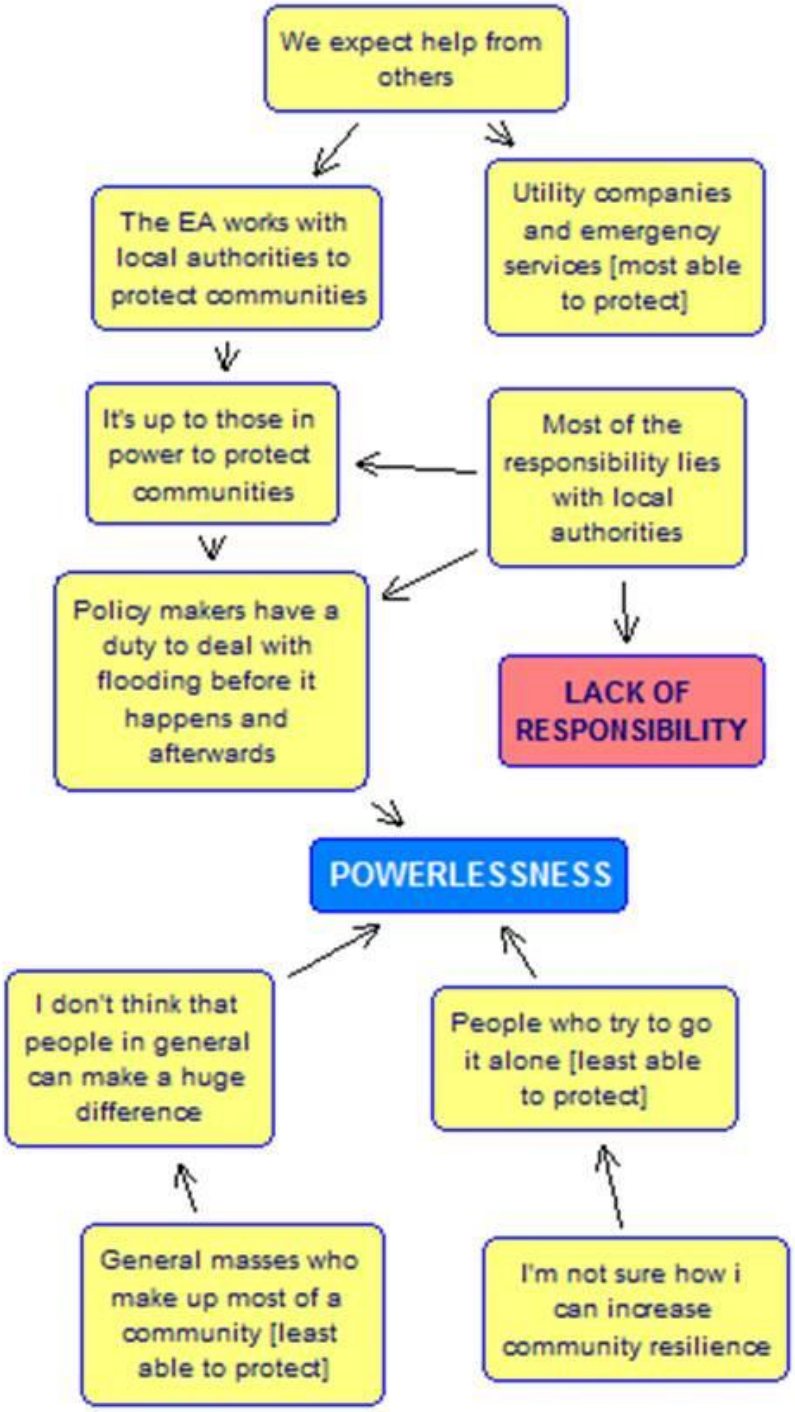
5. Lack of Responsibility



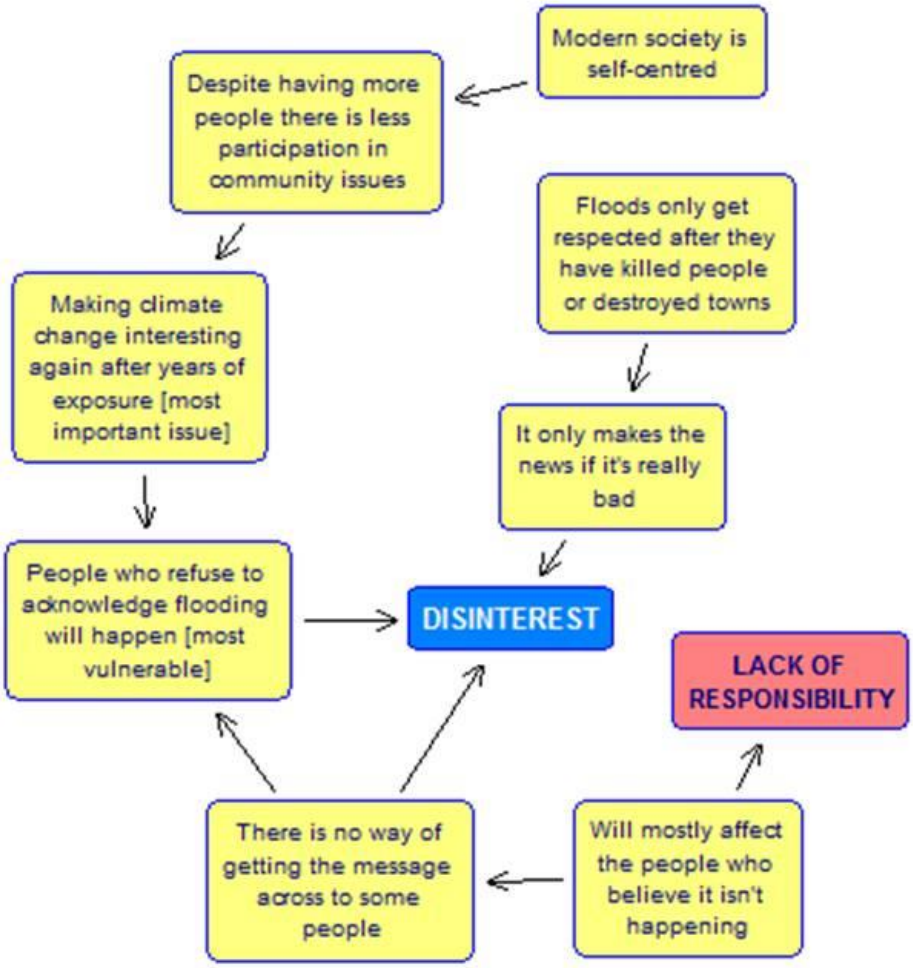
6. Language Barrier

Appendix 33: Cognitive Maps of the Remaining 7 Themes for Thornton Heath SMEs

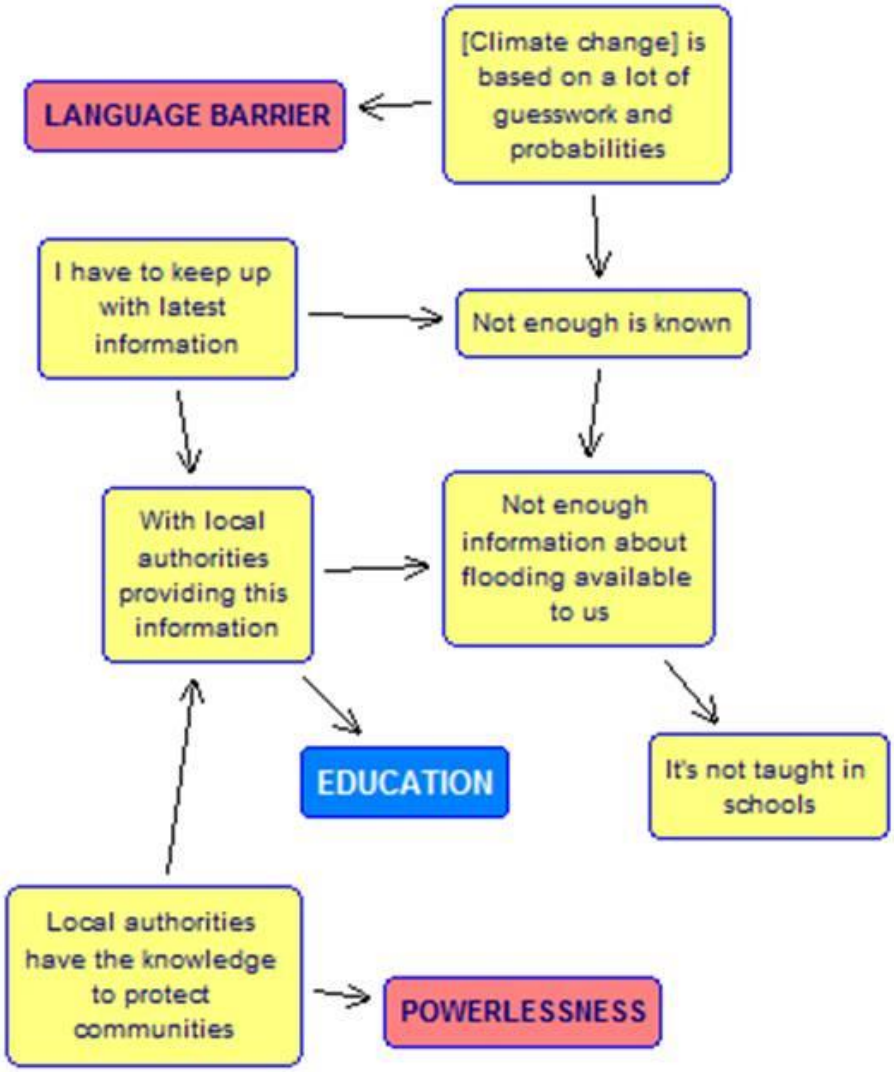
1. Powerlessness



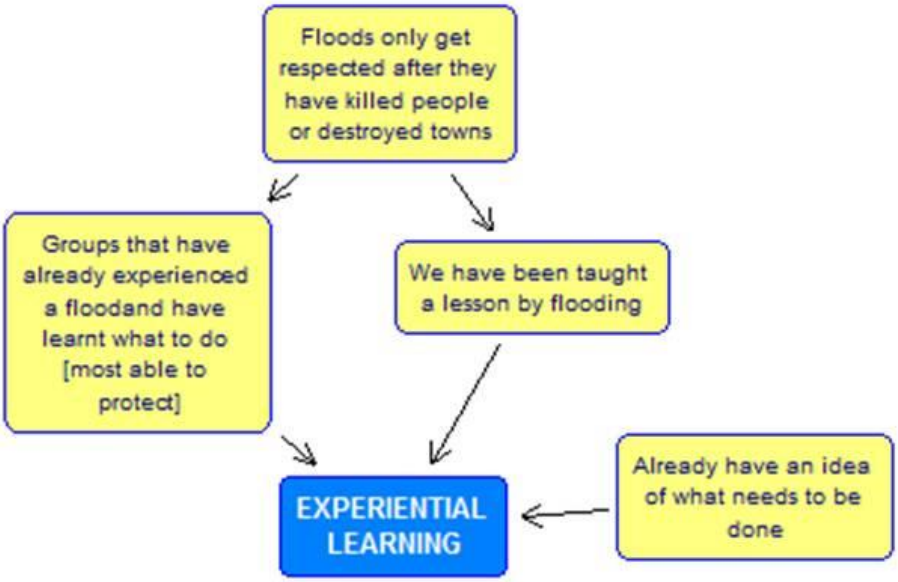
2. Disinterest



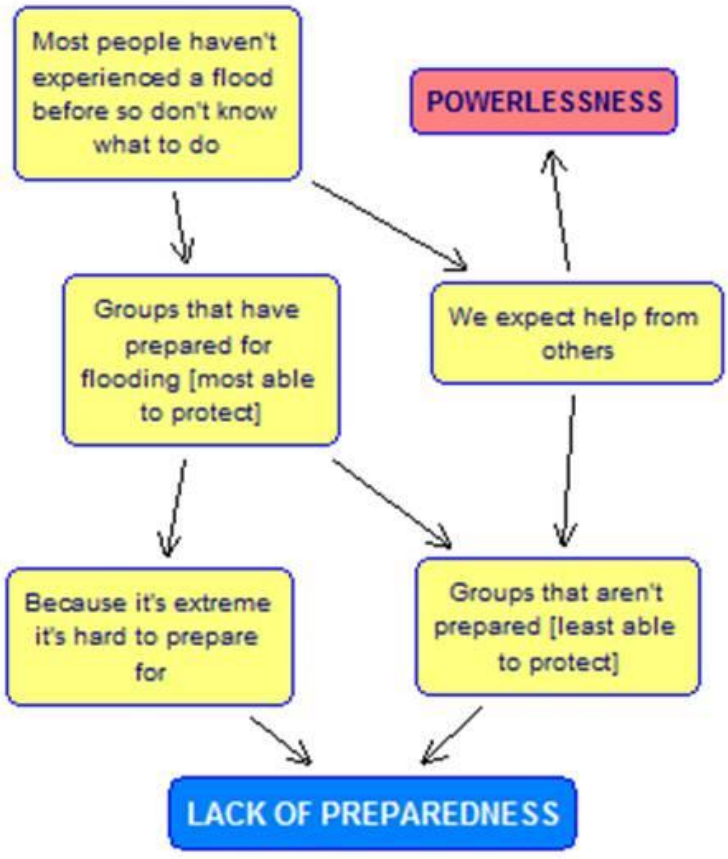
3. Education


[Climate change] is based on a lot of guesswork and probabilities
LANGUAGE BARRIER
I have to keep up with latest information
Not enough is known
With local authorities providing this information
Not enough information about flooding available to us
EDUCATION
It's not taught in schools
Local authorities have the knowledge to protect communities
POWERLESSNESS

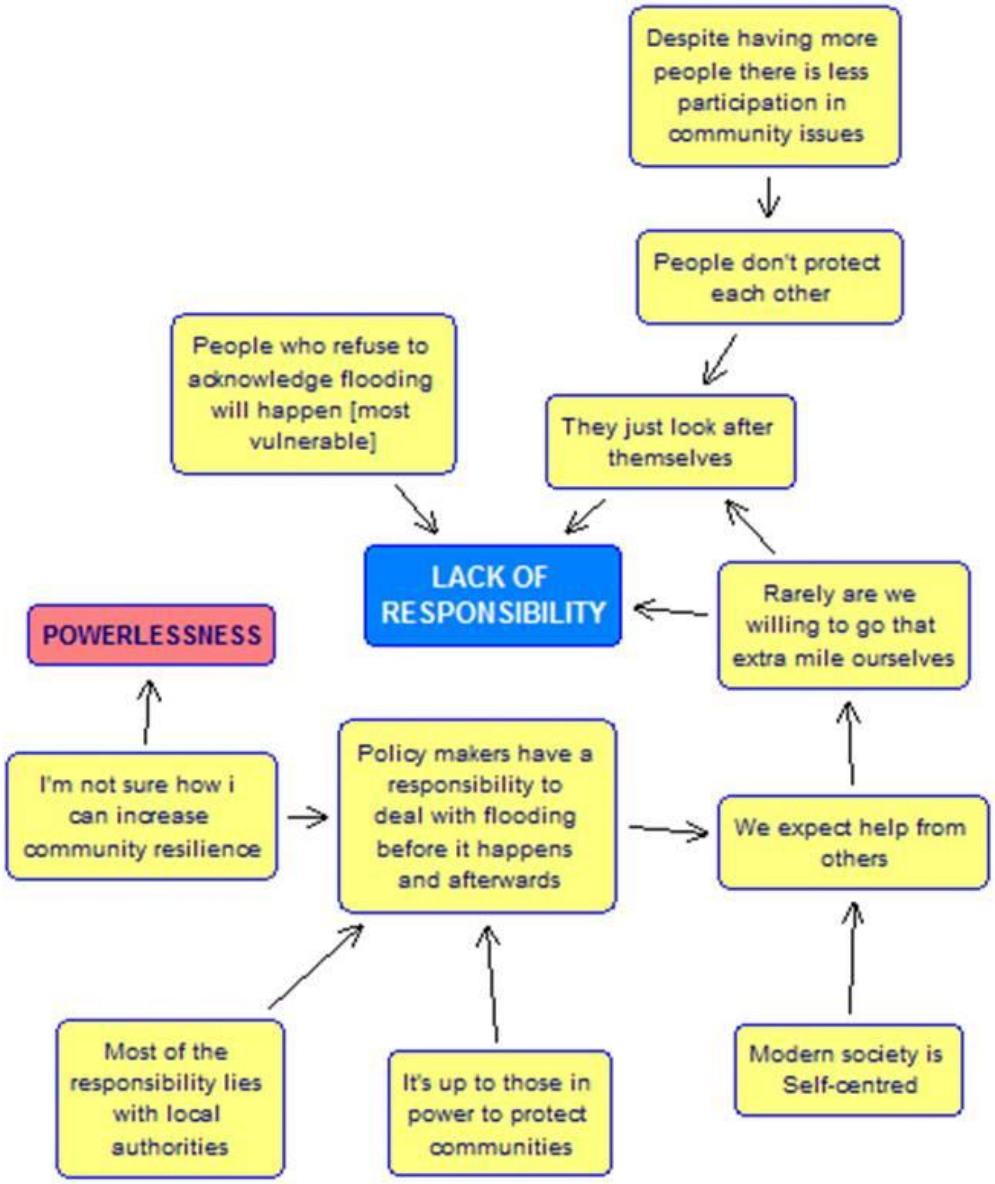
4. Experiential Learning



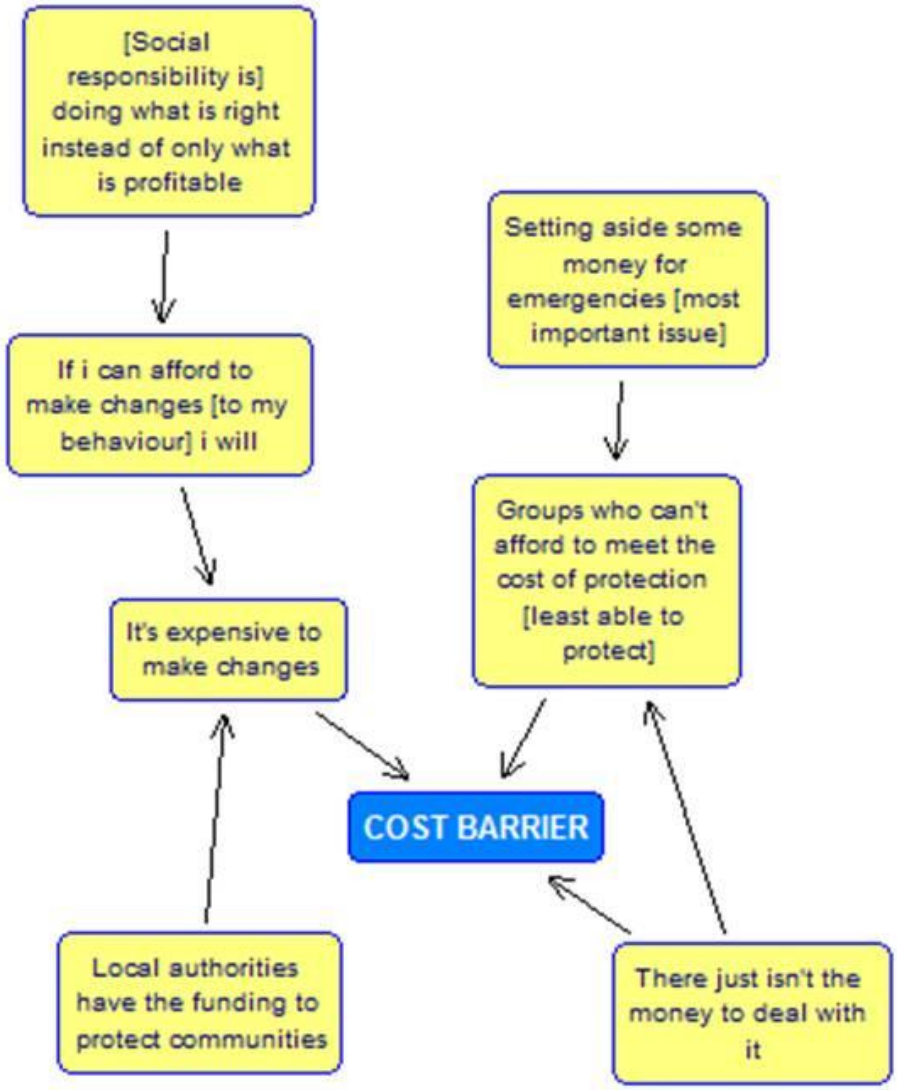
5. Lack of Preparedness



6. Lack of Responsibility

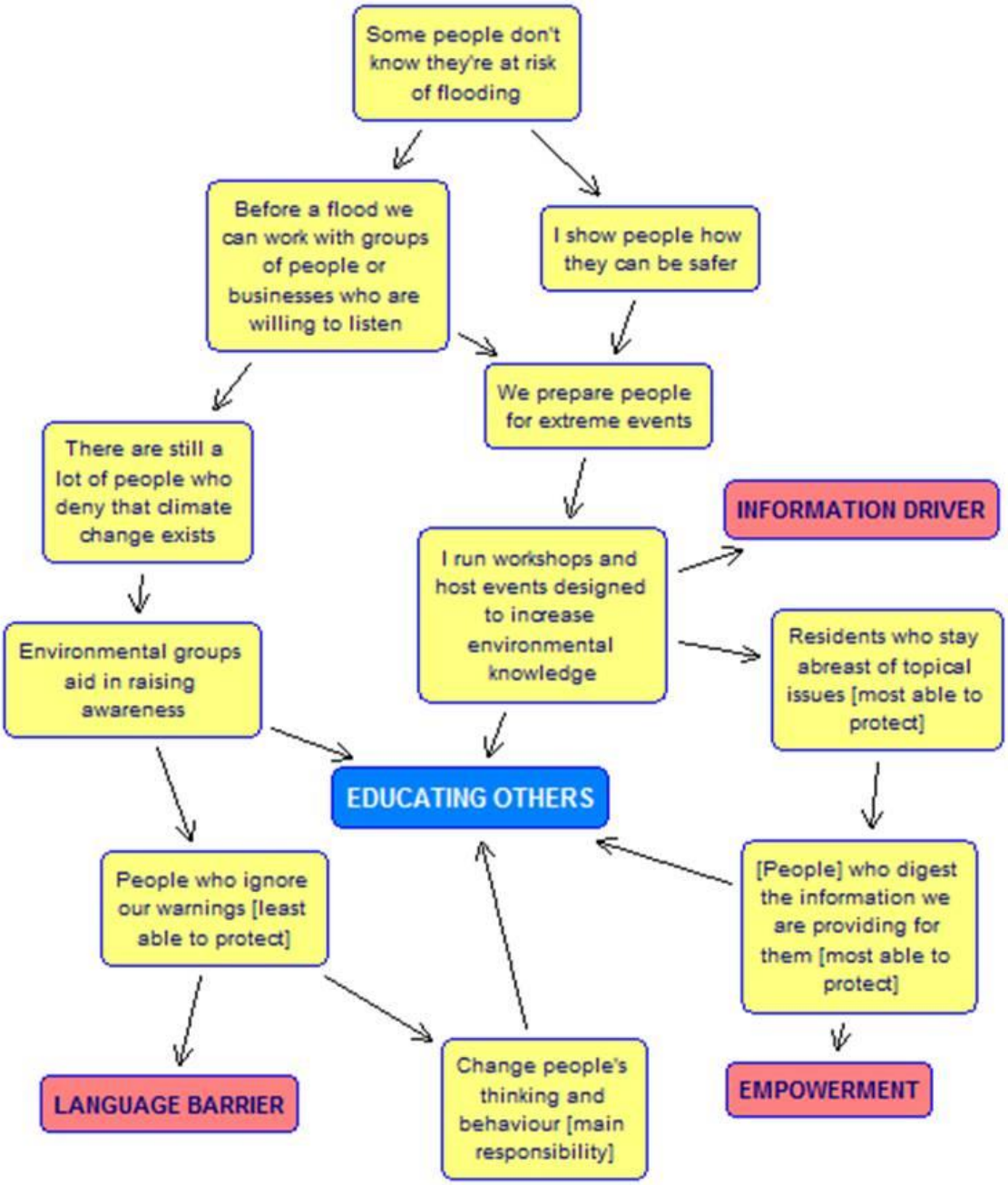


7. Cost Barrier

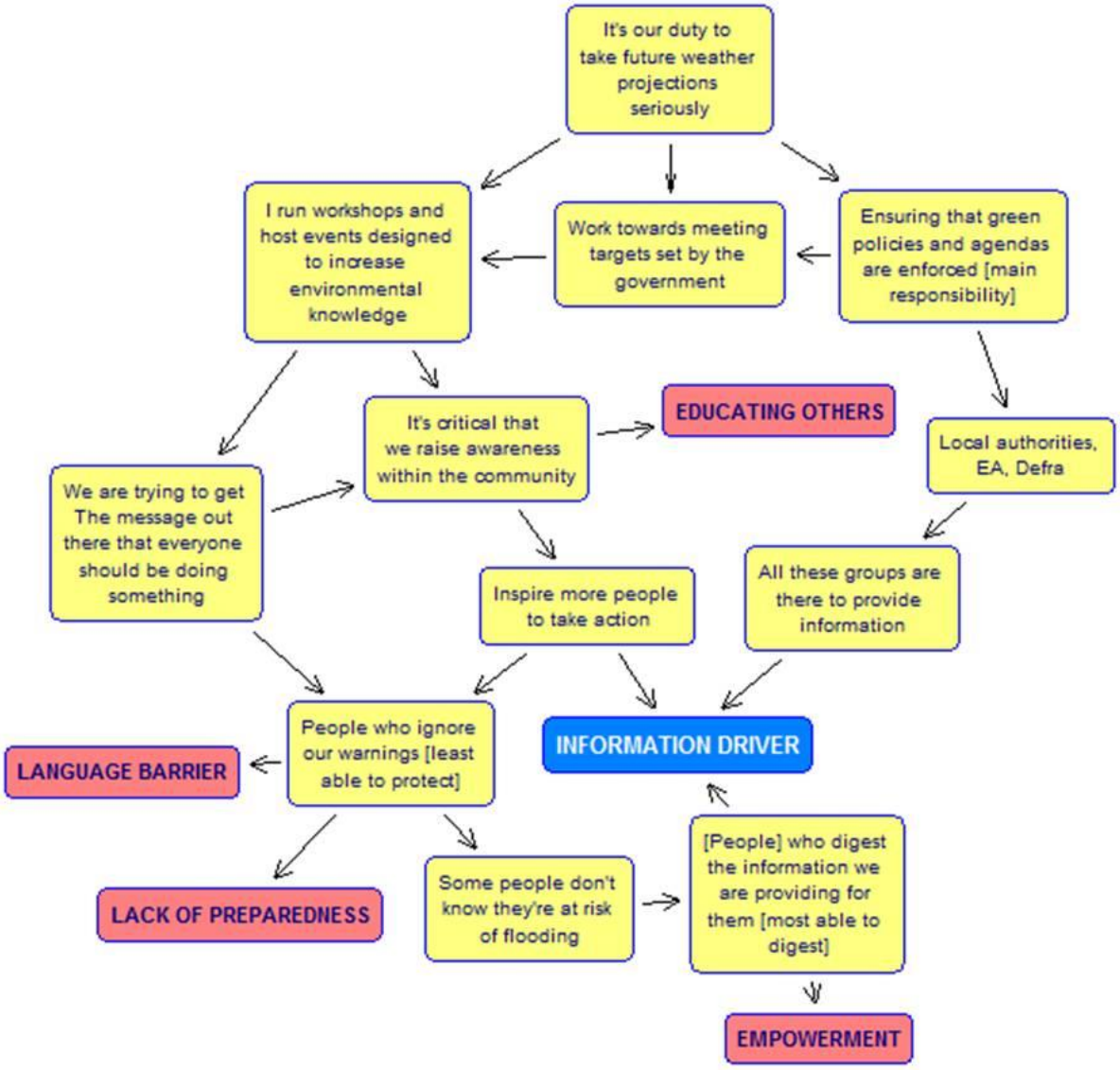


Appendix 34: Cognitive Maps of the Remaining 5 Themes for SE London Policy Makers

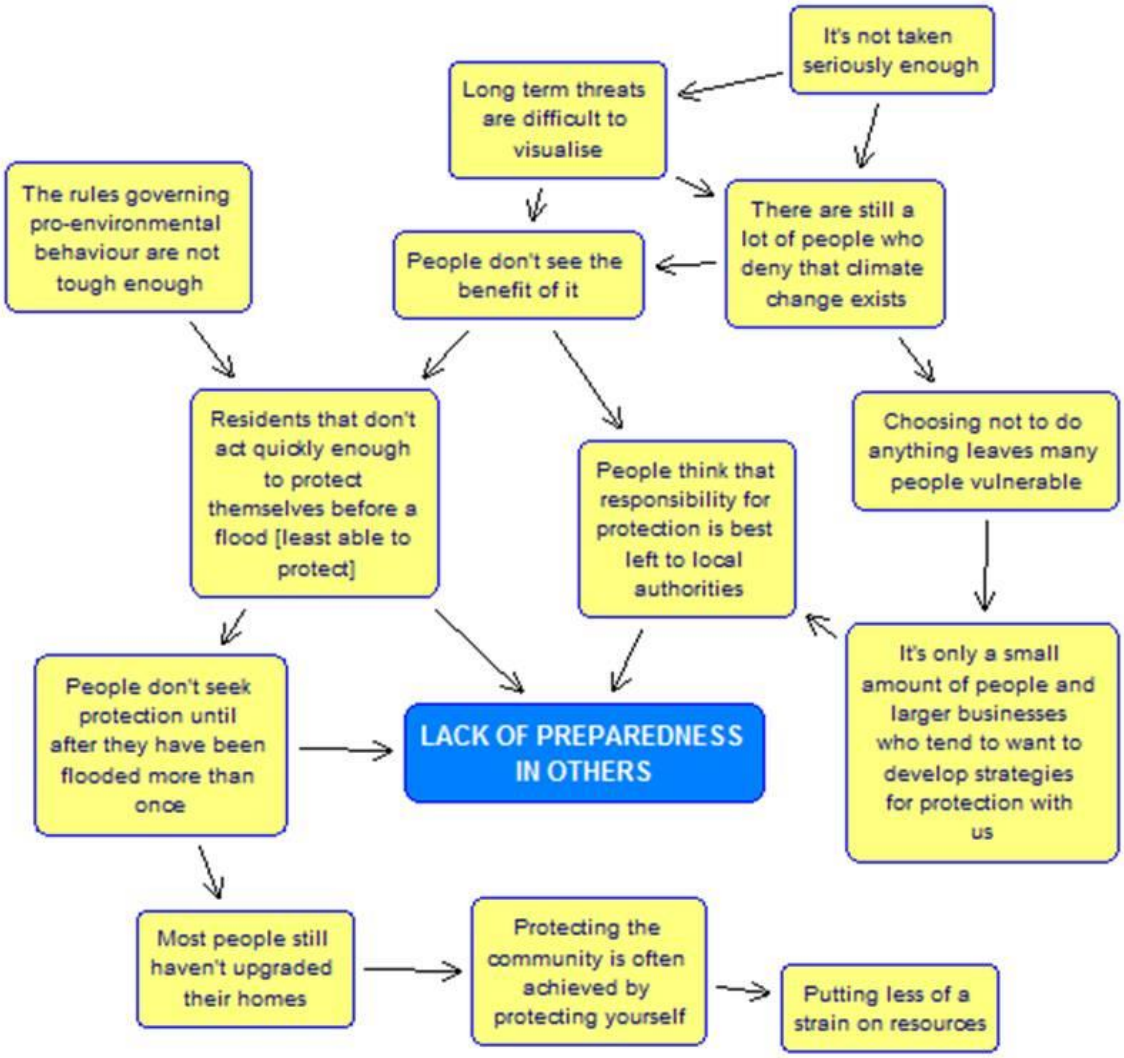
1. Educating Others



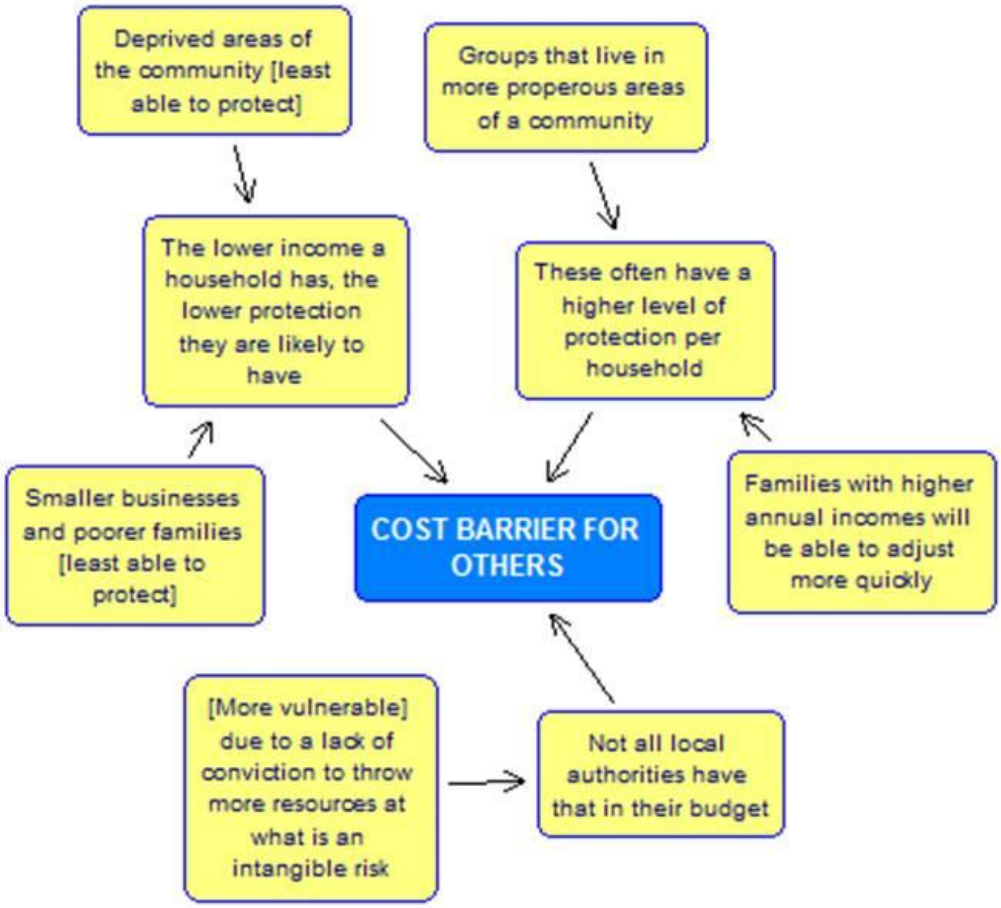
2. Information Driver



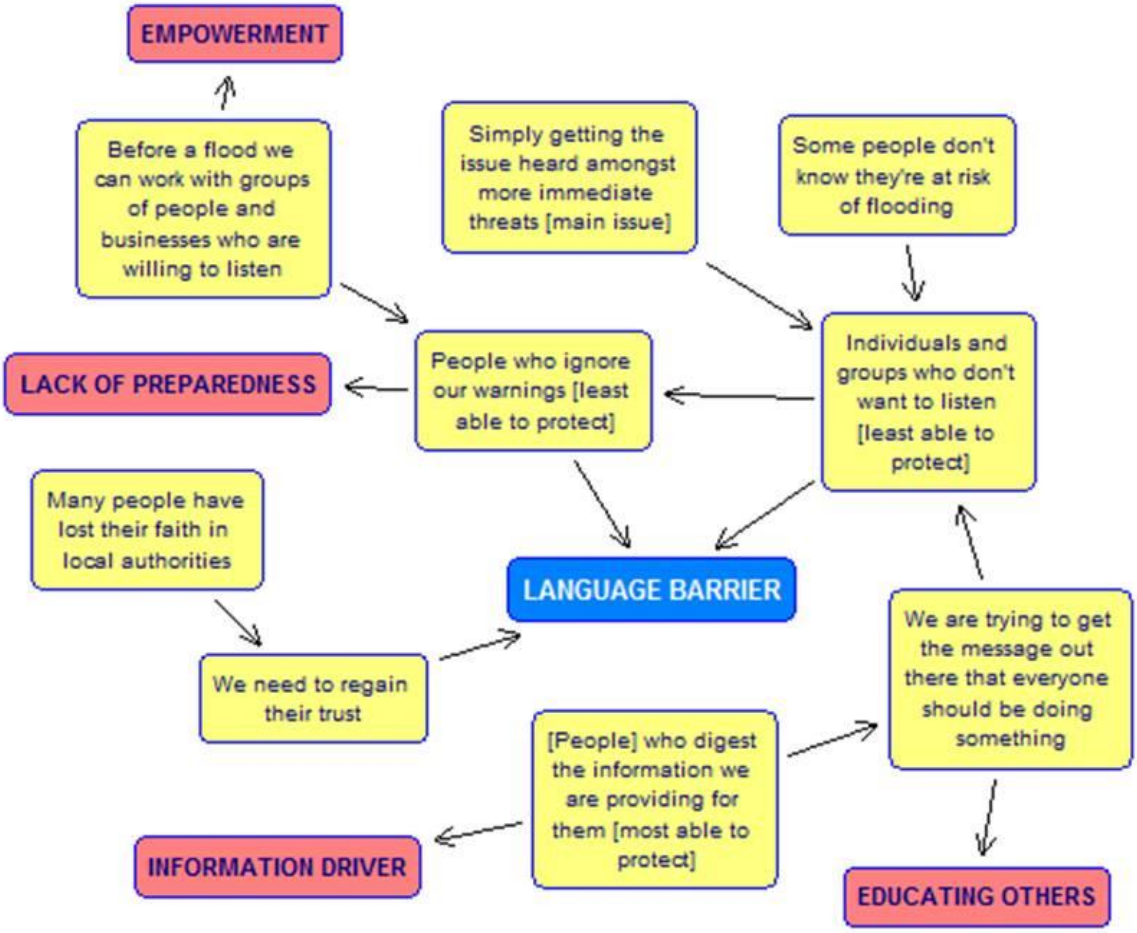
3. Lack of Preparedness in Others



4. Cost Barrier for Others



5. Language Barrier



The following publications have been removed