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Disruption in and across time

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Introduction

Disruptions reveal the hidden dynamics of everyday life, but what and how much they reveal depends on conceptual focus and analytical scale (Bennett, 2005). From one perspective, disruption can appear as a discrete and extreme event, a sudden break in time, normality and equilibrium. Power outages that last for several days, weeks or even months fit this ‘punctuated’ profile. From another point of view, disorder and order may seem to fuse into one another. Cyclical and seasonal water scarcities that modulate everyday life in California, for example, fit this second perspective. Although droughts may have intensified, people have become acclimatised to severe conditions: dryness has become ‘normal’ (Pincetl and Hogue, 2015). As the sociologist Hendrik Vollmer notes it may be more appropriate to think in terms of a ‘continuum of disruptiveness’, ranging from ordinary troubles to full-scale breakdowns (Vollmer, 2013).

How disruption is perceived has profound socio-political and material consequences, for it shapes how resilience is understood and how responsibilities are assigned between providers and users. Disruption can be viewed as a temporary intrusion into normal life to be mitigated and overcome as quickly as possible. Alternatively, it can be treated, even welcomed, as part of a continuous reordering of daily life. The former approach is exemplified by policy approaches that look to flexible consumers to respond to “crises”, such as the International Energy Agency (IEA) report *Saving electricity in a hurry*, (IEA, 2005). Yet an emphasis on collapse and crisis obscures the more prosaic efforts of repair and maintenance that keep networks operating as normal (Graham and Thrift, 2007).

Viewing disruption as part of a continuing story rather than an exceptional occurrence requires a more historical approach. During the twentieth century people in the developed North came to rely increasingly on externally provided resources and centralised modern infrastructures. In Canada, for example, a mere 765,000 residential and farm customers were connected to electricity networks in 1920. By 1975, that number had risen to 7 million, by 2007 to 13.7 million (Statistics Canada, 2007). However, it would be misleading to deduce from such aggregate connection figures that disruption has disappeared in the rich North. The very interconnectivity of current networks has arguably made urban industrialised societies more vulnerable (Lovins and Lovins, 2001; Taylor and Trentmann, 2011). While interconnected grids may be more efficient when working, when they go wrong, they go completely wrong. The United States saw a tenfold increase in major power outages (those affecting more than 50,000 customer homes or businesses) between the mid-1980s and 2012. The cascading power failure in North America in 2003 affected an estimated 50 million people (Kenward and Raja, 2014; NERC, 2004). And grids vary significantly between and within countries. The average American electricity consumer has to cope with 30 times as many service interruptions each year as their Japanese counterpart (CRO Forum, 2011). In British Columbia, rural residents living in the most remote regions can go without power for an average of 20–30 hours a year, whereas those living in cities such as Vancouver lose only one (Skelton, 2015).

This chapter explores contrasting understandings of disruption over time in energy and water systems. Disruptions give us short, momentary glimpses of the fabric of ‘normality’ as it is fraying and reveal the patterns in which practices and infrastructures are woven together. Rather than being isolated instances, disruptions over time shape expectations of a ‘normal life’.

Our historical analysis follows disruption in four directions: (1) what people actually did in times of disruption, (2) how what they do is shaped by particular socio-technical regimes, (3) how disruption and normality intersect *across time* and what legacy this leaves for future reactions and (4) the impact of networks on resilience and responsiveness.

Disruption in time

We begin with a specific case *in time* – the 2006 drought in southeast England – drawing on interviews with households that lived through it (Medd and Chappells, 2008). This drought was a consequence of two successive winters of below average rainfall. The eight water companies serving the region introduced water use restrictions for their customers. Domestic water users were the primary targets – 15.6 million people were restricted in their use of hosepipes, roughly one quarter of the British population (Environment Agency, 2006). Water companies viewed many outdoor water uses as ‘non-essential’ and thus beyond their statutory duties of supply. What people actually did in the drought, however, and how they experienced and coped with disruption reflected many different interpretations of ‘normal’ use. Many of those interviewed claimed already to be sensible about their water usage and to see little scope for cutting back. As one middle-aged, householder put it: “we do everything we need to do but we don’t do it with excess, and I think that’s reasonable”.

People assessed the 2006 drought against background knowledge of previous shortages, especially the record-breaking drought of 1976. A middle-aged father recalled this excruciatingly hot summer of his childhood and believed that citizens had been asked to do more to reduce consumption back then. Several householders remembered having put a brick in the toilet

cistern. As no such measures were discussed in 2006, many concluded that the current water problems were less severe. Collective memories of 1976 framed the 2006 drought, but so did personal memories of other disruptions. One middle-aged businessman, for example, recalled an overseas trip where he had been three days without running water, having to rely on seawater and bottled water to wash. The real hardship he found was facing the ‘ghastly’ reality of not having water to flush the toilet. It was a sharp reminder of the essential importance of water, so easily taken for granted at home.

In 2006, water use restrictions did prompt changes in daily practices, but to become permanent, a favourable mix of practical knowledge and technologies within a household was required. For some gardeners, watering cans were a purely temporary arrangement needed to see them through until the rains predictably returned. Several other households had kept rainwater tanks in the garden for years, but developed additional routines as the drought intensified. A retired older couple, for example, added containers for collecting more water. The couple had a sense of an impending regional water shortage due to a perceived rise in the local population, a long-standing ethic of conservation and caring for plants, a particular configuration of plumbing that made it easy to collect water directly from the drain outlet and the right combination of practical skills and outdoor space, with the water collection containers located in a convenient spot for garden watering. These favourable preconditions were reinforced by social networks and learning. The couple was impressed by a younger neighbour’s recycling efforts and they had also followed a friend’s advice concerning chemical-free dishwashing and laundry detergents that would not harm plants. Though this is only one household, we get a clear sense of the social, cultural, spatial and infrastructural factors that came together in shaping water use. These

considerations included inherited values (past), current challenges (present) and an anticipation of water and population stress (future).

For gardeners who had previously learnt to live with dry, sandy soils or other natural challenges, the drought did not entail a sharp break in normal practice, but instead formed a part of a continuation of trial and error with limited watering. Such acquired knowledge also reinforced people's preparedness to consider long-term changes such as abandoning watering plants altogether. A less dramatic response was to rearrange seasonal activities, for instance, by switching patio pressure washing from summer to winter or spring.

How people respond to disruption depends on the circumstances before, as well as after, a disruptive event hits. In their specific adaptations, people drew on established skills and knowledge, including their experience of what is 'normal' and what works. Such individual and collective pre-framings of normality constitute an important backstory to any disruption.

Macro structuring of disruption at different points in time

That people's responses are context specific does not mean that they are driven entirely by the social and cultural dynamics of the household itself. Beyond the household, the experience of disruption is shaped by politics that affect the substitutability of a scarce resource, infrastructural development and the collective dynamics of supply and demand. These structural conditions vary from one location to the next and under different politico-economic regimes. In some situations, water scarcities, energy crises and climate change have been used to promote certain scientific and political agendas (Bakker, 2000; Mehta, 2010). The 1995 drought in Britain was

the product of meteorological modelling, demand forecasting, corporate restructuring and deregulation under a neoliberal regime (Bakker, 2000).

As well as shaping the extent and type of shortage, the political context also affects users' sense of responsibility and blame. In England in 2006, leakage was often treated as symptomatic of negligent profit-focused privatised companies and contrasted with a public ethos of conservation in 1976, when water was still nationalised. (Taylor et al., 2008).

Droughts across the twentieth century provide an opportunity to follow the impact of different politico-economic regimes on institutional ideas about the rights of water users and the relative roles of consumers and providers in overcoming shortage. In England and Wales, water provision evolved first from locally fragmented to mixed public-private arrangements in the mid twentieth century, then to national centralisation coordinated through regional water authorities in the 1970s, and finally, since the late 1980s, to privatisation overseen by a national regulator (Taylor et al., 2008). These regimes placed radically different expectations on consumers and providers. In the early twentieth century, water companies had a statutory duty to provide constant domestic supply, but this did not apply in times of unusual drought when private users were called upon to reduce consumption. In the 1990s, by contrast, the need for restrictions was publicly questioned since supply had become the responsibility of private water companies and was regarded as a customer service that should be maintained.

The drought in West Yorkshire in 1995 was consequently as much a crisis of governance as a physical scarcity. While hosepipe bans, rota cuts and standpipes all played a part in drought alleviation, the unresponsiveness of many consumers was taken by some water companies as evidence that restrictions no longer had much effect in what had become a customer service based business geared towards giving consumers what they wanted (Bakker, 2002; Howarth,

1999). Many people were unprepared to see their water supply cut to help what were, after all, profit-making companies. Some metered customers argued that, since they paid for it, they would continue to use as much water as they liked. Ultimately, water companies were compelled to deliver water by tankers to villages at huge expense.

By the time of the 2006 drought, there was greater concern for ‘the environment’ and for the preservation of rivers and habitats. Abstracting more water for public supply was no longer considered a legitimate response, as it had been in 1976 when dramatic engineering interventions saw every last drop squeezed out of reservoirs (Andrew, 1976). Emphasis shifted instead to strategic long-term thinking and a shared responsibility for water stress. The government adopted a more proactive, precautionary approach and water companies focused on the need for careful water use, trying to instil in their customers a sense that drought was a ‘normal’ expectation when living in a relatively dry climate (DEFRA, 2006).

Connections between disruptions across time

If we see disruptions not as stand-alone moments but structured by regimes and experiences before and after moments of crisis, we can ask next what is carried over from one disruption to another and what is lost. How are infrastructures or persistent cultural scripts implicated in responses to recurrent disruptions? What role do political regimes play in sustaining or changing expectations and practices? In exploring these questions, we turn from water to coal and examine features of disruption and normality that recurred over several generations in the first half of the twentieth century.

Coal shortages were a frequent occurrence in Canada during the early twentieth century, but were largely localised. It was the two World Wars that propelled coal to the centre of national political debates. Coal was the dominant fuel in Canada in 1917. It was used to power the railways and factories and heat homes. By mid-1917, national coal shortages had escalated to a point where the Federal Government was forced to appoint a fuel controller, who ordered an increase in coal mining to ensure that the people of Canada got all the coal they needed (HoC, 1917a). Reality proved tougher: coal shortages continued into the harsh winter of 1917–18 causing significant disruption to everyday life that culminated with the introduction of heatless Mondays (Blake, 2011).

Disruption to daily life during the winter of 1917–18 did not come without prior warning. In June 1917, the fuel controller had already beseeched patriotic citizens to keep house temperatures down to prevent coal shortages in the coming winter (Keshen, 1996). Householders were advised to build bigger storehouses to stockpile coal. While a few large industries responded to calls to conserve fuel, relatively few local coal dealers or their customers did. Domestic and commercial users were reluctant to tie up money stockpiling when there was not yet any actual shortage of supply. Coalfields in the United States, upon which some provinces heavily relied, had reportedly increased their output (HoC, 1917b).

The main problem in 1917 was one of distribution: insufficient transportation capacity to deliver coal to where it was needed the most. The situation was exacerbated by the competing demands from railroad operators, firms and households as well as from war-related industries in the United States. Why did Canada not manage to overcome the fuel shortage by tapping into its own considerable coal reserves? The answer partly lay in the spatial nature of the challenge. Canada's coal shortage was an outcome of multiple local and regional problems that were

exacerbated by a priority system for meeting demands from different groups of consumers. Quebec, for example, usually relied on the delivery of two million tons of bituminous coal from Nova Scotia to see it through the winter, but in 1917–18 the bulk of the prospective mine output was targeted instead for local needs and railways. Mines in Pennsylvania were expected to fill some of this gap, but the cumulative pressures of coal demands from Ontario and increased wartime needs within the United States meant that this could not be guaranteed. In the western prairie provinces, meanwhile, supply was precarious because of labour strikes in Alberta.

The wartime coal shortages had all the ingredients of a perfect storm. In addition to natural factors, such as heavy snow and ice blocking roads and railroads, there were political, social and infrastructural pressures. One member of parliament openly blamed the government's laissez-faire policy: if the mines in the maritime provinces and prairies had been kept running during the summer, then there would have been more coal for the winter. But clearly, the problem was one of demand as well as supply. Households and coal merchants had failed to plan ahead and store sufficient coal when it had been available. What proved decisive in turning a fuel shortage into a full-blown disruption to everyday life, however, was householders' almost complete reliance on coal in certain areas, such as the prairies. The ability to cope was weakest where the lack of alternative fuels was greatest.

By December 1917, coal production and internal demand in the United States had worsened to the point that Canada faced a genuine supply shortage. The authorities now took more drastic steps. In Toronto, schools were closed. In the city of Guelph, people doubled up in homes. In Brantford, Ontario, women fought over scarce supplies outside the civic distribution centre. Here, some consumers were also charged with illegal hoarding (*The Globe*, 1918a). Such strategies reveal how some people had learnt to cope with shortages by storing and planning for

worse to come. What had changed was the nature and severity of disruption. Ordering coal ahead for future consumption was lauded as a civic act in the summer of 1917 when there was still coal to go around. Six months later, when stock had run out and the price of coal was going through the roof, it was a criminal act of hoarding.

Serious coal shortages returned in the Second World War, in the winter of 1942–43. The situation was marked by several of the same factors – Canada was dependent for two-thirds of its coal from south of the border as well as from the United Kingdom. The war, again, resulted in labour shortages in mines. Meanwhile, overall levels of coal consumption had risen to 43 million tons per year in 1943. On top of this, Canada suffered the most severe winter for half a century. As in the previous war, the government in the summer of 1942 urged consumers to plan ahead and take delivery of their winter coal in the summer, this time with help to pay for advance bulk purchases (HoC, 1943a).

Vulnerability was again highly regionalised. So was the potential for resilience. The situation was especially bad in Alberta, where the lack of labour had simultaneously meant a sharp fall in wood fuel. Shipping coal from Alberta to markets in Ontario was prohibited. In British Columbia, labour shortages similarly closed down the option of switching to alternative fuels for many households. The inhabitants of Vancouver instead took the axe to any piece of wood in and around their homes (HoC, 1943b).

These two coal shortages were separated by more than three decades but connected by a recurring debate about Canada's over-reliance on US coal and the threat this posed to national and provincial energy security as well as to national development. In Ontario, newspapers asked how in one generation thousands of potentially valuable acres of timber had been cleared, depriving the province of a vital substitute fuel (The Globe, 1918b). But it was especially

hydropower from Canada's own waterways that caught the attention of politicians and the media in the 1920s–30s (The Globe, 1921; 1933). Companies involved in producing hydropower had good reasons for wanting to increase the number of electrified households and increase demand and revenue. But the promise of greater energy autonomy and freedom from shortages of foreign coal certainly aided hydro's position in national politics and infrastructure development. As a Canadian newspaper already stressed in 1923: 'Every house wired for cooking saves Canada from importing two tons of coal – residential heating by electricity to make Canadians independent of American coal strikes and profiteers' (The Globe, 1923). 'White coal' was the political beneficiary of the shortages of 'black coal'.

Coal shortages reveal the dialectic between disruption and normality. By boosting new energy systems and infrastructures (hydropower), disruption helped bring about a new 'normality' that was premised on rising electrical dependency. Similar indirect effects can be observed in other national contexts as well. Coal shortages in Britain and the disruption of electrical and town gas supply in Germany during the Second World War made many households turn to new portable electrical heaters and other electrical appliances, as well as rediscovering wood fuel. In Britain, electricity consumption per person soared by 40 per cent between 1939 and 1944. Such increased demand favoured an expansion of electric power generation and infrastructures after the war (Hannah, 1979; Trentmann, 2017). At the level of daily life, these transitions were rarely smooth or straightforward. In Canada in the 1920s, the initial hope was that hydro would enable households increasingly to cook and heat with electricity, thus reducing the coal burden (The Globe, 1933). In reality, Ontario still imported 98% of its coal from the United States in 1957 and efforts to reduce dependence through a substitution with hydro or oil were only partly successful (Snider, 1957). Coal was cheap and

versatile, and many industries and households continued to rely on it as a supplementary fuel, especially when hydroelectric networks faced their own disruptions due to drought or infrastructure failure (The Globe, 1920).

Connecting the present to the past

The shift from coal to hydro-powered electricity did not only concern a substitution of one fuel for another. It was part of a larger transition from decentralised to centralised networks and from multiple fuel sources to single-fuel grids. What has been the effect of this shift for resilience, for the ability of people to cope with disruption and for the distribution of responsibility between infrastructures, collective bodies and individual consumers? Has centralisation increased or decreased the vulnerability to disruption?

Ice storms in twentieth century Canada, load shedding in Britain in the years after the Second World War and coal shortages in communist East Germany between the 1950s and 80s provide a set of contrasting cases that lets us observe recurring disruptions across time in association with network expansion. Severe ice storms are common in Canada and the 1959 ice storm was not the first to hit Toronto. But it was one of the first major storms after dependence on electricity had become the norm, prompting demands to move power wires underground to raise the city's resilience (The Globe and Mail, 1959; 1968). The expansion of the grid, moreover, meant that an ice storm would increasingly result in blackouts for rural as well as urban households. In 1969, for example, the ice storm that downed hydro lines caused a blackout for 10,000 families for up to five days in the rural municipality of Norfolk County, Ontario (Gilles, 1969). The recent conversions of these rural homes and farms to all-electric provision

had introduced new levels of vulnerability: no power here also meant no water, since pumps were electric. Some households had hung onto older technologies such as coal stoves or oil lamps, but found it hard to get the necessary fuel, as their supply and distribution networks had all but disappeared with the advance of electricity.

The record-breaking 1998 ice storm cut power for 1.4 million customers in Quebec and a further 230,000 customers in Ontario for up to 25 days. It illustrates how vulnerability continues to vary, depending on a region's particular trajectory of electrification (Bonikowsky, 2012). In Quebec, insurers found that the heavy historical investments in hydroelectric power in the province had created an over-dependency on electricity (Van Zyl, 2001). In 1996, electricity supplied 41% of all energy consumption needs in Quebec compared to a national average of 24%. The share of electricity for household consumption was even more pronounced at about 70%; the other 30% came from biomass, petroleum products and gas (Gouvernement du Québec, 2016; Lecomte, Pang and Russell, 1998). In eastern Ontario, just across the border, the ice storm also hit hard, but here disconnection times ended up being shorter and, significantly, it was reported that many people had back-up options when electric power failed. The 1998 ice storm not only toppled power lines, it also called into question the legacy of the socio-technical regime that had established the conditions for the monopolisation, nationalisation and over-centralisation of Quebec's power system. It triggered a discussion about the decentralisation of grids and power structures as a means of ensuring future resilience.

Longer-term responses to the 1998 breakdown took a number of forms. One was at the level of infrastructures: Hydro-Québec made significant improvements to their electrical power grid in the hope of decreasing the likelihood of future lengthy power outages. Equally revealing, though, were changes in the fuel systems and practices of households and firms. Many Quebec

homeowners and businesses, for example, purchased generators and non-electrical stoves and heaters (RMS, 2008). For them, resilience was no longer something to entrust to distant network managers, but a task to be taken into their own hands and homes. Disruption also intensified social cooperation and bonding (Trentmann, 2009). In the eastern Ontario town of Vankleek Hill, for example, where residents at the outskirts were without power for three weeks, the local restaurant was fortunate enough to cook with gas and staff were able to feed local residents and the hydro crews working to restore power. The local hardware store was another vital hub where people could get hold of candles, kerosene and lamp oil. Others faced the ice storm of 1998 with a fair bit of learning and skill acquired during earlier disruptions. A householder in rural Ontario recalled how her family's move from the city to the countryside had necessitated learning all about 130-volt light bulbs, power surges and outages (Government of Canada, 2015). As a consequence, they had collectively learnt not to rely on a single source of energy. Timely household acquisitions prior to the ice storm included a woodstove and natural gas supply. What was a catastrophic nightmare for others, this family experienced as a mere inconvenience. The experience of disruptive events – both extreme and recurrent – involved social learning that shaped future expectations of service and capacities to respond.

Comparing the British with the Canadian experience is useful in revealing several differences, as well as parallels, about how people coped with recurrent energy shortages as networks and dependencies on them evolved. Although coal in Britain was not rationed and electric power stations received preferential treatment, by the winter of 1946–47, it was necessary to restrict electric use. In February 1947, industrial consumers in large parts of the country were prohibited from using electricity altogether and households were banned from using electricity between 9:00-12:00 and 14:00-16:00. Britons coped fairly well with the

disruption, mostly treating it as an inconvenience rather than a crisis. Significantly, and in stark contrast with the later situation in Quebec, very few households were locked into all electric homes at this time. Most were therefore able to substitute their energy from a mix of gas, coal and electricity. In rural areas, some had wood-burning stoves and were able to get their fuel straight from the forest. Some shops dimmed or reduced their lighting. People also adapted by changing their temporal rhythms, getting up earlier to cook breakfast before the restrictions came into force or rearranging hoovering, washing and other household tasks that required energy (Shin and Trentmann, forthcoming).

A widespread criticism was the extension of existing restrictions of food and clothing (which were rationed) to sport, leisure and entertainment. In February, cinemas were no longer allowed to run their afternoon shows. Dog racing and mid-week sports events were prohibited entirely, with the partial exception of international cricket, which was considered too crucial for relations with the Commonwealth. The BBC had to reduce its programming from twenty-three hours to six and a half. In addition, households in restricted areas were urged to switch off their radios during specified hours. In general, housewives suffered most, since they were stuck at home and had to reschedule household tasks, in the cold and without entertainment. As one of many complained to a newspaper in March 1947, she was ‘tied all day to the house, with a young child, no coal, not enough food’. At least she wanted to have ‘music while she works’ (Farmer, 2013: 31).

While the Labour government was acutely aware of the unpopularity of these measures, there was neither popular rebellion, let alone crisis. Tellingly, the government relied on an ‘honours’ system without recourse to wholesale disconnection or heavy-handed controls. True, some people continued to turn on their cookers and radios regardless, but most households

appeared to have respected the system. Many felt worn down and frustrated that wartime constraints and disruptions never seemed to end. At the same time, such wartime experience provided valuable lessons in how to absorb these temporary interferences and keep on living. There had already been twelve incidents of load shedding between 1944 and 1946 and they reached a formidable 267 in 1950–51. By this time, the war and blackouts had prepared Britons to shift activities from one hour to another. The collective spirit of the Blitz was an important ingredient in this preparedness, but it was also helped by the consultative and democratic process through which energy shortages were mediated for households. Load shedding after the war continued the local organisation of fuel control during the war. When coal, gas and electricity were nationalised in 1947–48, consumers were represented on consultative councils. These favourable contexts protected domestic consumers from more serious and costly forms of intervention, such as peak pricing.

Resilience was distributed radically differently in socialist East Germany. Comparing this case with the British and Canadian ones highlights the importance of politics in shaping the very nature and effects of disruption for people and practices. Energy shortages were a systemic challenge for East Germany, from its foundation in 1949 all the way into the 1970s. Partly they were the product of geography and history. East Germany was almost exclusively dependent on its own lignite or *Braunkohle*. Lignite, unfortunately, has a high water content, which created difficulties for mining and transport in freezing winters. But a lot of the shortages were also man-made political consequences produced on the demand side. In its first few years, East Germany had repeatedly targeted private households and rolled out power cuts during peak hours. The uprising of 17 June 1953, which almost toppled the regime, led to a radical change in approach. Households continued to receive patriotic calls to do their bit and save electricity, but the regime

now thought it better to abstain from direct interference in the home. Instead, industry had to bear the brunt of shortages. Large industrial consumers were set electricity quotas for peak hours and pressed to introduce night shifts.

The reactions of industrial and private consumers during energy shortages reveal how the political context makes changes in practice more or less attractive. The response of industries was mixed. Some firms adapted their operating schedules or tried to save energy by switching off ‘unnecessary’ lights and whitewashing rooms to reflect light better. Many others ignored the quotas and preferred a fine to slowing down production. Reaching production quotas mattered more than exceeding an energy quota. This observation reminds us that each disruption is relative – not only in relation to normality, but in relation to other disruptions. For a socialist firm, the constant disruption in the arrival of raw or semi-manufactured materials necessary for their own production was a much bigger headache than repeated energy shortages – after all, calls to reduce consumption during peak hours could be ignored at the moment (at the risk of a fine), shifting the problem onto other users. The regime tried hard to lower the evening demand by shifting activities into night-time, but with limited success. In 1963, a spot check revealed that only a third of enterprises had been prepared to move working hours (Landesarchiv Berlin, 1963).

There was also little incentive for private consumers to change their lifestyle – although additional nightshifts had a big knock-on effect on women and children, not least for the hours of childcare. Household coal and electricity were cheap and, like housing itself, heavily subsidised by the regime, which treated them as a basic need. Activists put up posters in stairwells urging households to abstain from using irons, hoovers and heaters in the morning and evening hours, but few took any notice. Energy savings campaigns were themselves hampered by product

shortages – low wattage 15 or 25 W light bulbs were much praised but almost impossible to obtain. The housing shortage exacerbated problems. One reason why portable electric cookers and heaters were so popular was that they enabled lodgers who were given a room in an apartment to cook in the privacy of their own room instead of running into conflict with the main tenants in what the latter considered ‘their’ kitchen. It was only in the early 1980s that the regime forced users to hand over electrical heaters and night-storage heaters unless they had obtained a special license. That three quarters of the tens of thousands of applications for such licenses were granted gives a sense of how few East Germans were able to switch to substitute fuels.

Finally, there was lack of political understanding and collective will. In 1971, for example, there were plenty of people who blamed that year’s energy shortage on the regime itself and its lack of investment in coal mining and power stations. Lack of power was treated as symptomatic of the wider failure of socialism. Such sentiment did not bode well for energy savings campaigns. Young pioneers did set up warm chambers for freezing pensioners and the National Front did manage to entice a few households to cook for vulnerable neighbours, but overall such instances of activism had little long-lasting effect. The minute such campaigns were over, electricity consumption rose again. Unlike in Britain, most East Germans did not see any reason for changing the normal rhythm of their day (Bundesarchiv Berlin, 1971).

Conclusion

Disruption and normality are inextricably connected in time. By feeding into each other, they help shape the relative resilience of infrastructures and practices. At first glance, disruptions may appear as departures from normal life, but once placed in their historical context, they emerge as

part of it. Our examination of specific cases of disruption is meant as an invitation to others to deepen our understanding of the social interweaving of order and disorder over time.

The sociologist Vollmer (2013) has stressed that disruption is not something that can be externally defined. It demands an understanding of the social situation in which it takes place and micro-sociological attention to what precisely is disrupted and repaired. Our analysis of the 2006 drought shows how disruption was experienced in highly differentiated ways. For some it was an acute crisis, for others a minor irritation. Such micro-sociological observations of the here and now need to be complemented by temporal analyses of learning and memory across time. People's personal life histories interact with collective experiences to frame how a particular disruption is received, what counts as 'normal' and how people respond.

Sociological studies of disruption have tended to focus on interpersonal relations, social skills and social networks. These matter but should not be at the expense of politics. Our analysis highlights the importance of politics in structuring how disruptions proceed and in defining what normality and disruption mean in the first place. People's responses to disruption have been framed by the politics of provision that govern services and material supply and distribution at a particular moment. These arrangements have changed over time, and the distribution of responsibility between providers and users and between infrastructures and practices has shifted with them. Nationalised systems are different from privatised ones. At the same time, recurrent disruptions can generate a political momentum across time that contributes to future expectations of what should be 'normal' and what kind of infrastructures and policies should be deployed in service of such visions of normality. Disruption, in this sense, is often not a temporary blip but a political spur to action that mobilises arguments and interests for national policies and development. The generation of these new 'normal' arrangements, in turn, feed into the

dynamics and experience of future disruption. A disruption emerges from social situations as a nexus of occasions in which activities and expectations are coordinated, but the force of the nexus and the type of coordination is a function of politics.

Finally, what differences have networked infrastructures made to people's resilience and the responsiveness of daily practices at moments of disruption? Responsiveness to disruption varies in relation to past decisions about network development and the relative ease with which users can switch to substitute fuels and materials. Just as important, however, is social and technical learning over time. Disruption is usually defined in terms of a deficit of material resources. But human capacity matters, too. Coping with ice storms, fuel crises or food shortages involves skill, competence and ingenuity. These human resources can be rallied by calls for collective action, but they cannot entirely be called into existence by them. They are partly built up (or depleted) by long-term processes of social learning (and forgetting). Repair, maintenance and adaptation are ongoing processes in daily life. A high degree of dependence on centrally coordinated infrastructures can minimise but never entirely replace them. Modern networked societies have not been able to eliminate disruptions. What has changed is the delegation of repair and the distribution of responsibility and cost. As the future of centralised infrastructures is called into question by climate change and the need to bring basic services to poor and developing societies by less costly and decentralised means, there is a lot that can be learned from viewing disruption and normality as members of the same family rather than as enemies or opposites. Instead of treating disruption as a deficit to be overcome, it might be time to reclaim it as a moment that cultivates valuable knowledge and skills of adaptation for a future normality.

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