‘It’s not about having a back-up plan; it’s always being in back-up mode’:

Rethinking the relationship between disability and vulnerability to extreme weather

Abstract

This article presents an empirically driven critique of the predominant theoretical perspective concerning the relationship between disability and vulnerability that continues to underpin much of the scholarship focusing on the human geographies of environmental hazards and disasters, as well as policies and practices of Disaster Risk Reduction. Findings from a study involving semi-structured interviews from six case study sites in the United Kingdom examining responses to prolonged electricity outages during periods of extreme weather demonstrate that the simple equating of disability with vulnerability cannot be sustained. This is because people with disabilities were no less likely than those without disabilities to be able cope and adapt to challenges imposed by extreme weather. Furthermore, in instances where people with disabilities struggled to cope, this can be seen to result from social, physical, and structural constraints, rather than the presence of impairment per se. From this, we argue that the experiences of people with disabilities can be better understood from a *relational perspective*, which promotes consideration of local relations, interdependencies, and networks within which people with disabilities are embedded, and through which they engage with society and place. We conclude that UK Priority Service Register (PSR) emergency response systems, like other emergency response protocols utilised in other geographic locations and which uncritically equate disability with vulnerability, need to be replaced with an approach that recognises the capabilities and agency of people with disabilities and considers how social and environmental factors interrelate to produce vulnerabilities and enhance capabilities.

Keywords

Disability; Environmental Hazards; Extreme Weather; Power Outages; Vulnerability; Relational Perspectives

1.0: Introduction

People with disabilities are disproportionately negatively impacted by environmental hazards, including floods and storms (Abbot and Porter, 2013; Alexander et al, 2012; Kelman and Stough, 2015; Ton et al, 2019; Twigg et al, 2011; Wisner et al, 2004). Studies of major environmental hazards, most prominently Hurricane Katrina in 2005 (Laska and Morrow, 2006) and the 2004 Indian Ocean tsunami (Priestley and Hemingway, 2007), demonstrate that during the event itself, in the immediate aftermath, and over the longer-term 'recovery' period, people with disabilities are more likely to be physically, psychologically, socially, and materially affected. For these reasons and given that 15 percent of the global population are living with a disability (WHO, 2011) – a proportion expected to rise as societies' age and more people live with chronic illness – disability should represent a critical consideration in research and policy focused on human responses to environmental hazards and disasters, as recognised in Article 11 of the UN Convention on the Rights of Persons with Disabilities (UNCRPD, 2006). However, research on the experiences of people with disabilities remains limited, with the majority of existing studies focusing on sudden-onset, life-threatening disasters (Connon et al. 2019a; Hemingway and Priestley, 2014). With a few exceptions (Curtis and Oven, 2012; England and Knox, 2016), the impacts of smaller-scale events, such as storms and flooding, and the secondary impacts on infrastructure and services, on people with disabilities, remain underexamined. While such events do not pose the same immediate risks to life as major disasters, they nevertheless result in significant disruption, difficulties adapting to changed environments, and fear and trauma (Connon, 2017; 2019b). Managing the impacts of extreme weather is certain to become an increasingly significant challenge throughout both the Global North and South as weather-related hazards become more frequent and severe as a result of climate change (IPCC, 2012).

For several decades, academic researchers examining the relationship between disability and responses to environmental hazards and disasters have adopted a social model to argue against a prevailing conceptualisation that is also reflected in much of the policy literature on disability and disaster planning and response (UNISDR, 2013), which is that the disproportionate impact on people with disabilities can be understood as an outcome of their 'inherent vulnerability' (See Hemingway and Priestley, 2014, and Donner and Rodriguez, 2008 for examples of this critique). According to this perspective, an individual's degree of impairment is taken to determine their ability to respond, meaning that the heightened vulnerability of people with disabilities is taken-for-granted and assumed to be an inherent attribute of the person, rather than understood to be the product of social and physical

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environmental constraints. The disproportionate impact experienced is, thus, understood to be inevitable, and it is therefore assumed that people with disabilities will *necessarily* require assistance beyond what those without disabilities would need (Cabinet Office, 2008). From this it follows that the best way to assist this population is to improve emergency response practices and equip people to better protect themselves, rather than to improve the wider socio-environmental contexts that construct states of vulnerability (Cabinet Office, 2011; Ready, 2021).

This article contributes to this long-standing, and recently strengthening critique of the assumed inherent vulnerability of people with disabilities in hazard situations, by focusing on the experiences of people living with and without disabilities in the UK during prolonged (over 24 hours) electricity outages that occurred during severe winter storms between 2011 and 2015. Increasing incidences of climate change-related extreme weather events and disasters in recent years has resulted in a renewed scholarly and policy interest to better understand the relationship between disability and experiences of environmental hazards, from which improvements in emergency disaster response and contingency planning can be devised (Bennett, 2020). This article contributes to advancing this understanding through an empirical case study from which conclusions are drawn. Furthermore, given that much of the contemporary literature examining disability and environmental hazards focuses on lower income countries in the Global South, this study adds value by presenting a case study from the Global North in what is considered to be a resource-rich country. While understanding how this relationship manifests in the Global South is fundamental for devising appropriate planning and response strategies specific to this region, it is also important to examine how the relationship plays out within the Global North given the degree of increase in environmental hazard events in both the Global North and South and the need to devise context-specific strategies to improve outcomes (Kelman, 2015; Kruger et al. 2015). The study also focuses on smaller-scale extreme weather events which receive less scholarly attention and are associated with lower acute risks to human wellbeing than major events such as earthquakes and hurricanes, but which nevertheless are associated with significant stress, fear, increased health risks and disruption to livelihoods (Connon, 2017. Twigg et al., 2011). As the frequency and severity of these smaller-scale events is predicted to increase over the next few decades (Bell, 2018; Cutter, 2020), it important to consider how responses to these events can be improved as well as responses to larger, more destructive events. While the article acknowledges the often-difficult experiences of people with disabilities

during periods of extreme weather, it emphasises the social and structural environments that either place people in positions of risk or, more positively, enable adaptive capacities. In addition, it critically questions the concept of 'vulnerability' in relation to disability (Lid, 2015); moving away from a theoretical conceptualisation of impairment associated with a lack of agency and ability, to an understanding of people with disabilities as interdependent, networked, and capable (Gilson, 2013; Ton et al. 2019). Drawing on empirical evidence from a qualitative study of six case-study sites, we argue that the simple equating of disability and vulnerability in hazard contexts, still dominant in many policy formulations, cannot be sustained. This is partly because many people without disabilities faced significant challenges coping with storms and power outages, while many people with disabilities coped well and displayed confidence and resourcefulness in adapting to these same challenges, and also because in instances where people with disabilities struggled to cope, this can be seen to result from social, physical environment, and structural constraints, rather than inherent vulnerability.

The article begins by examining the existing theoretical perspectives of disability within the international human geography of environmental hazards scholarship and within the UK policy context and sets out the article's theoretical approach. This is followed by a description of the study methodology, details of the findings, and discussion of their significance for improving understandings of the relationship between disability and vulnerability. We argue that the current UK institutional 'blanket' response to all people with disabilities as 'vulnerable' in hazard situations, like other emergency Disaster Risk Reduction protocols utilised throughout the world (Abbot and Porter, 2013; Donner and Rodriguez, 2008; Hemingway and Priestley, 2014; Lewis, 1999; Lunga et al. 2019), needs to be replaced with an approach that recognises the capacities and agency of people with disabilities, and which is specifically tailored to the local communities and environments within which people are located.

2.0: Theoretical and policy contexts

2.1: Theoretical context: vulnerability and capability of people with disabilities in environmental hazard events

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Abbot and Porter (2013: 843) cite evidence from multiple studies to demonstrate that people with disabilities are 'disproportionately affected by the consequences' of environmental hazards and disasters, 'being more likely to die, be injured, traumatised, or displaced, 'whether the hazard be large-scale … or small-scale and relatively everyday'. However, large-scale, sudden-onset hazards, such as earthquakes and tsunamis, have dominated scholarly research and policy thinking (NCD, 2006; UNISDR, 2013; Wolbring, 2009). For example, a study found that in New Orleans more than 73 percent of the deaths attributed to Hurricane Katrina in 2005 occurred amongst people aged over 60 years (Wolbring, 2009), and the US National Council of Disability noted that most of the people who died had some form of impairment and/or chronic health issue (NCD, 2006). The explanation commonly provided for the enhanced impact of these events on people with disabilities is that, due to their impairments, they are unable to act quickly or to a sufficient degree – to seek shelter, escape, or be in a position to be rescued (as noted by Twigg et al. 2011). As such, people with disabilities are understood as being more 'vulnerable' when an event occurs, as well as in institutional assessments of the risks posed by such events (ibid). There exists a powerful dominant narrative in disaster preparedness policy that vulnerability is 'inherent' amongst members of this population, meaning that disproportionate difficulties experienced during a hazard are perceived as determined by the impairments of an individual (as critiqued by Abbott and Porter, 2013; and Hemingway and Priestley, 2014). For example, whilst there is no doubt that to be a person with a disability during Hurricane Katrina meant that you would find it harder to clamber into a boat or be able to adapt to the transformed urban landscape, including the loss of power supply (as described by Hemingway and Priestley, 2014), the cause of these challenges is commonly attributed in policy discourse to the 'limitations' of the individual, rather than the inadequacies of the emergency response (Cabinet Office, 2008).

Research focusing on experiences of people with disabilities to prolonged power outages that result from large-scale disasters and extreme weather events remains limited. While a small body of scholarship has examined how households in the UK, Netherlands, Finland and the US adapted during power outages lasting 24 hours or more, concluding that people with disabilities were more likely than others to be in need of assistance (Bethel et al. 2011; Ghanem et al. 2016; Helsloot and Bareens, 2009; Klinger et al. 2014; Molinari and Chen, 2017), specific first-hand accounts of the experiences of people with disabilities were not included within the remit of these studies.

A number of studies have sought to define, measure, and assess population 'vulnerability' in relation to environmental hazards, identifying three key components: i) 'exposure' – communities in locations susceptible to hazards; ii) 'sensitivity' – individuals or groups with characteristics that mean they are more likely to be affected by an event; and iii) 'adaptive capacity' – how people are able to respond to and recover (Birkmann, 2013; Birkmann et al. 2013; Cardona et al. 2012). The specific level of vulnerability to an event results from the precise mix of these components in a specific spatial-temporal context (Lewis, 2014). For example, in a study of flooding in the UK (England and Knox, 2016), the term 'social vulnerability' is used to describe a state determined by a combination of personal ('sensitivity', e.g., age and health), social ('adaptive capacity', including social integration and access to information), and environmental ('exposure', e.g., housing and neighbourhood characteristics) factors. Social vulnerability therefore interacts with exposure to produce impacts termed 'climate disadvantage', whereby groups and communities are unequally affected (ibid). Of particular significance here is the identification of 'older people, people with physical, sensory and cognitive impairments, people with chronic illness, and those receiving care at home' as 'those who are most 'sensitive'' (England and Knox, 2016: 4). Although the study notes society-level factors, including poverty, likely 'increases vulnerability to climate impacts' (England and Knox, 2016, citing Banks et al, 2014 , 4), the implication is that vulnerability is *already present*, given a person's impairment, illness and/or age . Cutter et al.'s (2003 249) 'index of social vulnerability' also attempts to capture the multiple factors that determine levels of vulnerability, including 'Special needs populations'. However, Turner (2006, in Sparf, 2016: 245) contends that such measures cannot reflect the complexity of relations that produce vulnerability and, more fundamentally, retain the 'ontological determinism' that defines people with disabilities as vulnerable. Rather, as Oliver-Smith et al. (2016: 8) argue, vulnerability should be understood as 'based on the potentially damaging physical events, but seriously and dominantly conditioned by societal perception, priorities, needs, demands, decisions and practices' that, over time, place certain social groups at a disadvantage (also see Kelman et al. 2016).

Understanding how individuals and communities respond to disasters is fundamental for developing effective Disaster Risk Reduction policies, strategies, and practices (Kelman, 2015; Kruger et al. 2015; Lewis, 1999; Lunga et al. 2019). At present, there remains a significant lack of adequate data on people with disabilities in hazard contexts (HelpAge

International, 2005; Phillips, 2015: Lunga et al. 2019; Ton et al. 2019), with its absence creating a major barrier to effective planning and response. Wolbring (2009) demonstrates how people with disabilities are marginalised and disproportionately affected at every stage in the unfolding of a disaster: in the pre-onset stage through increased exposure to risk as a result of poverty; during the event when they are more likely to experience negative health impacts because of absent or inappropriate emergency response; and in the aftermath, when they are more likely to suffer significant physical and psychological impacts (see also, UNISDR, 2013). This discrimination is arguably an exaggerated version of the everyday social exclusion experienced by many people with disabilities (Twigg et al, 2011; Soldatic et al. 2014). Once vulnerability is understood as the outcome of exclusion, what happens to people with disabilities becomes clearer: not being adequately prepared is due to limited and inaccessible information and resources; and not being able to remove oneself from an area of danger becomes the result of poor design and inadequate support systems (Hemingway and Priestley, 2014). In other words, vulnerability is not the inevitable result of impairment, but a conditional consequence of disabling environments (also see Jackson et al. 2017; Kent and Ellis, 2015; Twigg, 2014).

The critical shift from understanding vulnerability as inherent in individual impaired bodies, to seeing it as a product of social and environmental contexts, echoes the transition from a 'medical' to a 'social' model of disability (Gleeson, 1999), and a focus on human rights (UNCRPD, 2006; Kakoullis and Johnson, 2020). The social model, however, has been critiqued for its lack of attention to the reality of the complex embodied experience of impairment (Chouinard et al., 2010), and existing studies show that bodies do matter in shaping how people with disabilities experience and respond to hazard situations (Quaill et al. 2018; Hemingway and Priestley, 2014, Twigg et al. 2011). Nussbaum (2006; cited in Lid, 2015) argues that *all* humans, as embodied beings, necessarily have needs for care and are dependent on others in various ways across their lives. As such, vulnerability can be reimagined as 'a universal condition' (Philo, 2005; Fineman, 2008), meaning we are *all* potentially vulnerable to dynamic situations, including hazard events. Crucially, for the argument here, this prevents the simple equating of impairment with vulnerability (Clough, 2017).

In this study, we draw on a 'relational geography' of disability (Hall and Wilton, 2017), which contends that being and becoming a person with a disability is an outcome of complex

interrelations between impaired bodies, objects and social and physical environments; hence the focus shifts from an explanation based on *either* individual impairment *or* social context, to the ongoing ways in which all elements/actors interrelate and produce an emergent and dynamic experience of being a person with a disability. A relational interpretation of disability can help us rethink the experiences of people with an impairment in the environmental hazard context as an assemblage of relations and forces, comprising the human and the social, and producing an emergent set of outcomes, including vulnerabilities. Given that *everyone* is potentially vulnerable and interdependent, it follows that in the midst of a severe storm and related power outage, a combination of individual embodiment (with and without impairment), social context, judgements made, and decisions taken, may lead to emergent negative or positive experiences (Gilson, 2013). As a result, some people with disabilities may find a storm and loss of power difficult to cope with, while for others, their circumstances may be such that they do not experience increased vulnerability. Abbot and Porter (2013: 840) note that people with disabilities commonly possess coping skills based on their 'intricate, daily negotiations with risk, hazards, and barriers'. Not only does this suggest that 'disability cannot be equated with vulnerability', but also that some risk managing abilities may actually be 'enhanced by disabilities' (Sparf, 2016: 251). Viewing people with disabilities as automatically vulnerable may therefore risk making people *more* vulnerable by denying opportunities to develop skills (Clough, 2017).

A relational conceptualisation of disability – seeing disability as an outcome of an assemblage – offers an opportunity to decentre the person with a disability (Duff, 2018) from accounts of hazard events, and allows people with disabilities to be 'recast as agentic' (Hall and Bates, 2019: 101). That is, as active and engaged in their experiences of storms and power outages. Ton et al. (2019) applies Sen's (2005) 'capabilities approach' to people with disabilities in hazard situations to demonstrate limitations in the focus on (lack of) access to resources as the dominant factor in determining outcomes and shifts attention to the skills and choices made by people with disabilities to 'convert' resources into 'what people are capable of doing and being' (Ton et al. 2019, 16). As Ton et al. (2019: 16) note, 'although there have been an increasing number of studies regarding the vulnerability of people with disabilities in the face of disasters, studies looking at the capabilities of people with disabilities … remain very limited'. This article seeks to address this research gap.

2.2: Policy context and approaches

The UK offers significant opportunities for examining how people with disabilities experience smaller-scale environmental hazards within the local contexts they inhabit. According to the UK Government Department for Work and Pensions (2020), nearly one in five people have a disability. Furthermore, the UK, like many other countries in Western Europe and the wider Global North, has witnessed increased frequency and severity of extreme weather, including floods and unpredictable seasonal weather patterns (Scottish Government, 2014; Kendon et al. 2016; IPCC, 2013).

Existing research focused on community members' experience of extreme weather in the UK has shown that, although extreme weather is unlikely to pose as severe an impact as major weather-related events like hurricanes that occur in other parts of the world, it can significantly disrupt infrastructure and services, people's livelihoods, induce high levels of fear and trauma, and result in the emergence of 'ontological insecurity' (Connon, 2017; 2019; Curtis and Oven, 2012; Oven et al. 2012). Ontological insecurity, a phenomenon commonly found amongst people affected by major environmental disasters like earthquakes and tsunamis, refers to perceptions of isolation, abandonment, distrust, and loss of control over one's future (Edelstein, 2004: 125-128, 136-142; Edelstein et al. 2007), and occurs when high levels of uncertainty lead to disconnections from underlying socially embedded values and expectations about how the world operates. However, the question as to whether people with disabilities in the UK are more likely to experience severe disruption or ontological insecurity in the face of extreme weather remains unanswered.

UK official emergency response is based on a statutory requirement to ensure that those deemed most at risk during severe weather and power outages receive required assistance (Cabinet Office, 2013; Scottish Government, 2012). For this, local authorities and utility (power, water, telecommunications) companies have each developed 'Priority Services Register' systems (PSRs) to identify and map the location of people deemed 'vulnerable' and requiring assistance during emergency situations. The system utilised by [Energy company] involves a voluntary registration process, whereby customers are asked to declare whether they are over 60 years, have a disability, have a child under 12 months, or are dependent on electrically operated medical equipment. Those registered are grouped into one of three priority groups, depending on perceived risk: Category 1 – those dependent on medical equipment and identified as 'most vulnerable'; Category 2 – those with a disability,

regardless of specific type, who are deemed less vulnerable than Category 1; and Category 3 – those 60 years or older, regardless of health status, or those with a child under one year in the household, who are seen as more vulnerable than the general public, but less vulnerable than those in Categories 1 and 2 ([Energy company], 2018: 5). PSRs provide additional support in a crisis situation for those registered, for example, customers receive information about how to prepare for a power cut, regular updates during power outages, and advice about accessing help ([Energy company], 2015). [Energy company] can also notify local authorities about PSR customers, so that emergency assistance can be provided, including evacuation or generator provision (Personal Communication, 2015). However, during prolonged outages, resources and assistance are prioritised, with support going first to Category 1 customers ([Energy company], 2018). PSRs do enable utility companies and local authorities to focus assistance on people in need in an emergency, and thus can be very beneficial (Cabinet Office, 2020). However, as the system is dependent on customers providing their details voluntarily, not all people with disabilities are registered. Further, the suitability of PSR systems for meeting the needs of people with disabilities in the extreme weather context remains unexplored. This study will therefore also examine the extent to which the system is responsive to their needs and capabilities.

3.0: Methodology

Understanding the outcomes of extreme weather for people with disabilities from a relational perspective requires attention to be paid to their lives and experiences, within local networks of interdependent social relations and local place contexts (Hall and Wilton, 2017). A qualitative study involving interviews and ethnographic research was designed to examine how members of local communities, including people classed by emergency responders as 'vulnerable' because of disability, experienced and responded to power outages during periods of extreme winter weather in specific local contexts. The data collection paid particular attention to the actions and agency (and how these are constrained) of people identified as 'vulnerable' (Ton et al. 2019). The study was funded as part of a larger (36 month) Knowledge Transfer Partnership, between [university name] and [company name].

3.1: Participant recruitment
The study analysis draws on 89, 60-90-minute, semi-structured interviews conducted with residents, including people with disabilities, from six case-study sites, between September

2014 and December 2015, during periods of 12-20 weeks of ethnographic field research undertaken within each site. Participant observation enabled the researcher to participate in community activities to become familiar with the socio-contextual dynamics of each community (Barrios, 2014; Jones and Faas, 2016; Oliver-Smith and Hoffman, 2019), identify potential interview participants, and build up trust and rapport. This proved crucial for eliciting rich interview data pertaining to participants' embodied experiences of storms.

3.2: Semi-structured interviews

The 89 interviews included participants from all six sites and included people with and without disabilities. The semi-structured interview questionnaire consisted of twelve broad questions focused on gathering information about participant experiences of power outages during recent periods of severe weather, with a further eight questions focused on eliciting information about each participant, including how long they had lived in their respective local area, employment status, whether they identified as having a disability and whether they were dependent on electrically powered equipment for health, mobility, or day-to-day needs, details about their living circumstances, and (where relevant) details of any carer support received (formal or informal). Participants were asked to describe their experiences of power outages during recent extreme weather situations in their own words, with other questions focused on obtaining information about practical preparedness, emotional responses and abilities to seek out help and assistance. All participants were asked the same initial broad questions, however additional probing questions were posed to participants to elicit further information about a topic or answer. These probing questions depended on respondent answers to each of the twelve broad questions during the course of the interview itself (Leech 2002). Specific questions included details about: challenges faced; what preparations had been taken in anticipation of a power outage and/or extreme weather event; information and official communications received before, during and after the event; experiences of previous extreme weather events and/or power outages in the local area; whether participants felt they coped during the extreme weather event and aftermath; whether they tried to seek out any help or assistance during the event and from whom; and, where appropriate, details of the effectiveness of support provided by the emergency services, community support group, other community organisation, family, carers, friends, or others. Participants with disabilities were also asked: whether they were registered with [name of energy company's] Priority Service Register or any other priority service register; how helpful they found the support

provided (if obtained); and what they felt could have been done differently. Participants were also given the freedom to raise any additional information that they considered to be important or that they wished to share with the researcher (Dunn 2000). Each interview was voice recorded, with permission.

The decision to conduct semi-structured interviews was influenced by a capacity-driven approach to overcoming representational inequalities in research that promotes the voices of those most marginalised in society (Gunewardena and Schuller, 2008; Klein, 2008; Nadarajah and Mulligan, 2011; Pyles and Harding, 2011). Semi-structured interviews were chosen over structured, closed-ended questionnaires as these would have placed limitations on participants' ability to raise new topics and issues and to describe experiences in their own words (Bernard, 2012; Bryman, 2012).

The study was approved by [University name] Research Ethics Committee. Participants were informed that participation was voluntary and that they could withdraw at any time. They were all asked to sign a consent form. Participants unable to sign due to physical impairment were offered the opportunity to provide a recorded oral declaration instead. All participants were able to give informed consent. All interviews took place in public locations convenient to participants, except for those for whom travelling to public locations was problematic, in which case interviews were undertaken in participant homes, but only when another adult (carer, friend or family member) was present for the duration of interview.

Fifteen participants stated during interview that they had a disability that affected their day-to-day functioning (between 1 and 4 in each case-study site). A range of physical, sensory, and mild social (autism) impairments, as well as chronic health conditions, were self-disclosed. Ten people lived independently in their own homes, either as a single person household or with other adults; three lived with family members; one lived in a supported semi-independent living complex; and another lived in sheltered accommodation. Ten received support from formal carers, while others relied solely on family and friends; two received no support. Five were retired (due to age or ill-health), two were studying, three were in employment, and one was volunteering; the remainder were not working or studying.

3.3: Case-study sites

The six case-study sites consisted of three villages (including one island location, one remote rural location and an accessible rural 'commuter' village on the outskirts of a city) and a small town in northern Scotland with a population of 12,000: and a rural village and larger town in southern England located on the outskirts of a major city and with a population of 164,000. As the study wished to explore the importance of place in mediating the relationship between disability and experiences of extreme weather, sites were selected that, broadly speaking, collectively represented the diversity of the residential geography of the UK by covering each of the main residential classifications used in Government policy and for civil contingency planning – very remote rural, remote rural, accessible rural, urban area (small town), and large urban area (Scottish Government, 2018).

Secondly, as the study was undertaken as part of a Knowledge Transfer Partnership project that aimed to explore whether individual, community and emergency responder actions that were helpful in enabling people to adapt in one location could be implemented at another location, the mix of sites chosen deliberately included several sites where resident abilities to adapt during previous episodes of severe weather were deemed 'exceptionally outstanding' and several sites which were deemed to be 'poor' by emergency response organisations, including [name of energy company]. This is because exploring whether knowledge could be transferred from one site to another required knowledge of the problems that existed at sites labelled 'poor', as well as what the key strengths were at sites labelled 'exceptionally outstanding'. Sites were identified as being 'exceptionally outstanding' or 'poor' by [name of energy company] on the basis of: numbers of complaints made about lack of support and inadequate resource provision, evidence of the effectiveness of local organisations in helping to support people during these events, as obtained from company survey data; numbers of emergency callouts to provide assistance to people experiencing difficulties received; and observations made by those assisting within local communities during and after the events. Five sites were selected after discussion with emergency response personnel on the basis of being either 'exceptionally outstanding' (all rural areas) or 'relatively poor' or 'poor' (urban areas and one rural area) by these organisations, in terms of response during previous episodes of severe weather, between 2011 and 2014. The sixth site was selected in September 2014, after discussion with senior emergency response personnel, who regarded it as exceptional in terms of coping ability.

Although it would have been ideal in terms of the wider project aims to have included an urban case study site that was considered 'exceptionally outstanding', none of the urban areas covered by [name of energy company] were considered outstanding, with emergency response personnel highlighting that, in general, a large discrepancy between rural and urban areas existed, with urban areas faring much more poorly than rural areas (Personal communication 2014). In addition, as the study aimed to specifically explore how different groups of people, including those with disabilities responded, it was considered important to explore whether difficulties were encountered by certain groups of people within the case study sites classed as 'exceptional', and which potentially risked being overlooked in future strategic planning developments, owing to the strength of response at the whole community level. Given that older people and those most socially marginalised, including those with disabilities, are often those least likely to seek out support from official institutions, to have the financial means to access resources independently, or directly ask for help from others during extreme weather emergency situations in Scotland and in the wider UK (Connon, 2017; also see Curtis et al. 2018), examining the experiences of those with disabilities at sites deemed 'exceptional', as well as 'poor' was justified on the basis of ensuring equality of outcomes from future developments. Each site had been affected by prolonged power outages (lasting 24 hours or more) because of severe weather since 2011, including snow, rain, and gale force winds, with trees falling onto lines, snow and frost damage to overhead lines, and flooding of electricity sub-stations. Although UK winter weather is variable, the severity of the storms in question at each site were described as 'exceptional' by the Met Office on the basis of historical data for the respective areas (Met Office, 2014; McColl et al. 2012; Ghanem et al. 2016). It is acknowledged that the small number of sites means that the study may not be representative of all communities everywhere across the UK. However, the number and spread across rural and urban locations in Scotland and England provides assurance that the findings are applicable beyond a single geographic site.

3.4: Data Analysis and reporting of findings
Interviews were transcribed, analysed descriptively according to thematic content, and verified using NVivo. Analysis was a three-stage process. Transcripts were: a) divided into respondents who had indicated they were a person with or without a disability; b) scanned for evidence of coping or not coping at the emotional level (e.g. descriptions of and evidence of stress, upset, fear of abandonment, ontological (in)security or calmness and confidence) and also at the practical level (e.g. access to resources and information, planning, support

networks) in hazard events and coded accordingly; and c) examined for reasons for being able/unable to cope at the emotional and practical levels (e.g. previous storm experience, length of residence in site, social support networks) and coped accordingly.

To ascertain whether participants coped positively or negatively at the emotional level, statements were highlighted where a participant either directly stated or indicated uncertainty, fear, anger, confusion, increased stress, feelings of abandonment and feelings of a lack of control, and which thus evidenced significant emotional upset and/or were indicative of difficulties coping at the emotional level. These were subsequently coded and classed as evidence of 'negative experience' for the reporting of the findings. Statements which indicated evidence of new, emergent distrust in environments and institutions and perceptions of danger or risk of harm from the environment, which reflected aspects of 'ontological insecurity' or 'lifescape change' according to (Edelstein's 2004) description of the key features of ontological insecurity associated with environmental hazards, were also classed as reflective of emotional upset/difficulties coping at the emotional level, and were therefore also included as evidence of negative experience. In contrast, responses that indicated that the person had been able to remain calm and in control were taken as indicative of coping at the emotional level, and subsequently classed as evidence of a positive experience in the reporting of the findings. Determining whether participants coped positively or negatively on a practical level was undertaken by highlighting statements that indicated where a participant had not been able to successfully plan for storm events, lacked access to adequate information and resources, did not receive sufficient or appropriate support from carers, friends, relatives and social networks, had difficulties obtaining support from official emergency response organisations and/or found it difficult to adjust or adapt to lifestyle disruptions brought about as a result of the event, which were indicative of difficulties. These statements were coded and classed as evidence of a negative experience for the reporting of the findings. Statements that indicated that a participant had access to adequate resources and information, had plans in place that worked successfully, and where support networks and emergency support were deemed to be helpful and appropriate for meeting participant needs were regarded as evidence of successful adaptation and coping at a practical level, and thus as evidence of a positive experience.

To protect the privacy of participants, the names of the case study sites have been omitted in the reporting of the findings and pseudonyms have been used throughout to distinguish between different respondents while concealing their names and identity.

4.0: Findings: people with disabilities in the eye of the storm

The analysis revealed that participants with disabilities were no more likely than others to report encountering problems with coping and adapting on a practical level during power outages in extreme weather and were slightly less likely than people without disabilities to indicate that they had become emotionally overwhelmed (see Table 1).

Number of Study Participants	N=89	
Number living with or without a disability	Disability	No-Disability
	n=15	n=74
1. Numbers reporting evidence of a negative experience:		
• 1 (a): Difficulties coping on a practical level	n=4 (27%)	n=26 (35%)
• 1 (b): Experience of significant emotional upheaval and/or ontological insecurity	n=2 (13%)	n=35 (47%)
2. Numbers reporting evidence of a positive experiences:		
• 2 (a): Successfully adapted/coped well at a practical level	n=11 (73%)	n=48 (65%)
• 2 (b): Coped well at the emotional level/ontologically secure	n=13 (87%)	n=39 (53%)

Table 1: Numbers of participants reporting evidence of positive and negative experiences at the practical and emotional levels.

4.1: Ontological security and coping at the emotional level

A small number of people with disabilities (two out of 15) indicated that they had experienced significant emotional upheaval during the storms:

> "I felt very isolated. I like living out here, the quietness…, but it's these times you feel you need someone there. That was at first. But then it went on for days, it was frightening." (Rebecca, 43, rural England)

However, a number of people without disabilities (35 out of 74) also reported similar experiences of emotional upheaval. The majority of participants, with and without disabilities, who said they had coped well (13 out of 15 with a disability and 39 out of 74 without a disability), gave the impression that they had stayed calm, as one person with a disability stated:

> "We have storms every winter. If you imagine a continuum…It lasted longer, but you could say it was a worse version of any other bad storm" (Jane, 65, rural Scotland)

No participants, with or without a disability, and who indicated they coped well, showed evidence of 'ontological insecurity' (Edelstein, 2004). Instead, participants spoke about the storms being more of a hindrance. In one case, a person with a disability described how the storms actually enhanced his self-confidence in his own abilities:

> "I managed fine on my own … I think I showed them [his family] how independent I can be. I wouldn't have managed that a few years ago" (Mark, 36, urban Scotland)

For those (with and without disabilities) who experienced emotional upheaval, their accounts illustrated some degree of emergence of ontological insecurity. This resulted in significant questioning of the purpose of their lives and imagined futures, as one participant explained:

> 'It's [the community] too isolated. It didn't feel at all safe…it can be dangerous… I felt like it's not for me anymore…It's a dream gone bust." (Anne 64, rural Scotland).

4.2: Coping and adapting at the practical level

People with disabilities were no more likely than others to report difficulties with practical adaptation. Participants with and without disabilities described being able to cope by ensuring they had enough food in the house in anticipation of a possible storm, having a secondary heating source and alternative cooking appliances, keeping a torch handy, keeping themselves informed about changes to weather via TV, radio, and internet, being able to contact others, and having previously thought about what they could do or where they could obtain help in case of emergencies. Participants described the importance of 'thinking ahead' and 'staying alert' to changes in the weather, and continually anticipating the potential impact

on their planned activities and well-being. However, those with disabilities were more likely to place greater emphasis on the importance of these skills:

> "Being prepared is what's important. You've got to have everything to hand, just in case. All [phone] numbers, where the spare batteries are…I need everything where I can reach it. … There's less room for error." (Nicola, 27, urban England)

People with disabilities also emphasised additional considerations that they needed to make, including charging electrically powered mobility and medical equipment in anticipation of storms, ensuring back-up supplies for devices, stockpiling necessary medications, identifying carer accessibility during storms, and planning emergency arrangements with family and friends in case of disruption to normal care arrangements. For example, one participant explained that knowing the roads would likely be blocked with snow meant she had to make alternative arrangements to collect regular medication:

> "In winter, I have to make sure I've enough to last if I can't get out so I always re-order in advance. This time I'd already re-ordered, but...didn't want to risk going out. So, I asked someone I knew who was out helping with the snow clearances if they could collect it for me" (Moira, 69, rural Scotland)

4.3: Factors influencing coping on the emotional and practical levels

The accounts of people with disabilities highlighted several interrelated personal and contextual factors that help explain the reasons underpinning abilities to cope well at the emotional and practical levels (Ton et al, 2019). Furthermore, they also revealed why those with disabilities who did not cope well had these experiences. A range of outcomes is possible as (impaired) bodies, objects and place contexts intersect (Hall and Wilton, 2017).

4.3.1: Previous experiences of storms and power outages

Previous experience of severe storms and prolonged power outages appeared to lessen the risk of emotional and practical difficulties during the storms in question amongst those with disabilities, as learning from previous experience increased knowledge, confidence, and ability to prepare for and cope during storms:

> "I always try to keep the cupboards stocked … [A]bout ten years ago. We had a bad storm…Since then, I've made sure I've had enough to last." (Moira, 69, rural Scotland)

In particular, experience of previous storms within the specific local area helped participants feel more confident:

> "It's not quite like once you've seen one [storm], you've seen them all…But I can't say I was afraid. It was like we'd had it before, only worse. I think knowing that it's a fact of life that comes with living here. I did what I always do during a bad winter, just with a bit more caution." (Suzanne, 52, urban Scotland)

The importance of locally based experience for enabling quick judgements to be made during storms helped people cope with unanticipated turns of events. For example, witnessing previous flooding helped one participant decide about whether to leave the area:

> "When [neighbours] said the park was starting to flood, I thought I'm going to try and get to my sister's because once the water crosses over the park, you know the road will be flooded over in a few small hours … I thought, leave now before I can't leave." (Ron, 88, urban Scotland)

4.3.2: Length of residence and familiarity with local environments

Prior experience of storms within local areas enabled participants make appropriate preparations and decisions. Those who had lived in an area for all or most of their lives displayed greater confidence in their abilities to cope well:

> "I know what roads can get blocked. I know that they always use the hall as an emergency rest centre." (Moira, 69, rural Scotland)

Those who had lived in an area for more than 15 years were not only more knowledgeable about how storms would most likely affect the area, but were also more confident in detailing where they could obtain official and unofficial emergency support:

> "I know my neighbours and that's where I go if I have problems. But I need to know what's happening and the best person for that is [name]…That's better than relying on the weather updates for the whole area. They don't touch on the specifics." (Jane, 65, rural Scotland)

In contrast, those who had lived in an area for fewer than five years were more likely to report feeling overwhelmed, were less likely to know where to turn for help, and more likely to question their ability to remain living in the area:

> "I thought not being out in the country, we'd be alright…I didn't know it affected the power here quite like it did. I didn't know if the tap water was safe … it's frightening." (Parmis, 46, urban England)

4.3.3: Social connectedness

Having strong social support networks helped participants with disabilities adapt. Sources of support, which helped people feel confident that they could obtain help if needed, included neighbours, friends and family, acquaintances from social or support groups, and, for some, work colleagues, living in nearby areas. For some, local family and informal assistance 'fill the gaps' if formal carers are unable to visit:

> "I've got family here … I know that if [my assistant] can't come round, my son will. Other folk too... [I]f I need an emergency lift, I've people I can ring … [I]t's not a worry." (George, 67, rural Scotland)

Participants emphasised, however, that what mattered was awareness of their specific needs and capabilities, rather than general willingness to help:

> "They [my friends] know me and know that if I get cold, I struggle more to walk…They've a better understanding than an emergency carer because they know you." (Nicola, 27, urban England)

Strong social relationships were important for transmission of knowledge about support services, which had a positive impact on coping abilities. This was particularly important for participants with long-term mental health conditions; they felt more confident seeking support from people who knew them well, owing to a fear of being judged negatively by unknown others:

> "I get anxious until I know what's happening. [Name of friend] is very supportive; he called me……He knows I don't like many people [together in crowded situations], so he said go to [name of place] where it was quieter than the [community] hall." (Mark, 36, urban Scotland)

People with disabilities with fewer family or friends in the immediate area were more likely to report feeling isolated and distressed, as well as difficulties adapting on a practical level:

> "You feel like everyone's forgotten about you … [W]hen you're on your own, all kinds of things go through your mind." (Rebecca, 43, rural England)

4.3.4: Place of residence and living arrangements

Living in a rural area seemed to bolster abilities to foster social networks, which helped enable adaptation and coping ability. People with disabilities living in three of the four rural case-study areas were more likely than those in urban areas to feel they were perceived by

others as members of their local communities, regardless of living arrangements and type or severity of impairment:

> "I think with it being a smaller community … you tend to be better known … You feel part of the village. If people know each other they know better how to help, and people feel comfortable relying on each other." (Jane, 65, rural Scotland)

This suggests that in smaller communities, particularly for those who have lived there a considerable length of time, a greater sense of inclusion was evident, which translated into greater confidence in social networks and local informal means of support during storms than for those less involved in community life. People with disabilities in three of the rural areas also reported greater feelings of being well known to members of the wider community, stating that other members of the community viewed them as 'a full person', with specific interests, as well as being more likely to be aware of their disability and living circumstances from having that degree of regular day-to-day interaction that living in a small place affords. This, they felt, added to their sense of security:

> "They don't just see your disability … The more people see you, the more they know you as someone, not just the person with a problem …But if you have a disability, you aren't going to be forgotten as people will think of you when we have a storm." (Moira, 69, rural Scotland)

Some people with a disability felt that increased visibility in smaller communities meant others were more likely to be alert to possibilities of regular care arrangements being disrupted during storms:

> "When [name] came round, she wondered how I was doing. She knows I've a home help and that she wouldn't be able to get through … I think the problem is [in] places where people don't know each other." (George, 67, rural Scotland)

Participants in the fourth rural site – a site in the south of England - were less likely to say they had coped well, regardless of disability status. A low level of social connectedness was evident amongst residents and, owing to significant demographic changes in rural southern England over the past few decades, the majority were not long-term residents, having moved there within the past eight years. Participants in this area were less involved in local community activities, and those with disabilities were more likely to feel isolated during the storms:

"[W]hen the roads were flooded, and the power was out...I'd no idea where I could get help, other than the emergency services." (Kate, 52, rural England)

For participants with disabilities in urban settings, specific housing arrangements were significant, such as whether they lived in supported accommodation, on their own or with others, whether they resided in neighbourhoods where they had lived for a long time, and whether they lived close to family members. In both urban case-study sites, people were more likely to report lower levels of perceived social inclusion within immediate local areas. However, in one of the urban areas, people with disabilities reported taking part in local recreational and social activities that were open to all and not specifically aimed at people with disabilities, which enhanced their perception of how well socially connected they were. This, they explained, increased their confidence that they could rely on the support of others if needed during storms:

"I know lots of people who can help. Some are further away than others, but in an emergency, I'd call them." (Kostas, 53, urban Scotland)

However, people with disabilities in both urban areas were more likely to depend on carers, whether formal or informal, during emergencies, than people in the rural case study sites. One person with a disability said:

"My carers are family members and I've got personal care assistants – without them I'd have struggled. At least you know they'll do all they can to help… Others … they don't have the same obligation and nor should they. They are your friends, acquaintances, but don't come with that certainty." (Suzanne, 52, urban Scotland)

Urban residents also emphasised that having carers who were knowledgeable about what to do during power outages was important for adapting successfully. This was especially important for those living in sheltered and supported accommodation, who experienced greater difficulty when usual care arrangements were disrupted:

"We had problems because we were sent replacements [staff]… [W]e have a small back-up generator, but no-one knew how it worked." (Parmis, 46, urban England)

Residents in urban areas placed greater emphasis on family members to be aware of their needs, have access to necessary information, and to provide assistance, compared to those in the rural areas, who said they could cope by relying on the support of the wider community in the absence of immediate household support. For example:

"I called my Dad…It would take others too long to get here … I heard later…staff from the community centre [were] going out helping people, but there's a risk you open the door to the wrong person." (Nicola, 27, urban England)

4.3.5: Experience of living with an impairment

Many of the people with disabilities in this study had developed a set of skills and confidence in navigating local environments and undertaking a range of tasks in their day-to-day living. Hence, the length of time a person had had an impairment, as well as the stability of the impairment over time, was significant. Three participants with lifelong impairments explained that living with an impairment meant that, in general, they always needed to plan ahead and anticipate a range of possible outcomes in order to be able to fully function. One explained that using a wheelchair meant she always had to think about potential challenges when planning activities:

"When planning a trip, I have to call in at the [train] station to make sure the ramp is available... Or check the taxi can take this [wheel]chair." (Suzanne, 52, urban Scotland)

All three explained they were used to having to consider many possible outcomes and eventualities:

"You've got to be open and not fixed in your way of thinking … It's not following a set plan, and that's the issue when you rely on others … [Y]ou have a goal and have to work through multiple paths to get there." (Suzanne, 52, urban Scotland)

For many, navigating potential uncertainties has come to be normal, unconscious even:

"I'm so used to [it]… I don't think about it. I couldn't have a fixed mindset relying on others … you'd feel you were constantly up against a brick wall." (Moira, 69, rural Scotland)

While most participants with long-term impairments were confident in navigating local environments, others who had become progressively impaired or become impaired later in life explained that getting to know their local world from their changing or new way of being was important:

"Eventually, I had to accept that life wasn't the same…I explored the area to find out what worked best for me getting around." (Ron, 88, urban Scotland)

Another participant reflected on how she had developed awareness of how best to relate to people in her social environment and what she could reasonably expect other people to do to help her meet her needs:

> "It's not enough to accept that you need assistance, it's learning to work with others.... I had to learn to be comfortable asking things of carers; things I wouldn't ask friends." (Nicola, 27, urban England)

Navigating complex physical and social environments and learning how to orient and adapt to impairments, appeared to have a positive effect on adaptation and coping abilities during storms. In particular, it helped participants feel confident when dealing with uncertainty and enabled creative forms of adaptation, such as when the weather took an unexpected turn. One participant explained that uncertainty about the duration of power outages led him to devise flexible courses of action:

> "[T]wo out of the four of us [nearby neighbours] still have the open fire… I said to [names of neighbours] 'if it's the same tomorrow, come here during the day'. We're only burning one set of logs that way and I've got people here. When you're used to working round people…you're maybe more used to thinking like that." (Douglas, 71, rural Scotland)

Another stated that coping with uncertainty during the storms was like an enhanced version of the uncertainties of daily life, rather than a different experience altogether. This, she explained, prevented her from becoming overwhelmed:

> "Coping without power, it's a big challenge. But the challenges that come up, cooking, travel problems, these are part of daily life, it's just that during storms they happen all at once, so it becomes bigger. But it's things we've dealt with before … [T]hink[ing] about it like that, it's much less frightening." (Jane, 65, rural Scotland)

She also explained that having to rely on others during the course of day-to-day life prevented her from developing fixed expectations that created problems for others when disruptions occurred:

> "I know one of the big complaints was people being told the power would be back on by a certain time and then it not coming on … I think people are fixed in their expectations now. When they don't have that control – panic. When you rely on others as I do, you get used to not having that full control. For me, it's not so much about having a back-up plan, but always being in back-up mode." (Jane, 65, rural Scotland)

In contrast, those who had recently become impaired or had a progressive long-term condition, were more likely to report negative experiences. This resulted from a lack of confidence in adapting to life with a new impairment, and, in some cases, new care arrangements in a storm event:

> "[I had] a leaflet about what to do with the [dialysis] machine if there was a power cut … but never really took it in. I had to learn how the thing worked... I have the nurse and home carers, but during the storms, [name of partner] phone[d] the care manager. They said I should go to hospital. I couldn't because the road was flooded. I panicked, but there's a window period … but I wasn't sure how long you could delay it as I hadn't been in this situation before." (Kate, 52, rural England)

Another factor influencing storm coping abilities amongst participants with a disability was confidence and experience in communicating specific needs to a wide range of people. For example, one participant explained that because of the visibility of her disability, assumptions were often made about the extent of her capabilities and ability to make decisions for herself:

> The worst is when people…ignore me or ask who I'm with what I want. … Sometimes there's this over eagerness to help." (Jane, 65, rural Scotland)

She emphasised the importance of being direct when communicating her needs in order to manage this effectively. Having to learn to manage other people's assumptions about disabilities and to communicate needs in the most effective way, proved to be helpful for enabling people with disabilities to have their needs met during the storms:

> "I ended up giving instructions down the phone for what they [a friend] needed to ask on my behalf. There are risks [relying on others to speak on your behalf], but sometimes I think people expect that because someone has a disability, they are going to be fragile and people seemed in doubt when I said to them myself that I was alright." (Moira, 69, rural Scotland)

Success in communicating needs effectively and managing other people's assumptions was associated with how long a person has had a disability and whether their impairments were stable or changing. As participants stressed, learning what works in terms of communicating needs comes through experience of trying different strategies and learning from outcomes:

> "You have to become confident…who you are apart from your disability … it's important because when you communicate in these situations [during a storm emergency] it can feel like your identity is reduced to your disability." (Jane, 65, rural Scotland)

4.4: Priority Service Registers: emergency arrangements for people with disabilities

While people with disabilities sometimes required emergency assistance, the Priority Service Register (PSR) system was viewed as being limited in terms of its ability for meeting their needs, as well as for enabling effective resource distribution. The interviews also demonstrated that these problems resulted from the automatic labelling of people with disabilities as 'more vulnerable', and the failure of the system to consider wider socio-environmental contexts within which people are embedded. One participant stated that prioritisation of emergency support should focus on immediate need rather than disability status:

> "I don't think you can put someone first just because they're disabled…I've got carers, the nurse, the health people, they all know about me, I'm on the radar. Someone normally healthy with kids and they get ill, I'd say they're vulnerable. Those without regular support are likely to slip through the net." (George, 67, rural Scotland)

In addition, someone dependent on medical equipment was deemed most likely to have a network of carers and be known to local health care teams who would be alerted during a power-related emergency:

> "In that situation [dependent on medical equipment] … Those with the most complex needs are the ones who neighbours, carers, doctors, will think of first. They aren't always the vulnerable ones here. Those totally on their own, they'd be more at risk." (Helen, 56, rural Scotland)

Furthermore, two participants said they thought the PSR scheme could cause additional uncertainties related to support during weather emergencies and could potentially inhibit adaptive actions by influencing expectations that affect decision-making:

> "If people think they are getting all this [support]…it gives a false sense of security that they'll be fine at home. But if the roads are blocked, there's no way they can lug a generator all the way up here. [I]f you've got power cuts in more than one area, they don't have enough for everyone." (George, 67, rural Scotland)

Centralised services, like the PSR helpline, were also seen as lacking the necessary local geographic knowledge required to help people with disabilities make decisions to enhance adaptive abilities:

> "They don't know you, the area, your circumstances. … There's not that insight you get living here. A person's situation changes and only those knowing the circumstances will get what it really means." (Douglas, 71, rural Scotland)

Whilst PSRs do allow utility companies and local authorities to be better informed about who will require support in an emergency, and how they need to prioritise often limited resources, this shows that at present their effectiveness is constrained by the limited information they gather and the lack of flexibility in their application.

5.0: Discussion

The key finding of the study, that a person with a disability was no more likely than someone without a disability to experience difficulties in adapting – both practically and emotionally – during extreme weather-related power outages, makes a significant contribution to the strengthening critique of the dominant understanding in much emergency preparedness policy, that people with disabilities are inherently more likely than others to be vulnerable in such circumstances (Cabinet Office, 2011; Ton et al. 2021). The study evidenced that the majority of people with disabilities responded in ways that were highly adaptive, and which demonstrated self-awareness and awareness of the needs of those responsible for their care. Their interview accounts also showed they were not passively dependent on others, but displayed active involvement and high levels of agency in making decisions about how to respond (Ton et al. 2019). This challenges understandings that people with disabilities are inherently more 'sensitive' to the impacts of environmental hazards owing primarily to the presence of impairments (as noted in Knox and England, 2016).

It is important to note that the findings may be reflective of the fact that the storms and power outages in question (lasting for at least 24 hours in all case study sites) can be considered to represent small scale environmental hazard events in comparison to major, acute, sudden-onset disasters like severe earthquakes and hurricanes that may require mass whole-area evacuations and which pose a more immediate and acute risk to life. Whether the findings would apply in situations where people with disabilities experienced a major disaster requiring large-scale emergency evacuation cannot be ascertained from this study. However, the findings from our study are significant in that small scale extreme weather events in the UK are known to induce risks to the health and wellbeing amongst the wider population, with difficulties adapting being associated with various forms of social marginalisation, lack of familiarity with local environments (physical and social), lack of experience having witnessed previous severe weather emergencies within particular localities before (Connon,

2017; Twigg et al., 2011), as well as increasing interdependencies between natural, social and technological systems (Curtis et al. 2018). Previous research has demonstrated that social connectivity is important in determining outcomes, with recent rural in-migrant populations, and young, transient adults living in urban having been found to struggle more than others owing to greater levels of social marginalisation (Connon, 2017; Connon, 2019b). The findings of this study support the conclusions of this research as well as the arguments presented in the wider scholarship focusing on human responses to environmental hazards as they show that the extent to which people with disabilities are embedded within the wider local social context influences outcomes during severe weather emergencies (Connon, 2017; 2019b; Kelman et al., 2016; Wolbring 2009). Furthermore, although the study focuses on small scale events the findings represent an important consideration for policy makers and practitioners in the UK and for developments in Disaster Risk Reduction more generally as these smaller scale climate-related events, which have received far less scholarly attention than larger scale disasters, are predicted to increase in frequency over the coming decades at both the local and global scales (Bell, 2018; Bronfman, 2019; Cutter 2020). Given that these events are associated with a degree of human suffering which, as this study and others have shown (Connon 2017, 2019b), can be prevented when adequate support is provided that is responsive to the particular needs of those most at risk, finding ways to reduce these risks becomes important for reducing what can be regarded as an unnecessary and unjust human suffering.

The findings also demonstrate the significance of social and physical contexts in influencing responses to environmental hazards (Kelman et al. 2016; Wolbring, 2009). More importantly however, they show that experience of living with impairments, and having to make everyday adjustments to adapt within often inaccessible physical and social environments, shapes abilities to respond during extreme events (Ton et al. 2019). Where and when people with disabilities struggled to cope or adapt can be understood as the outcome of a combination of the presence of impairment *and* the conditions of the social and physical environment that, *in relation,* place limitations on abilities to adapt and shape experiences of living with an impairment more generally (Hall and Wilton, 2017). As this study shows, assumptions cannot be made about the vulnerability of people with disabilities; indeed, given an assemblage of favourable contexts, social relationships, and previous experience adapting to storms, people with disabilities are just as likely to, if not more so, be able to successfully adapt as those without disabilities. By adopting a relational conceptualisation of disability (Hall and Wilton,

2017), it can be seen that although having an impairment and being in a certain place and time potentially establishes a likelihood of difficulties being experienced during hazard events, negative outcomes are not inevitable. Multiple personal, social, and environmental factors interrelate to produce a range of potential (positive and negative) outcomes. Therefore, attention needs to switch from a focus on *either* the individual impaired person *or* the context, *to* the specific ways in which these combine to shape peoples' experiences of severe storms and power outages. Given that the quality of people's relations with others (family, friends, and carers) was so central in shaping people's experiences and coping in storms is significant, it is not that people with disabilities did not have corporeal vulnerability, but rather that they have knowledge of their limitations and need for (inter)dependencies on others to function and use their abilities. The capabilities approach (Sen, 2005, cited in Ton et al, 2019), with its emphasis on the agency and skills of people with disabilities and how they develop coping techniques (and how this can be constrained and enabled by social and structural forces), is also useful for explaining how participants in this study responded to the challenges presented by storms. The study showed that skills in 'converting resources' (Ton et al. 2019, 16) developed over time and in interrelation with others, including a person's length of residence, their profile in the local community, experience of impairment, and quality and quantity of social relations, equip people to cope, respond and realise their capabilities.

These findings also lend support to understandings of the impacts of extreme weather in terms of complexity and systems-based theories (Curtis et al.. 2018, Cutter, 2020), which highlight the interdependencies between social, natural and technological systems in influencing resilience at the local community level and demonstrate that spatial variations in vulnerabilities result from a combination of intersecting environmental, social, political, technological, economic and cultural factors that combine together to produce new challenges (Cutter 2020). The findings support the argument that the scale of complexity and extent of interdependency between the various constituent parts of the social and technological environment within larger urban settings in affluent societies can generate challenges to effective adaptation, as the parts are path dependent and therefore, what affects one part of the system, affects all other parts, with greater complexity allowing for less direct contact between and knowledge of all constituent parts (Curtis et al. 2018; Cutter 2020). The study findings show that in urban areas, greater dependency on supported living and formal care arrangements, together with lower levels of social inclusion, resulted in greater

adaptational difficulty and enhanced dependency on emergency support amongst people with disabilities during extreme weather when normal care arrangements were disrupted. In contrast, rural residents mostly demonstrated greater abilities to organise flexible, informal arrangements, owing to greater levels of place-based social connectivity, which translated into greater awareness to know where to obtain assistance from during an emergency.

The capabilities demonstrated by participants with disabilities within the study suggest that policies and practices designed to enhance emergency support for 'vulnerable' people during storms need to move away from providing and prioritising support on the basis of disability status alone. The study shows that UK PSRs, like other emergency support systems that identify and map vulnerable people in environmental hazard contexts (Donner and Rodriguez, 2008; Hemingway and Priestley, 2014), whilst useful in responding to emergencies, risk perpetuating unhelpful and erroneous notions of people with disabilities as *always* dependent, passive, and without capability, and conversely those without disabilities as capable and without need of assistance. The notion of vulnerability as a shared human attribute (Fineman, 2008) demands a more nuanced assessment of who is in need; as George commented above, 'I don't think you can put someone first just because they're disabled', noting that someone with children and without the support he has could be in greater need of assistance. Emergency response systems based on narrow conceptualisations of disability also downplay the importance of local geographies of place in shaping adaptability, and risk hindering the abilities of people with disabilities to make decisions and act of their own accord. Furthermore, PSRs conceptualise vulnerability as an individual attribute, whereas the study shows that people with disabilities are commonly in close relations with families, neighbours, and carers on a daily basis, who are all involved when an emergency situation occurs. The focus on the individual rather than the whole support network could result in non-appropriate targeting of emergency resources and increase the vulnerability of people whose situation places them at risk. Decentring the person with the disability (Duff, 2018) from the assessment of disaster response, and building an analysis of local geographies and support relations within which people with and without disabilities are situated, as well as recognising and drawing upon the knowledge and skills of people with disabilities rather than assuming dependency, will make for a more effective and more equitable response to needs during environmental hazard events.

Previous research has noted that the development of locally-based Community Resilience initiatives, including within the UK, may be useful for enabling local residents to self-organise to prepare for and coordinate responses during emergencies (Connon, 2017; Curtis et al. 2018; Fazey et al. 2018), as resilience plans can be adapted to suit particular local contexts and thus, may be helpful for incorporating the various social, environmental and technological factors that manifest together at the local level and influence how people respond (Cutter et al. 2018). Whether these would help meet the needs of those with disabilities in the UK remains unknown as no study has yet examined the effectiveness of these initiatives specifically amongst those with disabilities. Research examining care arrangements for older people during periods of severe weather has noted that as care systems have become less centralised and increasingly fragmented throughout the public, private and voluntary sectors, centralised top-down approaches for coordinating emergency responses have become less efficient (Curtis et al., 2018). Local community resilience initiatives that allow greater scope for communities to self-organise may be beneficial for enabling residents who rely on care arrangements, to obtain local institutional and informal means of support when normal arrangements are disrupted (ibid). However, as arrangements relying on self-organisation are dependent on social connectivity (ibid), they may be less effective in urban areas where people with disabilities are often more marginalised than others or for those in rural areas who are less well socially integrated compared to others. The study findings therefore lend support to suggestions that a combined, multi-level and multi-sectoral approach consisting of opportunities to enhance individual and community self-organisation at the local level and which co-evolves alongside an improved institutional emergency support system would likely be most beneficial (Curtis et al. 2018, Cutter, 2020). This would allow local communities to draw upon the capabilities of people with disabilities to develop plans for action that are suitable for local contexts, while ensuring institutional resource provision and that those who are more marginalised and dependent on formal institutional arrangements can obtain the support they require.

The findings also highlight the importance that prior experience of power outages during periods of extreme weather has for enabling people with disabilities to cope and adapt to future severe weather events. Existing research has cautioned however against devising new strategies based strictly on past events, as constant changes to the social, economic, political and environmental factors that determine outcomes at one point in time, may mean that strategies that worked during previous emergencies may not be suitable during future

emergencies (Cutter, 2020). Instead, it is argued that a more flexible approach is needed that enhances people's abilities to be able to deal with the uncertainties that future events may bring (ibid: 206). The findings of this study show that people with disabilities are highly skilled in coping with and adapting to uncertainty as a result of having to navigate day-to-day challenges that arise from having to adapt to challenging environments, which in turn, helped them cope with the uncertainties associated power outages and storms. This suggests that people with disabilities have much to offer in terms of knowledge and skill required to develop new society-wide approaches to Disaster Risk Reduction which are geared towards coping with uncertainty.

6.0: Conclusion

This study offers an original empirical contribution to research on disability and environmental hazards; the findings of which challenge the dominant narrative which is still reflected within much of the Disaster Risk Reduction policies and protocols that disability automatically equates with enhanced vulnerability (as critiqued by Hemingway and Priestley, 2014: Phillips, 2015). The findings suggests that policy understandings of disability in this context (Cabinet Office, 2011; Ready, 2021) should be revised to acknowledge the agency and capabilities of disabled people and the local contexts and interrelationships within which they are embedded. The article also presents an important contribution to the limited research on disability and smaller-scale hazards in the Global North and the effect of and responses to secondary impacts, such as power disruption. The UK PSR approach, like the majority of other emergency response strategies utilised in other parts of the world and which are based upon individualised conceptualisations of disability and simple understandings of the relationship between vulnerability and disability, although useful in an emergency situation, frames people with disabilities as dependent and risks undermining agency through assumptions of a lack of capability. A reformed approach is needed to mitigate weather-related hazard impacts for people with disabilities, one underpinned by a relational understanding of disability that recognises how agentic bodies (with a range of capabilities), environments, and objects interrelate to produce both potential vulnerabilities and effective coping responses (Hall and Wilton, 2017). This would help ensure resources for preparation and response are targeted at those most at risk of encountering difficulties. Future research could involve drawing on a larger sample of people and sites to further enhance understanding of the interrelating social and environmental factors that influence coping and

adaptation, and, most importantly, should involve working collaboratively with people with disabilities and local agencies to develop and enact new and appropriate approaches to preparation and response (Hay and Pascoe, 2019; Ton et al., 2019).

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