

Finding a New Normal: The Role of Technology in Life Disruptions

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ABSTRACT

In recent years, the HCI and CSCW communities have begun to examine the role technology plays in personal, rather than professional settings. Part of this work has begun to address a specific class of life events that are unpredictable, uncontrollable, and destabilizing—what we refer to as *life disruptions*. While each disruption is unique, we find that patterns of social and technical reconfigurations occur in a variety of different contexts. Drawing on three case studies of severe life disruptions—intimate partner violence, homelessness, and death—we remark on the ways that life disruptions prompt a journey towards a “new normal.” We enumerate the common lessons learned among our case studies and seek to inform future technology research and design work which may involve life disruptions.

Author Keywords

Disruption, intimate partner violence, homelessness, death, new normal.

ACM Classification Keywords

H5.m. Information interfaces and presentation (e.g., HCI): Miscellaneous.

General Terms

Design, Human Factors.

INTRODUCTION

Following an adverse life event, technology can play a key role in how we react and adapt. Several distinct HCI and CSCW projects have focused on these adverse life events, which we term *life disruptions*. Examples of such disruptions include moving house, divorce, bankruptcy, abuse, and death. While each life disruption is unique, there are patterns in the ways people and technologies are reconfigured following a disruption. In this paper, it is our goal to synthesize three different research projects to identify and characterize these reconfigurations in more detail. In so doing, we provide a resource for HCI researchers and designers working around other life disruptions.

Of the variety of disruptions that might occur, we consider three specific case studies from our research: escaping and recovering from an abusive partner, dealing with episodic

homelessness, and coping with the death of a family member. While each of these cases may appear unrelated, they each share the characteristics of being invisible, stigmatizing, and long-lasting disruptions. Escaping a situation of intimate partner violence is often invisible as victims cope with shame; becoming homeless due to job loss is frequently kept private to avoid stigma and discrimination; and while a death in the family will initially be met with sympathy and support, the disruption to individual and domestic normalcy often outlives public forms of mourning and acknowledgement.

In this paper, we reflect on our fieldwork from these three case studies, and share vignettes that vividly depict the lived reality of finding a “new normal.” While we recognize that the disruptions themselves—abuse, homelessness, death—cannot be mitigated directly by technological intervention, we find it productive to reach across case studies to illuminate some thematic similarities that these disruptions share. In the discussion, we present three of these themes as ways of thinking through technology’s role in life disruptions, and in so doing, contribute to our growing understanding of how people use and relate to technology during times of personal crisis and upheaval. We then conclude with potential directions for technology designers seeking to support individuals and communities in the journey towards a “new normal.”

RELATED WORK

Disruptions in HCI and CSCW Work

We often consider the home as a certain kind of place [17]—a “haven in a heartless world” [22]; we assume that families operate on consensus, that family life is fulfilling and restorative, and that routines support cooperative and generative action. These characteristics have led us to appreciate alternate modes of technology use in the home including the repurposing of technologies that might be familiar from the workplace: research has examined technologies for entertainment [46], socialization [7], and family cohesion in the context of the routine and ordinary [39].

Two of the broader themes that tend to run through domestically focused HCI and CSCW research are the role of routine in family settings and the collaborative nature of different forms of domestic work [9,15,33]. Routine-focused research has studied the work needed to set up and maintain home network infrastructure [16] as well as the complex gendered division of domestic work and privacy [39]. Each focuses on different accounts of how domestic routine is

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CSCW’12, February 11–15, 2012, Seattle, Washington, USA.
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maintained in the face of technological change, acknowledging that the home is a dynamic environment not always denoted by stability or social stasis.

An important part of maintaining these routines is the work done by different members of the home and the negotiation of that work as responsibilities evolve. In examining the social dynamics of the home, researchers have highlighted the collaborative and shared nature of domestic technologies. O'Brien and Rodden, in an ethnographic study of a "set top box" prototype, recommend that technologies for the home should be designed to fit the "cooperative nature of home life" [34]. Similarly, Brush and Inkpen found that the assumption of individual computer accounts—arguably a holdover from workplace privacy protection standards—did not match domestic use, as many of the families in their study shared "pretty much everything" [7].

Beyond the roles of routine and collaboration in the home, we also find work that has focused on the relationship between play [4] and intimacy [20] within the home. Arguably, play and intimacy can be viewed as an important component to the social glue that makes a home and differentiates it from other settings where technology is used, such as the workplace.

This earlier work begins to show how interconnected the home is, both socially and technologically. Family members establish routines of technology use, they divide the work necessary to keep the technology working, and they engage with the technology for reasons of enjoyment, connection, and intimacy. The effects of life disruptions ripple out through these routines, reconfiguring work divisions, and imparting different meaning to the technology mediated experiences shared within the family.

CSCW research concerning divorce provides two examples of how technologies are involved during this life disruption. The first example looks at the role technology can play in helping maintain meaningful contact between children and their divorced (and separated) parents [35,47]. This thread of research directly addresses how families marshal different networked technologies to manage the difficult situations that arise as they attempt to reestablish routine and regular contact after the divorce. In a different example, Dimond *et al.* point to the significant difficulties that arise when family members who were relied upon for technical support are no longer present due to divorce or death [10]. Changes in family membership mean that some family members find themselves having to attend to their technology in new ways as the person they relied on to maintain things like the home network is no longer present. As this more recent work starts to engage with some of the diversity of human experience that plays out in the home, it retains some characteristics of the generative and consensus driven home that pervaded earlier domestic studies. Divorced families are presumed to be actively engaged in easing the burden of separation on their children, and extended families are assumed to be willingly enlisted to help maintain home technologies following separation or divorce.

It is along these lines that we focus our attention: on the serious life disruptions that upend routine and change the

social and technological relationships within the family. We recognize that routine, and the effort to reestablish it, plays a crucial role during disruptive life events [31], but that search for routine can often be isolating in unexpected and invisible ways. By examining these conditions—when domestic routines and work are disrupted, when technology use is upset, and when private support networks are stressed to breaking—we gain an analytic perch from which to better understand the range of experience in the home and to consider how technology might be enlisted in reestablishing a new normal.

CASE STUDIES OF LIFE DISRUPTIONS

Building on this previous work, we turn to consider three disruptive life events that occur in private life: intimate partner violence, homelessness, and a death in the family. Each disruption is substantial and grim, however, they collectively represent the extreme realities of domestic life that highlight tensions between public and private. They also expose challenges associated with connecting to and making use of infrastructure—both social and technical.— They highlight the struggles that occur as these disruptions transpire and then pass. Each case study is the result of substantial qualitative fieldwork completed in each of these three settings as well as a technology intervention deployed at one of the research sites.

Case 1: Intimate Partner Violence

Intimate partner, or domestic, violence provides a stark counter example to tranquil visions of domestic life [12]. Intimate partner violence occurs across the world, in many different cultures and is not uncommon even in "developed" countries: in the United States and across Europe, one in four women will be physically or sexually assaulted in her lifetime [44]. Child abuse is often concurrent with partner violence—up to 60% of children are also abused in domestic violence cases [9]. Furthermore, contrary to popular assumptions, in the U.S. partner violence occurs at the same rate in same-sex relationships as it does in opposite-sex relationships [38]. In short, it is a pervasive and often invisible disruption.

The upshot of these statistics is that violence in the home shifts the conversation from how families work together to coordinate their activities, to how affected individuals exercise their need for privacy, separation, and survival. In intimate partner violence research and activism, leaving an abuser is seen as a crucial act for breaking the cycle of partner violence [18]; it requires a reconfiguration of private life and a crossover into publicly provided programs and services. However, with personal technologies, it is unclear that this act severs abuse as completely as we might think.

In the winter of 2010, one of the authors interviewed ten female residents at a domestic violence shelter after volunteering for several months. For data collection, we recorded semi-structured interviews to explore how technology was being used by the women at the shelter. We asked questions such as, "Tell me about how you use your cell phone" and "Tell me what you do on the computer." Interviews were analyzed using thematic analysis; this includes first transcribing the interviews, identifying the different patterns of

experiences, and identifying sub-themes within those patterns. The author validated the coding during a “safe technology” workshop at the shelter. Since there are few empirical studies on intimate partner violence and technology, we wanted to understand the landscape of how technology is generally intertwined within these survivors’ lives. Survivors of partner violence, after leaving their abuser, have a heightened need to protect their privacy while also coping with new routines and changes in social and resource infrastructure. In this disruption, technology both helps and hinders, as the very same technologies that are used to find jobs, housing, and provide emotional support are also used by abusers to threaten and harass [11].

Harassment and Safety

Text messages were the most frequently reported medium for harassment as seven of the ten participants had received harassing text messages from their abusers. Janelle¹, who fled from her abuser with her four children, explained how her abuser used to threaten her with text messages such as, “*I’m gonna gut you.*” She also experienced harassment from her abuser’s family on Facebook: they posted messages on her wall accusing her of stealing the kids. Her abuser posted harassing messages not only on her Facebook wall, but also on her sister’s Facebook wall.

In a similar case, another woman at the shelter received a text message from her husband stating that he was tracking her via the GPS on her mobile phone. Despite the technical reality of whether her husband could actually track her location, the mere idea of that possibility prompted the woman to abandon her mobile phone by throwing it out the car window. This may indicate that the perception of privacy when using technologies such as GPS are not always aligned with technical reality. This misalignment has the potential to cause emotional trauma and disconnection as individuals perceive a danger that may not be present and abandon technologies that otherwise provide a life-line to their social support networks. Situations such as these exemplify how privacy needs are enacted [36], indicating a need for designers to consider physical and emotional safety in addition to functional usability.

Tactics to Maintain Social Support

Abusers often exerted control over their partners by isolating them from their social network or other resources; this control often continued even after survivors left. As already pointed out, these threats manifested through mobile phones and social networking sites, but were not limited to direct harassment to the victim. For example, Serena’s abuser tried to control who she could communicate with on her cell phone by threatening her family members to get her phone number. As a result, Serena decided to stop calling her family to protect them. For another survivor, Facebook became problematic due to her abuser’s harassment. She stopped posting any content, and instead just logged on to view her sister’s updates in order to feel connected to her. She said that her “*life on the Internet is over.*” She was also too

afraid to apply for jobs online because information she had to release, such as her social security number, could potentially link her to her physical location.

The social isolation experienced by the residents was further compounded when they moved into the shelter. As a result, residents had to work to maintain their social connections. One of the most common strategies the women used was to get a new phone and register it under a pseudonym. As one participant said, “*You can register it under Miss Beyonce Knowles and they don’t care.*” In this way, a survivor could replace her phone number if her abuser discovered it. However, this was not always possible if participants could not afford to continually set up new pre-paid accounts or if they relied on government-issued phones such as those provided by SmartLink program sponsored by the federal government of the United States.

Another example of how the women developed creative strategies for maintaining their social support networks comes from Ayana who sometimes talked to her mother-in-law for emotional support (her mother in-law also had an abusive husband). The challenge for Ayana was that her husband sometimes tried to call from his mother’s home phone, so Ayana was never sure who was trying to call. To remedy this, Ayana recorded a voicemail stating that she does not answer calls, but will respond to voicemail. Her mother-in-law learned to leave a message, telling her that it was okay to call, and then Ayana would call her back.

Intimate partner violence disrupts social support networks—the friends, family, and institutions upon which we rely. Survivors of partner violence must grapple with prolonged harassment and threats through technology, yet they rely on these same technologies to seek out the support and resources needed to move on—information about counseling, jobs, housing, and childcare. Furthermore, for people escaping an abusive relationship, location information becomes problematic. Due to this, survivors are wary of new technologies as many devices are now embedded with GPS and other tracking mechanisms; these technologies take a certain amount of technical expertise to feel confident that location information is appropriately managed. As seen in the ways that residents of the shelter try to maintain their access to social networking sites or mobile phones, it is not feasible to just quit Facebook, stop using a mobile phone, or otherwise disavow personal technologies. These technologies provide survivors of violence much needed social connections and public resources in times of isolation and change.

Case 2: Homelessness

Starting in 2009, one of the authors began extensive fieldwork and participatory design activities at an emergency homeless shelter for single mothers [27]. The shelter was relatively small, housing up to 8 families at a time for 30 to 90 days. The research conducted at the site began with four months of fieldwork, including ethnographic observation along with semi-structured interviews held twice a week with both shelter staff and residents. Notes from the observations and fieldwork were continuously analyzed and used to further refine the interviews. Following the initial field-

¹ Names throughout the case studies have been changed to protect participants’ identities.

work, we worked with the staff and residents to co-design an information and communication system to support the staff and residents.

The deployed system was designed to address three main goals: help the staff more effectively share resources with the residents; enable residents' access to information and expertise when and where they needed it via mobile communication; and provide both staff and residents a means to express their knowledge and expertise together [25]. Each of these goals was formulated in response to the specific ways homelessness disrupted the lives of the women at the shelter. An important point to raise here is that the mothers were homeless for economic reasons such as job loss or sudden medical expense. As such, they identified as working mothers, not as homeless mothers, and viewed their time in the shelter as an unexpected and unwanted disruption to their normal lives.

Given this situation, we focused on the information and social needs of the mothers and on expanding the constraints under which those needs were met. We learned, for example, that the women were coping with information overload and that helping the mothers and the staff impose some order and timing to the information being shared would help the residents make better use of available resources. For the staff, we learned that their contact time with each resident was limited in part because the shelter was only open at night. By providing facilities to encourage mobile communication, the staff could extend their reach, amplifying their support while still managing their case load. Finally, we worked to create a shared message board where both residents and staff could post information, thus providing a way for each to express their knowledge and expertise, and alter the expectations of where to turn for help and knowledge.

"Getting Connected"

Broadly, the challenge of staying connected to different kinds of social and material resources is a primary concern for many homeless individuals [26]. The social support of neighbors and friends becomes strained or broken simultaneously with interruption to the material resources of institutions such as schools and places of employment. As a result, one of the first things the women at the shelter discussed was the need to "*get connected*" to public entities like support groups, childcare facilities, employment services, and entitlement programs to help them reestablish their independence. As we will revisit in the discussion, it is this mix of social and material resources that comprise the durable infrastructure upon which these women depend [23,40].

Within this disruption to social and material access there were some compounding factors with which the single homeless mothers in our shelter had to contend. First, for many of the mothers in our study, a consequence of moving to the shelter was displacement from their social support networks and more isolation as sole providers for their children during a time of extreme instability—an isolation in many ways similar to that of the previous case study. Second, the disruption to material access had an immediate

impact on the children at the shelter [37], as they found themselves in new schools or making long bus trips to remain at the school they were enrolled in before moving to the shelter. Both of these interruptions served to displace established routines [31], which, in combination with some of the common risk factors and characteristics of single-mother poor families [28], exacerbated the stress on everyone [3,24].

Two specific examples illustrate how getting cut off from different forms of support affected the women at the shelter. The first, Jacquie, had to contend with the impact of being cut off from friends and family while she tried to find employment and attend to her son (a boy in his early teens). One of the first challenges she faced was finding work that she could balance with her responsibilities as a parent. Initially, Jacquie had found second-shift work—from 2pm to 10pm—but because the shelter would not allow her son to be there alone in the evenings, she had to prolong her stay until she could find first-shift (9am to 5pm) work. Part of the challenge Jacquie faced was gaining employment without being able to enlist the kind of social support she might have otherwise had access to; she could not initially rely on the support of her fellow residents and she was disconnected from her previous life by virtue of having to move to a shelter in a different part of town.

Nancy, another woman at the shelter, was looking after her grandchildren. In some regards, her relationship to her family was reversed. She had been—and continued to be, despite becoming homeless—the stable go-to person for her adult children. She became the guardian of her grandchildren while her own daughter was in a substance abuse program. Nancy became homeless when her unemployment ran out and she was unable to resume work due to severe health problems. As a result, she had to contend with connecting to new forms of institutional support for health and housing while acting as the main support for her family.

Both Jacquie and Nancy became steady users of the system we deployed at the shelter. They actively used the messaging features to stay in contact with the shelter staff, who helped them arrange appointments with employers, receive reminders and supportive messages to secure housing, find childcare, and even manage hair appointments. They also used the shared message board to post messages about resources they found as well as get information on housing programs and job fairs. The routines they developed centered around daily messages sent to their case worker to check on specific programs or follow up with different employment opportunities. They also used the shared message board, passing by it every day and checking to see what new information was there that might be useful. One of the important elements of their interaction with the technology was that it supported different modes of seeking information—either directly from their case worker, or through announcements posted on the shared message board—and it turned information seeking into an active endeavor, where they each took responsibility for seeking what they needed rather than wait for it to come to them.

Case 3: Death of a Family Member

One of the most common disruptive moments in private life is a death in the family. Despite the ubiquity of death, it is a topic that designers and researchers have only recently begun to address as it plays out across various computational platforms. Compared to other life disruptions, death appears frequently; all families will experience multiple deaths as time moves on, and for each member of that family, every loss is unique. Furthermore, a death is irreversible (unlike, for instance, a financial crisis); families must learn to cope rather than struggle to recover what they have lost.

In this case study, we draw on fieldwork conducted by one of the authors with middle-aged parents who had lost a child. Based on three focus groups with 24 bereaved parents, meetings with community support group organizers, and consultations with mental health professionals, we have learned how the death of a child profoundly disrupts the lives of parents. Buckle and Fleming characterize this type of loss thusly: “[t]he fracturing of one’s assumptive world results in substantial psychological upheaval, and the reluctant recognition that the world is no longer safe, orderly, and fair leaves bereaved parents feeling fearful and vulnerable” [8]. Over time, parents must learn to live with the death of their child despite their grief and powerlessness, and must adapt their lives to reflect this new reality.

The Journey Following a Loss

In our focus groups and interviews, the time following the death of a child was repeatedly characterized as a “journey” by both the bereaved and professionals alike. This journey, starts with a period of intense emotional turmoil accompanied by the pressing need to organize religious and communal activity. During this time, the bereaved are thrust into a circumstance wherein technology is used to spread the news, receive condolences, and make plans. In an example of this, Charlotte, a bereaved mother, described using email to announce the death of her twins: *“I didn’t want to make phone calls, I didn’t want to have that conversation. So, I’m writing an email telling people that I just lost my kids, and it felt weird at the time.”*

However, as time progresses, and the flurry of activity fades away, bereaved parents come to value isolation, quiet, and privacy [1]. Focus group participants described *“hiding out at home”* for extended periods following their child’s death. Terry, a bereaved mother, decided to shut off her mobile phone and screened calls to her landline in order to control her privacy: *“These people don’t understand where you are. They get offended if you don’t respond. I know I have to pick up the phone, and I don’t want to, but you feel obligated to. Sometimes it just takes everything out of you to return that one call.”* In these cases, technology acts as a double-edged sword. In some ways, it overexposes the grieving parents by making them readily available for phone calls, emails, text messages, and so forth. In response, participants described the need to take actions to shelter themselves from others, and to choose isolation, silence, and disconnection as they reacted to their loss.

As more time passes, the death may usher in social disorder in the personal lives of the bereaved. Grieving family mem-

bers may be riddled with guilt, anger, or depression. In the case of a child’s death, married parents may blame one another for the event, or have different, incompatible styles of grieving; as one participant in our focus groups put it, a child’s death *“can make or break a relationship.”* Relationships with surviving children become strained as they must model strength to their children while taking care of themselves [8]. Bereaved parents in our focus groups also remarked on how their child’s death was a turning point in their social lives, where they discovered who their “real friends” were by virtue of their continued companionship during this life disruption. The new social arrangements precipitated by a death are rarely considered in the technologies we design, as long-standing patterns of “normal” communication are disrupted by permanent changes in frequency, duration, and emotional timbre.

As the years continue on, bereaved parents slowly come to develop and accept a new definition of their own identities, and what their role is within their social circles. For example, Rebecca, a bereaved mother whose daughter died 28 years ago, described that even though her child is dead, she is still a part of their family, and Rebecca is still a mother: *“For some of us...we’re still sort of parenting in a sense. There is a great need for us to. We’re cut short in our parenting—this is still innate in all of us.”* Parents may continue to include their deceased children in domestic routines and events; they may mark the child’s birthday or death day, or set an extra place at the dinner table. Continued communication with the deceased is also a common occurrence—beyond simply “speaking” to the deceased, many people will write to them [45]. These writings, traditionally highly private, are moving into the public eye as the bereaved leave public messages on the deceased’s Facebook or MySpace profiles [6,14]. The concept of routines as stabilizing forces in technology use and adoption is thus rattled by the inclusion of a dead participant in the routine, and this life disruption can threaten the stability of relationships between living household members. For the bereaved, technology increasingly plays a role in how they cope with their loss over time and rebuild their lives [30].

DISCUSSION

In the case studies above, we presented three different types of life disruption and illustrated how technology is implicated during these disruptions. In reflective discussions between the authors, we noted how the participants in our fieldwork share the search for a “new normal” – a reconfigured lifestyle where previous social and technical infrastructures have been torn down and replaced with tenuous and emerging social groups and resources. In this discussion, we revisit and synthesize the findings from the case studies to identify three thematic lenses that may help technologists think through life disruptions. We begin with thoughts on the shifting landscape of personal relationships as mediated by technology before discussing how social and technical infrastructures are used, broken, and then reformed in light of life disruptions. Cutting across this process, we describe some of the ways that privacy work is performed and in particular how technology and communities work together to achieve this new state of life.

Dynamism of Social Life

Relationships formed in private life are commonly considered to be at-will, desirable, and productive. In Western culture, we often think of families as groups where members contribute to family well-being through the provision of emotional, instrumental, and functional support. Outside the family, we commonly think of fun, enlightening, and nurturing friendships. However, as our case studies have shown, these relationships are not always positive, desirable, or beneficial to an individual's well-being. Personal relationships change over time: good friends can become distant, lovers can become abusive, and our closest confidants may become ill or die.

Our case studies add further nuance to how we conceive of the networks of institutions and personal relationships—what we call the social infrastructure—that families rely upon to create and maintain a sense of stability. First, we must acknowledge that relationships are not permanent; they begin, and they must eventually end. The ending of relationships may occur for reasons outside of one's control (e.g., death), or a person may volitionally end a soured relationship (e.g., intimate partner violence). Many systems pay attention to establishing relationships, but less thought is given to how these relationships represented in the system might gracefully end or change. One study on “unfollowing” behavior in Twitter begins to speak to the dynamics at play [21], but little is known about this behavior in relationship to life disruptions specifically. Harassment through text messaging and Facebook stalking provide two stark examples of technologies that fail to degrade gracefully even when one party attempts to prune their social network or altogether remove themselves from exposure. Similarly, when Facebook began suggesting that users “get in touch” with a dead friend, it sharply demonstrated how a lack of consideration for changing relationships could be problematic [21], and demonstrated the poor tools within the technology for dealing with deceased users and the variety of friends and family who may each have different ideas of appropriate and meaningful ways to mourn and remember.

Relationships are not universally or continually positive; relationships can be roller coasters, with periods of great happiness offset by periods of anger, resentment, or apathy. Bereaved parents sought solace in the home to temporarily escape from friends and family and cope with their grief; alternately, victims of partner violence may be in relationships fraught with mistrust and anger and need to seek refuge in a shelter. This consideration is relevant to systems that aim to design for reciprocity or mutual disclosure [2,19]. While there are certainly healthy relationships, it may be inappropriate for systems to *require* such reciprocity given the range of legitimate reservations someone might have for allowing this sort of technology-mediated intrusion. We must appreciate that human relationships are dynamic, and designers cannot presume that a given relationship in a multi-user system exists as a completely positive and desirable arrangement.

A Shifting Socio-Technical Infrastructure

Disruptions, by their nature, upend the routines, resources, and patterns that we follow during “normal” periods. Our case studies show us that what we take for granted is actually subject to destruction or disturbance. These disturbances are latent foundational parts of our normal lives that provide a unique space for inquiry in domestic HCI. However, by thinking about the vulnerability of the home's social and technical infrastructures, we see how computing plays a part in maintaining, rebuilding, or tearing apart this infrastructure after a disruption comes to pass.

Because relationships are dynamic, so too is the support that comes from them. The people upon whom we rely to install, maintain, and operate personal devices may not always be available. When an individual dies, bereaved family members must make up for a considerable amount of technical resourcing and know-how [10,30]. Furthermore, the ways in which technologies are packaged and consumed sometimes encourage codependence among users; for example, a victim of partner violence may find her mobile phone deactivated by her abusive partner because they signed up for a “family plan.”

Further, many relationships need some level of infrastructure stability to maintain continuity. This, in particular, becomes a challenge for the episodically homeless discussed above. The challenge for the homeless mothers was twofold. First, during the initial experience of homelessness they might stay with friends and family, but soon that becomes burdensome and they are asked to leave. Second, as these individuals find themselves evicted from their homes, they are also often evicted from their neighborhoods as a byproduct of having to move to a shelter or other temporary living arrangement.

In that disruption, we described how Jacquie needed to find work that would not encroach on her responsibilities as a mother, while Nancy needed to enroll in appropriate disability and subsidized housing programs. Even so, both effectively used the system as a way to establish connections to new social and material resources. The creation of these new resources, and the integration of them into daily routines constitutes a kind of infrastructuring [42,43] where the material resources of the deployed system buttressed the formation of routines and social ties with shelter staff. The outcome, then, is that technology aimed at supporting families coping with homelessness acts not only to connect people to needed resources, but also establishes routines around those forms of information [31]. These routines become the basis for creating a new normal and for supporting the mothers as they move toward reestablishing stability in their lives.

For survivors of partner violence, often their abuser isolates them from family and friends who can offer support, as a way to exert power and control. In both cases, their connection to social support is strained or simply not feasible. The breakdown of the infrastructure of the home, also affects the social infrastructure that provides emotional support, childcare, transportation, and information about jobs.

We have shown how social support in the home is subject to disruption. During times of disruption, it is clear that the socio-technical infrastructures present in the home are also vulnerable, and that these breaks in infrastructure serve to make them more visible [41]. Our case studies teach the lesson that a stable home infrastructure is not always available to the technology designer. The technical and material resources of the home are finite and subject to depletion or unavailability. Homelessness presents an obvious example: for affected individuals, access to electrical outlets and the Internet may be a hard-to-find luxury. Similarly, people escaping an abusive partner will find diminished and intermittent access to the technical infrastructure needed to accomplish their goals of safety and independence. In bereavement, this home's technical infrastructure may be dismantled temporarily as the grieving seek peace and quiet, or be subject to degradation over time if the home's technical support specialist has died.

Privacy from Stigma and Harm

Life disruptions of the magnitude described in this paper share a common theme insofar as users find a new need to manage their privacy *vis-à-vis* the event. During these events, information and interaction boundaries shift and “bleed over” between what is usually considered private, such as the home, and what is considered public. Using Altman's privacy and technology framework, Palen and Dourish suggest that what is considered private is reconfigured depending on orientations towards temporality via different social groups, and different contexts [36]. Our case studies illustrate how, specifically, the context of life disruptions may trigger movement and blurring of privacy boundaries, and how technology is implicated in these contexts. Each of these instances demonstrates the heightened need for controlling privacy and the considerable vigilance, action, and the technical know-how needed to defend it. Considering the details of intimate partner violence helps us to paint a vivid picture of Palen and Dourish's observation that privacy is situated and enacted [36].

Moreover, survivors of intimate partner violence must contend with physical and emotional safety as well as safe access to communication technologies. These concerns go beyond the common conceptions of privacy and technology that arise in response to protecting financial information and identity theft. For example, although there are mechanisms to protect the whereabouts of a shelter's location (such as mandating all residents sign a confidentiality agreement), there are no similar mechanisms in which to cope with new ways to “locate” a person through mobile phones and the Internet. Particularly for individuals vested in various social networking sites, the public-ness of their profiles and their connection to their social network often leaves them exposed and accessible to those they are trying to escape.

The larger point here is to draw attention to the complicated privacy work that occurs during a life disruption. The interconnectedness of place, time, interpersonal relationships, and technical possibility beget an intricate privacy-maintenance process where aspect of life previously

thought to be safe or stable must be re-evaluated in light of a new set of sensitivities, goals, and standards.

Furthermore, the shifts in boundaries between public and private illustrate a need to scaffold nuanced user agency with respect to privacy management. For example, when a loved one dies, often their Facebook page becomes a sort of public memorial, where people share their memories. Yet, when intimate partner violence survivors escape, often their communication becomes more private. Further, the homeless may have to give up some privacy to receive social services. Homeless people are left with few other choices than to rely upon publicly provided services while simultaneously attempting to “pass” as having a stable private life for their dignity and relationships. In these cases, the magnitude of life disruptions necessitates the intervention of public, legal, or governmental agencies. This kind of involvement may result in a loss of control over personal information.

As we discussed in the beginning of this paper, HCI and CSCW research has only recently come to grapple with some of the important differences between work in the home and that of the workplace. One example of this came from demonstrating that the concept of user identity derived from the workplace does not provide the same utility in the home—for families where everyone “shares everything,” the overhead of individual user logins no longer make sense [21]. Based on our fieldwork in diverse contexts, we would argue that the challenge to effectively providing shared computer resources in the home goes beyond dealing with the breakdown in how families use and share login credentials. It is not just that the presumption of *what* is and is not considered private is different, but that the *consequences* of privacy break downs are different as well.

In particular, life disruptions such as those outlined above demonstrate that there are instances where the consequences of privacy mechanisms are unpredictable. In the case study of intimate partner violence, the particulars of the context shape the meaning of the information. Often, tracking the location of family members has been viewed as an instrumental tool in supporting the work of the family [5]; however, using a mobile phone to track the location of a partner can become a threat to personal safety and is difficult to manage, particularly since those family members are reflexively considered trustworthy.

Furthermore, systems concerned with privacy need to understand the home as a place that does, from time to time, interface with the public world. The blurring of these boundaries complicates what is considered domestic HCI. When becoming homeless or escaping partner violence, the construct of the private home as a site of inquiry dissolves. Private life becomes necessarily more public after moving into a shelter and receiving help from different social institutions. It is also especially apparent in the case of dealing with the death of family member. Bereaved parents found that important information needed for a public memorial or for making arrangements following a death was inaccessible because it was private (*e.g.*, data from personal comput-

ers or internet accounts such as social networking sites or email).

While the previous examples have highlighted the challenges that arise through domestic disruptions with respect to existing technologies, we would also point to ways that intentionally designed technology interventions impact privacy for disrupted families. Prior to the deployment of the system to the homeless shelter, communication at the shelter was done on an exclusively face-to-face basis. However, once the system had been in use for a couple of months, new habits of communicating between the residents and the staff began to emerge. Importantly, because the system enabled communication to personal devices—residents' mobile phones—the staff stopped feeling that they needed to physically deliver information. This in turn led to a redrawing of social boundaries that empowered residents to communicate with the staff as synchronously or asynchronously as they chose.

While this change might seem small, for the homeless women in the shelter, being able to regain some sense and practice of privacy was important as the rest of their lives were so heavily dictated by external impositions from various care providers (however well-meaning, necessary, and welcomed they may have been). This dynamic also shows how technology can constructively re-introduce social boundaries rather than break them down as is often assumed to be the case in the contemporary breed of social applications.

Designing for a “New Normal”

Life disruptions can result in straining or breaking of existing relationships and access to resources. When this happens, new relationships are often formed which acknowledge the individual's role in moving towards a new normal. A person who loses their home may seek out a homeless shelter, and a person in an abusive relationship may find a domestic abuse shelter. Similarly, bereaved individuals may seek out support groups or other places where they are able to communicate with other people in their situations, and find the resources and information they need. This pattern repeats, and shares commonalities with other life disruptions (*e.g.*, drug addicts entering rehabilitation centers, alcoholics attending Alcoholics Anonymous).

This shift towards a new normal as facilitated by new relationships increasingly involves technology. Technology can play a key role in helping members of these groups communicate more consistently and satisfyingly. In that sense, technology establishes and sustains a new community that eases the transition towards a new lifestyle and new routines following a life disruption. People may also experience periods of “normal disruption”, such as episodic homelessness and abuse, and each of our case studies reflect a variance in their levels of permanency. A family that becomes homeless may be able to, one day, move back into their own home. However, for someone whose child has died, there is no way to replace that loss. In this section, we wish to draw attention to the idea of “finding a new normal,” and illuminate how families striving towards a new

balance in their lives take up technology, and could potentially benefit from new technologies.

Technologies for Socio-Technical Support

Members of the HCI and CSCW communities are uniquely positioned to develop technologies that allow people who are devastated from a severe personal tragedy to find solace or comfort. For example, based on the fieldwork with parents who have lost a child, one of the authors is developing a system that connects bereaved parents together so that they may form mutually-beneficial relationships and move forward together in their losses [29]. Similarly, the system installed in the homeless shelter demonstrates how technology can arm the homeless with an infrastructure that helps them achieve a new form of stability. Technology can provide people with the guidance that they need to ensure their continued safety that allows them to connect to social support—for example, one can imagine the development of a “safe phone” that contains different options for blocking calls and text messages.

New technologies give rise to opportunities for new routines, new traditions, and new ways of making a home (*e.g.*, consider the multitudinous ways in which the television has changed the way that a “typical evening at home” plays out) [32]. There are opportunities to continue to leverage and amplify diverse social resources to aid and support individuals and families recovering from a life disruption.

Designing for Social Interaction During Disruption

One problem that people facing severe life disruption often encounter is the need to explain their situation to interested others. However, explaining what has happened is a difficult prospect for a multitude of reasons, be they related to privacy, dignity, or the sensitivity of the topic. As system researchers and designers, we need to be aware of these concerns as delicate topics come to be expressed through new media and new systems expressly designed for social and familial interaction.

When designing for social interactions through technology, the principles of social translucence [13] such as visibility, awareness, and accountability need to be expanded in the context of life disruptions. For example, visibility about abuse, homelessness, and death, can often be stigmatizing and even dangerous. Similarly, when grieving, the bereaved may feel compelled to hide their feelings in professional or public settings, where their emotions would cause discomfort or unwanted attention. Indeed, many disruptions are events that are emotionally charged and not publically acceptable. There may be criminal or legal issues involved (*e.g.*, in intimate partner violence or with drug addiction).

Often times, people facing homelessness will attempt to pass as a “normal” person in order to gain access to services and resources. In this case, awareness could prevent access to services. We need to realize that the search for a new normal implies a need to develop sensitivities to privacy and infrastructure access that account for the richness and nuance of private life. Technologies that play a role in achieving a new normal must be designed in a way that prevents them from contributing to the stigma surrounding the events of a life disruption.

Importantly, the role of technology in these cases is not to be productive or efficient. It does not necessarily coordinate members in the completion of tasks, or determine the fastest or easiest route towards recovery. Rather, technology supports the members of a community as they establish a new normal in their own ways. Each life disruption is a unique situation, and prescriptive technologies may not offer solutions that work for all. Key to the success of technology in dealing with life disruptions is the open-ended and communicative aspects, and allowing individuals to ask for information, or identify and apply it as they see fit.

Potentially armed with a new appreciation for the pleasant parts of personal life—good friends, a reliable income, a place to call home—people may even find themselves in situations wherein they are more open to new methods for rebuilding and sustaining a new lifestyle. As part of achieving this “fresh start,” people may adopt new technologies which make them feel closer to their social networks or help them reconfigure old technologies to reflect their new way of life. Technology also plays a strongly symbolic role in how people achieve this new normal: removing an abusive spouse from your mobile phone plan, changing your Facebook status to single, or creating a web memorial for a deceased loved one are all opportunities to signal—to oneself and to others—that life is continuing on.

CONCLUSION

Across each of the case studies presented here—intimate partner violence, homelessness, and death in the family—we find opportunities for reflecting on interactive systems design that takes in the breadth of experiences that occur during life disruptions. Certainly, the case studies we have presented exist at the extreme ends of personal disruption: they are tragic accounts of some of the most difficult situations in which a family can find itself. Yet, by examining the extremes, we can shed new light on areas of technology use and design, particularly recognizing that as technology becomes an ever more personal, even intimate, accessory, the risk of amplifying negative life events increases.

The three thematic lenses presented in the discussion address a dynamic set of relationships, infrastructures, and privacy concerns. These lenses are intended to inform—and where applicable, extend—existing understandings of technology use during the performance daily living. They suggest ways of beginning to think through other sorts of life disruptions of other varieties. Through such settings we can see both the personal and technical limits, and then from those limits, begin to imagine new or modified systems that would mitigate rather than exacerbate some of the negative consequences.

Clearly, technology cannot “solve” a death in the family, undo the multifarious causes of homelessness, or provide physical and psychological protection against an abusive partner. But it can be used to mitigate the rippling consequences of each of these disruptive life events. By examining these extreme situations, we look to broaden how domestic technologies are considered within HCI and open discussion about a wider range of concerns when conceptualizing technology use in our personal lives. Ultimately, we

look to reflect, as designers and as researchers, on the deeply rooted trade-offs that must be reevaluated as our understanding of private life becomes more nuanced and robust.

ACKNOWLEDGMENTS

We’d like to thank the participants and organizations involved in this fieldwork, and Beki Grinter and Lana Yarosh for constructive feedback on earlier drafts of this paper. A portion of the research presented here was supported by the NSF under grant IIS-0915624, and by the Canadian GRAND NCE program.

REFERENCES

1. Aho, A.L., Tarkka, M.-T., Astedt-Kurki, P., and Kaunonen, M. Fathers’ Experience of Social Support After the Death of a Child. *Am. J. of Men’s Health* 3, 2 (2009), 93-103.
2. Ames, M.G., Go, J., Kaye, J.J., and Spasojevic, M. Making love in the network closet: the benefits and work of family videochat. *Proc. CSCW 2010*, ACM (2010), 145–154.
3. Banyard, V.L. and Graham-Bermann, S.A. Surviving poverty: Stress and coping in the lives of housed and homeless mothers. *Am. J. of Orthopsychiatry* 68, 3 (1998), 479 - 489.
4. Blythe, M.A. *Funology: From Usability to Enjoyment*. Springer Netherlands, 2003.
5. Brown, B., Taylor, A.S., Izadi, S., Sellen, A., Kaye, J., and Eardley, R. Locating Family Values: A Field Trial of the Whereabouts Clock. *Proc. UBICOMP 2007*, Springer-Verlag (2007), 354–371.
6. Brubaker, J.R. and Hayes, G.R. “We will never forget you [online]”: an empirical investigation of post-mortem myspace comments. *Proc. CSCW 2011*, ACM (2011), 123–132.
7. Brush, A.J.B. and Inkpen, K.M. Yours, mine and ours? sharing and use of technology in domestic environments. *Proc. UBICOMP 2007*, Springer-Verlag (2007), 109-126.
8. Buckle, J.L. and Fleming, S. *Parenting After the Death of a Child: A Practitioner’s Guide*. Routledge, 2010.
9. Crabtree, A. and Rodden, T. Domestic routines and design for the home. *Computer Supported Cooperative Work* 13, 2 (2004), 191–220.
10. Dimond, J., Poole, E., and Yardi, S. The Effects of Death, Divorce, and Life Disruptions on Home Technology Routines. *Proc. GROUP*, ACM (2010).
11. Dimond, J.P., Fiesler, C., and Bruckman, A.S. Domestic violence and information communication technologies. *Interacting with Computers In Press, Corrected Proof*.
12. Edleson, J.L. and Identified, H.F.W. The overlap between child maltreatment and woman abuse. *Violence Against Women* 5, 2 (1999), 134–154.
13. Erickson, T. and Kellogg, W.A. Social translucence: an approach to designing systems that support social processes. *TOCHI* 7, 1 (2000), 59–83.
14. Getty, E., Cobb, J., Gabeler, M., Nelson, C., Weng, E., and Hancock, J. I said your name in an empty room:

- grieving and continuing bonds on facebook. *Proc. CHI 2011*, ACM (2011), 997–1000.
15. Grimes, A., Tan, D., and Morris, D. Toward technologies that support family reflections on health. *Proc. GROUP*, ACM (2009), 311-320.
 16. Grinter, R.E., Edwards, W.K., Newman, M.W., and Ducheneaut, N. The work to make a home network work. *Proc. ECSCW*, ACM (2005), 469-488.
 17. Harrison, S. and Dourish, P. Re-place-ing space: the roles of place and space in collaborative systems. *Proc. CSCW 1996*, (1996), 67–76.
 18. Johnson, M.P. and Ferraro, K.J. Research on domestic violence in the 1990s: Making distinctions. *Journal of Marriage and the Family* 62, 4 (2000), 948–963.
 19. Judge, T.K., Neustaedter, C., and Kurtz, A.F. The family window: the design and evaluation of a domestic media space. *Proc. CHI*, ACM (2010), 2361-2370.
 20. Kaye, J.J., Levitt, M.K., Nevins, J., Golden, J., and Schmidt, V. Communicating intimacy one bit at a time. *Proc. CHI Extended Abstracts*, ACM (2005), 1529-1532.
 21. Kwak, H., Chun, H., and Moon, S. Fragile online relationship: A first look at unfollow dynamics in Twitter. *Proc. CHI 2011*, (2011), 1091–1100.
 22. Lasch, C. *Haven in a heartless world*. Basic Books New York, 1977.
 23. Latour, B. Technology is society made durable. In J. Law, ed., *A sociology of monsters: Essays on power, technology, and domination*. Routledge, 1991, 103–131.
 24. Lavee, Y., McCubbin, H.I., and Olson, D.H. The Effect of Stressful Life Events and Transitions on Family Functioning and Well-Being. *Journal of Marriage and Family* 49, 4 (1987), 857–873.
 25. Le Dantec, C.A., Farrell, R.G., Christensen, J.E., et al. Publics in practice: ubiquitous computing at a shelter for homeless mothers. *Proc. CHI 2011*, ACM (2011), 1687–1696.
 26. Le Dantec, C.A. and Edwards, W.K. Designs on Dignity: Perceptions of Technology among the Homeless. *Proc. CHI*, ACM (2008), 627–636.
 27. Le Dantec, C.A., Christensen, J.E., Bailey, M., et al. A Tale of Two Publics: Democratizing Design at the Margins. *Proc. DIS*, ACM (2010), 11-20.
 28. Letiecq, B.L., Anderson, E.A., and Koblinsky, S.A. Social Support of Homeless and Housed Mothers: A Comparison of Temporary and Permanent Housing Arrangements. *Family Relations* 47, 4 (1998), 415–421.
 29. Massimi, M. and Baecker, R.M. Dealing with death in design: developing systems for the bereaved. *Proc. CHI 2011*, ACM (2011), 1001–1010.
 30. Massimi, M. and Baecker, R.M. A death in the family: opportunities for designing technologies for the bereaved. *Proc. CHI*, ACM (2010), 1821-1830.
 31. Medved, C.E. The everyday accomplishment of work and family: Exploring practical actions in daily routines. *Communication Studies* 55, 1 (2004), 128–145.
 32. Morley, D. *Family television: Cultural power and domestic leisure*. Routledge, 1986.
 33. Neustaedter, C., Brush, A.J.B., and Greenberg, S. The calendar is crucial: Coordination and awareness through the family calendar. *TOCHI 16*, 1 (2009), 1-48.
 34. O’Brien, J., Rodden, T., Rouncefield, M., and Hughes, J. At home with the technology: an ethnographic study of a set-top-box trial. *TOCHI 6*, 3 (1999), 308.
 35. Odom, W., Zimmerman, J., and Forlizzi, J. Designing for dynamic family structures: divorced families and interactive systems. *Proc. DIS*, ACM (2010), 151-160.
 36. Palen, L. and Dourish, P. Unpacking “privacy” for a networked world. *Proc. CHI*, ACM (2003), 129-136.
 37. Rafferty, Y. and Shinn, M. The impact of homelessness on children. *American Psychologist* 46, 11 (1991), 1170-1179.
 38. Ristock, J. and Timbang, N. Relationship violence in Lesbian/Gay/Bisexual/Transgender/Queer [LGBTQ] communities: Moving beyond a gender-based framework. *Violence against women online resources*, <http://www.vaw.umn.edu>, (2005).
 39. Rode, J.A. The roles that make the domestic work. *Proc. CSCW*, ACM (2010), 381-390.
 40. Star, S. Power, technologies, and the phenomenology of conventions: On being allergic to onions. In J. Law, ed., *A Sociology of Monsters: Essays on Power, Technology, and Domination*. Routledge, 1991, 26-55.
 41. Star, S.L. The ethnography of infrastructure. *American behavioral scientist* 43, 3 (1999), 377.
 42. Star, S.L. and Bowker, C. How to infrastructure. In L.A. Lievrouw and S.M. Livingstone, eds., *The Handbook of New Media*. Sage, London, UK, 2002, 151–162.
 43. Star, S.L. and Ruhleder, K. Steps toward an ecology of infrastructure: Design and access for large information spaces. *Information Systems Research* 7, 1 (1996), 111–134.
 44. Tjaden, P. and Thoennes, N. Extent, nature, and consequences of intimate partner violence: findings from the National Violence Against Women Survey. *Washington (DC): Department of Justice (US) Publication No. NCJ 181867*, (2000).
 45. Vale-Taylor, P. “We will remember them”: a mixed-method study to explore which post-funeral remembrance activities are most significant and important to bereaved people living with loss, and why those particular activities are chosen. *Palliative Medicine* 23, (2009), 537 -54.
 46. Volda, A., Carpendale, S., and Greenberg, S. The individual and the group in console gaming. *Proc. CSCW*, ACM (2010), 371-380.
 47. Yarosh, S., Chew, Y.C., and Abowd, G.D. Supporting parent-child communication in divorced families. *International Journal of Human-Computer Studies* 67, 2 (2009), 192 - 203.