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People experiencing financial hardship often possess resilient and resourceful behaviors when handling their day-to-day activities. Understanding how these individuals manifest resilience during adversity could provide insights into how technologies can support their existing efforts. In a partnership with an Australian community care center, we identified resilient practices of people with low socioeconomic status. Following a strength-based approach, we collected data via home visits and semi-structured interviews involving 14 participants, and observed activities at the care center over 8 months. Our participants exhibited three key facets of resilience: (1) resilience as an integral part of their everyday lives, (2) a spirited phenomenon, and (3) a social and care-focused process. We contribute empirical insights into our participants' situated resilience and articulate ways through which design can support their existing social and collaborative practices. We compare and contrast our findings within and outside CSCW literature and advocate for a strength-based approach.

CCS Concepts: • **Human-centered computing~ Field studies** • Human-centred computing~ Ethnographic studies

KEYWORDS

Low Socioeconomic Status; Resilience; HCI; Design; ICTD; Qualitative Methods.

ACM Reference format:

Dhaval Vyas and Tawanna Dillahunt. 2017. Everyday Resilience: Supporting Resilient Strategies among Low-socioeconomic-status Communities. Proceedings of the ACM: Human-Computer Interaction: Volume 1: Issue 1: Computer-Supported Cooperative Work and Social Computing 2017. <https://doi.org/10.1145/3134740>

1 INTRODUCTION

People with low socioeconomic status (SES) are generally overrepresented in statistics related to crime, domestic violence, drug abuse, and teenage pregnancies [52] and are often stigmatized. Despite this, they develop resilience and strategies for “bouncing back” from adverse circumstances. In fact, there is a growing body of work within CSCW and HCI communities that has focused on going beyond the rhetoric of compassion and empowering people who lack ability, capacity, and access [59, 82]. In this paper we use resilience as a lens to focus on the strengths and capabilities of people with low SES, using a strength-based approach.

Resilience is described as “patterns of positive adaptation in the context of past or present adversity, which is one class of adaptive phenomena observed in human lives” [57]. Resilience is seen as an ongoing social process enacted through ordinary practices of everyday life and situated in people’s local contexts that enables them to achieve favorable outcomes in relatively unfavorable situations [44]. Saleeby’s

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strength-based approach suggests that people are motivated to use their capabilities to change when the focus is on such strengths [62, 63, 64]. Therefore, in this paper we used the strength-based approach to study resilience among financially stressed low-SES individuals. The strength-based approach focuses on people's strengths and capabilities over their weaknesses and deficits.

We sought to understand how resilience is manifested in the lives of people from low-SES communities, and how technology can play a role in supporting these resilient qualities. By looking into the existing ways people successfully navigate through adversity, and taking into account what already works, we can (1) acknowledge and collaborate with low-SES individuals' and communities' strengths, perceptions, and aspirations to evoke change [62] and (2) create new opportunities through design to support their resilience practices and strategies. A deeper understanding into resilience can provide CSCW researchers with a new perspective that can be useful for establishing innovative relationships between empowerment strategies and technology design.

We carried out a qualitative study in collaboration with a non-profit community care center in a metropolitan Australian city. We recruited 14 individuals who used the center's emergency food relief drop-in service. We carried out semi-structured interviews at these participants' homes while interacting with other individuals during our visits to the center's food relief drop-ins over 8 months. Our findings show a large array of practices among our participants that highlight three main facets of resilience — resilience as an integral part of everyday lives, resilience as a spirited phenomenon, and resilience as a social and care-focused process. While not being mutually exclusive, these facets highlight how our participants took advantage of social and structural aspects of their situation, in addition to being resilient and resourceful.

We make the following CSCW contributions:

1. A strength-based approach in a low-SES context that provides an empirical account of people's situated practices for supporting resilience.
2. A nuanced understanding of resilience, where resilience is not an individual trait or an extraordinary skill, but an ongoing process embedded and situated in people's everyday environments and accomplished through their mundane activities.
3. An image of the structural drivers afforded by cultural contexts and community organizations, and ways through which innovative technologies can be integrated into such settings.

2 RESILIENCE USING A STRENGTH-BASED APPROACH

Resilience is traditionally conceptualized as “an extraordinary atypical personal ability to revert or ‘bounce back’ to a point of equilibrium despite significant adversity” [11]. Ungar has argued that the dominating tendency to conceptualize resilience narrowly as an inner capacity ignores or problematically reconfigures the outer social worlds in which lives are embedded [79]. Harvey [37] highlighted the ongoing nature of resilience that is shaped by the socio-cultural environments within which activities take place. Resilience is heavily dependent on context at multiple levels. Not only is the adversity of a risky situation at stake, cultural expectations, human capacity, and development also play a role in the manifestation of resilience.

In this paper, we do not concern ourselves with the resilience versus non-resilience dichotomy. Following Lenette et al. [44] we believe that there is a danger in doing so — by looking into non-resilience, we leave room for attaching negative meanings to people who do not recover. Especially when we talk about people with low SES, a large array of deferring sub-vulnerabilities such as old age, disability, displacement, and other major life events are represented under a large umbrella that is inherently incomparable and therefore may not be relevant or appropriate.

Although resilience is a dynamic, ever-evolving process, it can take many shapes among people in similar situations. For example, Lenette et al.'s [44] study on refugee women in Australia showed that while one refugee woman relied on religion to cope with stigma, another woman created a social group to gain strength from others. Thus, resilience can take many forms among people, representing positive adaptation in the context of current adversity. Conceptualizing resilience as an ongoing, dynamic process could be an appropriate approach for understanding how people with low SES experience adversity in their everyday lives, and find ways to cope with them in nuanced ways.

The strength-based approach has emerged from the studies of social work [64] and advocates for a stronger focus on people's existing strengths and capabilities. It is meant to be applied as a way of thinking or a set of rubrics rather than a method or a model. It conceptualizes people as resourceful and capable of showing resilient behavior in adverse situations. A strength-based approach can be viewed as respectful toward and empowering of the oppressed and vulnerable people to which the field of social work traditionally has been committed. This approach has been applied in exploring a wide variety of issues such as mental illness, drug addiction, and elderly care, and has grown to be applied in large communities and schools [63]. Within the Australian context, the strength-based approach has been used to support aboriginal communities [38], refugee women [44], and people with mental illness [35]. It gained prominence in response to the deficit-based models of social work, where the focus is mainly on fixing pathological problems of individuals. An important aspect of the strength-based approach is that a practitioner who is studying a specific situation works in collaboration with his or her clients and is not seen as being in charge of the situation. The practitioner, generally from the social work domain, in collaboration with clients, identifies and amplifies existing client capacities to resolve problems and improve their quality of life. The approach in fact emphasizes the expertise of clients and community members instead.

Resilience is one of the central tenets of the strength-based approach. There are at least two advantages of using resilience, informed by the strength-based approach, as a lens to understand the everyday practices of people with low SES. First, it detaches the stereotypes and stigmas associated with this group and creates a starting point for involving their strengths while working with this group. Second, it provides shared agency between the researchers and members of low SES communities, where both the parties can engage and collaborate over finding ways to leverage people's existing strengths.

While we acknowledge that similar approaches and stances are advocated in the CSCW literature, we have not seen a nuanced approach grounded in social work literature. Recent work on designing for vulnerable people has advocated for a shift of focus where a holistic understanding of wellbeing and empowerment of people is given more importance over helping them meet specific needs [59, 60, 77, 82]. Vines et al. [82] raised concerns about the way vulnerability is currently treated — the current focus of the discourse being on the things people can't do rather than what they can. Such a discourse in the context of socioeconomically marginalized people risks stigmatizing these individuals further and excluding them in the design of novel technologies.

3 RELATED WORK

The related work identifies how resilience has been applied in CSCW and how this differs from aspects of resilience in our work. Within the context of low SES individuals and communities, we first highlight some of the relevant literature from the social sciences and then discuss studies from HCI and CSCW. While our research took place in Australia, we include studies from a larger context, including ICTD. We believe that even with apparent differences in the access to resources, welfare support, and structural drivers, the existing research from ICTD contributes to our understanding of resilience in a variety of regional contexts. We pay special attention to what aspects of the environment or entities within the environment support resilience.

3.1 Resilience in CSCW

In the CSCW research, the notion of resilience is used in the context of wide-scale crisis situations such as wars, mass migration, and natural disasters. Mark and Semaan [46, 47] showed how Iraqis adapted their use of technologies during the second Gulf War. Some of the resilient practices they described are reconfiguring the use of social networks for building and courting relationships; use of cell phones to crowdsource safer routes to work; and use of digital recorders, CDs, and internet links to support learning for people who could not travel so freely in conflicted areas. The work of Shklovski et al. [73] on 2007 Southern California wildfires showed how ICT was used for information seeking and communication among geographically dispersed people. The use of social media services such as Facebook, Twitter, Flickr, and Reddit has been

emphasized for supporting resilience during crisis situations. For example, Semaan and colleagues showed how Facebook was used to recover from crisis during a war [69] and how it helped veterans with post-traumatic stress disorder manage their online identities [68]. Vieweg et al. [80] reported that tweets sent during disasters contain information that could contribute toward situational awareness. Flickr and Instagram were shown to be potentially valuable information sources, as reported in [53], that provided almost real-time evidence of damage and hazards. While the existing CSCW literature on resilience show the everyday nature of resilience in the face to ‘crisis’ situations, it mainly focuses on large-scale events such as wars and natural disasters. Second, there is an explicit focus on the use of technologies for supporting resilience. Our research, however, focuses on understanding how, through resilience, people struggling with financial crises support their everyday needs – with or without technology.

3.2 Resilience in Low-SES Individuals and Communities

Understanding the role of resilience in the lives of people with low SES has been an important topic of research in behavioral economics, public policy, social work, family studies, and other social science fields. We provide an overview of this literature before proceeding into aspects of supporting resilience among low-income populations in fields such as HCI and CSCW.

3.2.1 Social Sciences

Studies from the social sciences have identified several factors through which members of low-income populations demonstrate coping skills and resilience. In a literature review to identify the factors contributing to resiliency in families, Benzie and Mychasiuk found 24 factors to foster resilience across three interactive, yet distinct areas: family, community, individual [10]. For example, familial factors included social support, adequate housing, and access to public services such as health care, child care, and quality schools; community factors included involvement in the community, supportive mentors, and safe neighborhoods; finally, individual-level protective factors included increased education, skills, and training, self-efficacy, and emotional regulation. Additional factors have included the use of public assistance and community outreach programs [13, 31], getting cash-in-hand work [31], individual problem-solving abilities [52], time-management and transportation practices [61], spiritual thinking [54], use of social networks [33], and inter-family support [31, 52]. To elaborate on a few of these factors, Edin and Lein [31] in their seminal work *Making Ends Meet* showed that low-income single mothers across four U.S. cities developed strategies where they relied on formal and informal jobs in addition to their welfare support, received help from their relatives and boyfriends, and relied heavily on charity and community groups. Another study that looked at the importance of social networks among 73 low-income mothers showed that social networks provided practical and emotional support, mentoring, and the expansion of informational resources [33]. Finally, an ethnographic study on payday loan providers in a low-income U.S. neighborhood showed how people juggle across multiple lenders to make ends meet [71]. It is argued that scarcity of resources (e.g., money) affects people’s mindsets and imposes strategies, which may have implications on their everyday affairs [50].

3.2.2 HCI and CSCW

Several studies from HCI and CSCW have reported a wide array of resourceful strategies used by people with low SES to make ends meet, without referring specifically to the word “resilience.” For example, studies in Australia [72] and the United Kingdom [81] have shown that many households from low-income backgrounds apply innovative practices such as bartering, pooling, and sharing resources to manage their everyday expenses. Other studies in the U.S. context have shown how through carefully managing household electricity [24] and relying on strong and weak social ties [18, 22], individuals from low-income backgrounds exhibit resilience. Several studies focused on low-SES populations in the U.S. highlight the use of technology for exploring employment opportunities, finding accommodations, and staying connected to others [41, 43, 88]. For example, a study by Le Dantec and Edwards [41] has shown that for the homeless population, the use of mobile phones is closely associated with staying connected with others and managing identity among friends and case workers. A set of studies by Woelfer and Hendry highlighted how homeless people interact with personal digital tools [88] and access community centers [87]. Dillahunt investigated

how technology can play a role in connecting individuals across low SES situations to develop social capital in low-income communities [18]. In the context of community organizations, studies have looked at how technologies can be incorporated to support food [27, 84] and housing [5] justice. A field study in an Australian context [84] showed that survival, reassurance, and social connections were the main advantages people saw in accessing community organizations. The emergence of community-centered sharing services is also an important contribution in this field. Some early studies in this area have been around time-banking [9], resource-sharing [45], accommodation-sharing [40], employment-finding [20], and ride-sharing [21].

Researchers from the social sciences argue for further research to confirm the factors contributing to resiliency and more research in general on resilience in low-income families, particularly those who do not receive public assistance [52]. Our research, in addition to past HCI and CSCW research, provides insight into these areas of research. As stated earlier, past CSCW and HCI research has not applied a lens of resilience to understanding experiences among low-SES individuals and communities. This perspective is needed for a strength-based approach and to understand the necessities to evoke change [62].

3.2.3 Resilience in a Larger Context

It has been argued that people's capacity to aspire depends on several cultural conditions [4, 7]. Social structures and constraints on opportunities (e.g., access to community centers) heavily affect people's navigational capacity through adversity. We believe that looking at resilience from a larger perspective involving different cultures will help us to better contextualize resilient strategies among lower SES Australians.

Collins et al. [17] in their book *Portfolio of the Poor* showed how low-income people in India, Bangladesh, and South Africa run sophisticated social systems through which they leverage microfinance and savings clubs for their own advantage. Another study in an Indian context has shown deep conservation practices associated with energy consumption to live an economical and resilient life [74] following sustainability principles [12]. Another such study, by Ahmed et al. [2], showed resilient practices of low-income slum dwellers in Bangladesh who shared their toilets and kitchens to help out their neighbors in need and who accessed electricity by illegal means. ICTD literature has also shown how through intermediation [65], workarounds [56], and shared technology use [16, 56] people from developing regions support their everyday needs. Donner [30] noted that mobile phones in developing regions have supported economic growth and livelihoods [16, 89], issues around the digital divide and universal access, and as Burrell [16] added, inequality. Some mobile phone users in India developed communication patterns by making missed calls instead of making actual calls to save money [29, 72]. Sharing, by means of intermediation, is also a common theme among our review of developing regions, which could lead to economic growth and learning [16, 65]. Similarly, in Kenya, Wyche et al. showed the use of Facebook among low-income populations to market businesses and find jobs [89].

4 THE STUDY

Our study took place over a period of 8 months in a metropolitan city of Australia. We collaborated with a non-profit community care center, which helped us in recruiting participants and enabling field visits to their drop-ins.

4.1 Setting

Australia is one of the costliest countries to live in the world [1]. The Australian government spent nearly AU\$150 billion in 2015 on public health and different welfare programs [49]. Although Australians have access to several government-supported welfare programs such as pensions, social housing, and subsidized health care, growing evidence suggests that the number of people seeking assistance from community care centers and charities is increasing [32]. The community care center that we collaborated with helped financially stressed members of low SES areas from neighboring suburbs through crisis relief services involving food, housing, and medical support. The center had nearly 3,000 registered members in their

database, with nearly 700 active members who regularly accessed different facilities offered by the center. A majority of people who sought help were pensioners, single parents, and people with disabilities. These members also received regular payments from the Centrelink, a government division that provides welfare in Australia.

4.2 Methods

We were interested in developing a rich account of the everyday practices of people with low SES, so we applied a qualitative approach. We were aware of the sensitivities and ethical aspects concerning our research and that our participants might feel uneasy while discussing issues related to their struggles. To help address this, we gave them an informed consent form (approved by our institute's ethics committee), which clarified the voluntary nature of their involvement and how we would de-identify their data and protect their privacy. Following the strength-based approach, we wanted to create a collaborative engagement with our participants, where the participants themselves would be able to define and describe their resilient behaviors. We informed our participants that we wanted to learn how they were *getting by*; in other words, we asked them to discuss what was working out well for them. In most cases, we recruited participants with the help of social workers and volunteers at the community care center. Our regular engagement with some community members during our frequent visits to the center's drop-ins made it easier for us to gain community members' trust. Two researchers were actively involved in data collection and analysis. Next, we describe the methods we employed in our research.

4.2.1 Field Visits to a Community Care Center

The community care center that we worked with conducted emergency food relief drop-ins twice a week. With help from the center's volunteers and social workers, nearly 100 members regularly took advantage of the program. This provided us with opportunities to meet a large number of potential participants in one place. Figure 1 shows the generic setup of these food relief drop-ins. On the one side, volunteers assisted members with food selections; on the other side, members awaited their turn. During the drop-in visits, we spoke to several community members and informally discussed their individual situations and experiences. We took retrospective notes of our conversations, and for interested participants, we organized semi-structured interview sessions, described in the next section.

4.2.2 Home Visits and Semi-structured Interviews

We recruited 14 participants and visited their homes for interviews. These participants were recruited during our visits to the community center's emergency food relief drop-ins. Our participants (Table 1) were diverse and included retirees (3), single parents (4), and couples with kids (2). None of the 14 participants had any kind of paid employment and they all received welfare payments from the government welfare agency, Centrelink, and regularly visited community care centers for food and financial assistance. Note that all participants had a chronic financial stress exacerbated by a variety of health and social conditions. Four



Figure 1: The emergency food relief drop-in at the community care center.

#	Name (Age)	Domestic Situation
1	Sally* (30s)	Recently divorced, 2 dependent kids.
2	Emily* (30s)	Drug problems, single parent.
3	Joan (60s)	Ex-offender, lives in social housing.
4	Dean ⁺ (70s)	Cancer, mobility issues.
5	Bert ⁺ (70s)	Debt in legal battles, mobility issues.
6	Annie (40s)	Ex-offender on parole, volunteers at the community center.
7	John (40s)	Ex-electrician, jobless for 2 years.
8	Kelly* (30s)	4 dependent kids, domestic violence.
9	Erica-Scott (40s)	Child custody battle with ex-partner, domestic violence.
10	Judy ⁺ (50s)	Dependent grandson, depression.
11	Jack (40s)	Depression, jobless for 15 months.
12	Ron (60s)	Works for the Dole, depression.
13	Will (50s)	Works for the Dole.
14	Jane* (40s)	Debt in legal battles, depression.

Table 1: Participants (with pseudonyms) in the semi-structured interview and home visits. + indicates disability and * indicates single-parent family.

of these participants had participated in an earlier study focused on household financial management within low-income families [75]. Ron, Dean, Bert, and Judy had older age and severe health conditions that were making them continuously rely on the center. For Sally, Emily, Annie, John, and Jane, it was more of a sudden crisis, where their socioeconomic situations had changed drastically due to divorce, job loss, and debts. Ron and Will were part of the Work for the Dole program [6] — a work-based welfare program where they were required to carry out unpaid community work for 15 hours a week to continuously receive welfare payments from the Centrelink.

We primarily focused our interviews on understanding their everyday routines and strategies they used to navigate through their adversities. Some questions included understanding their lifestyle, philosophy for spending and saving, specific know-hows of different government services, personal aspirations, and the steps they had taken to achieve them. We explored the role technology played in supporting and enhancing their everyday interactions. Because these interviews were conducted in combination with home visits, it allowed us to look at artifacts and tools they referred to in their answers. The interviews lasted longer than an hour and were audio-recorded and later transcribed; interview participants received AU\$30 gift vouchers for compensation.

4.2.3 Data Analysis

We started our data analysis by carefully reading and studying each other's field notes, transcripts and photos. We then carried out thematic analysis [15] on our data, where all transcripts were first open-coded to highlight potential trends in the participants' descriptions of their everyday practices. Following this process, we iteratively grouped initial trends into categories. We followed an inductive rather than a theoretical thematic analysis; therefore, the coding and categorization process was not guided by any predetermined theoretical frameworks or assumptions. Once this process was completed, we discussed our findings with the volunteers and social workers from the center to corroborate our findings with their knowledge and experience.

5 FINDINGS

We learned a large number of resilient practices from our participants. We discuss our findings in the form of three important facets of resilience that we uncovered from our data: resilience in everyday lives, a spirited nature of resilience, and a social and care-focused process. These facets, on the one hand, highlight both the resourcefulness of individuals as well the social and structural drivers that shape their resilience

strategies. On the other hand they speak to both the vulnerabilities associated with having low SES as well as the strengths people draw from.

5.1 Resilience in Everyday Lives

Our participants' everyday activities and routines exhibited resilience. In fact, it was the *everydayness* in itself that constituted resilient outcomes. In this section, we provide a set of examples related to how resilience was habituated into our participants' routine activities such as shopping, cooking, traveling, budgeting, and paying bills.

5.1.1 Economical Routines

Being economical was integral to our participants' routines and a critical ingredient in their resilience. Shopping from cheaper supermarkets (e.g., Aldi), freezing leftover meals instead of throwing them out, buying furniture and household goods from second-hand shops (thrift shops), and redeeming discount coupons were commonly used techniques. During our interview, Kelly (39) pointed out several used items in her house that she got from her friends and family members. She said:

"I buy lot of things second-hand. If the school fetes are on, they have cloths jumbo sales like 'fill a bag for 2 dollars.' So I go there. My sofa chairs are from Sanford's trash and treasure thing. The TV was given to me when a friend went to Japan. Most of my clothes are second-hand." – Kelly

Participants chose to buy products in bulk whenever possible and regularly visited local markets during closing time to get better deals on food products. Getting around was also an important part of our participants' routines. Bert (71) had resourcefully integrated his travel schedule to avail himself of cheaper transport. As a retiree, he already had a concession card for public transport. He then learned that by paying for the first two journeys, he would be able to use his travel card for unlimited rides within that day. Hence, he would make short rides in the buses in early mornings to be able to get free rides for the remainder of the day. He said: *"I just go out to a café one stop away and then I can go anywhere for free."*

5.1.2 Maintaining Health

Just as thriftiness was quite inherent to our participants' routines, they had a strong inclination toward living a healthy and positive lifestyle. Caring about their diet and their families, and expressing their aspirations toward a better future demonstrated the positive outlook most of our participants possessed. Some participants regularly used health-related websites and Facebook groups to learn more about living well. During our interviews, Jack, who had been out of work for several months, said that he was very health-conscious. He believed that if he stayed healthy, he would have a better chance of getting a job. He said:

"One of the things I do is to try and eat fresh food, whenever I can. I go to soup kitchens from time to time and try and eat the veggies. I go for walks around the neighborhood. I had a bike [which was used as a source of exercising] but it doesn't work anymore." – Jack

Several participants mentioned that they used YouTube videos to learn yoga and cook healthy meals. The community care center that we partnered with offered fruits and vegetables through their emergency food relief drop-ins. This facility was highly appreciated by our participants.

5.1.3 Leveraging Organizational Support

Knowing where to get help and how to maximize opportunities were integral resilience strategies of our participants. As we mentioned earlier, all of our participants received regular welfare payments from Centrelink. The majority of participants sought additional help from charity organizations such as St. Vincent de Paul, Wesley Mission, and the Salvation Army. Appreciating such charities, Jane (44), a single parent, said, *"It helps stretch the budget a bit further."* Most participants were connected to more than one such charity organization so that they could make ends meet. These services not only offered free goods, but also counseling (e.g., Positive Parenting) and study courses. Erica and Scott, who have 5 children (3 in foster care due to Erica's divorce and pending legal cases), regularly access many such services. They adhere to a weekly schedule that enables them to take advantage of services that offer free/cheap grocery and

counseling sessions: “There is Lighthouse Care in [anonymous], where you can get a trolley for \$25 and you can fill that with as many things as possible. We go there every Wednesday,” Erica said.

Participants also expressed the importance of the basic “know-hows” to deal with financial crisis situations. Knowing how to get in touch with charity organizations, catch public transport, contact doctors and medical experts, budget money, obtain food vouchers, find safe housing, and gain access to free social activities to help alleviate depression were a few points mentioned by our participants. The community care center that we visited provided such information to all of its members in the form of a booklet and displayed many such relevant services on its noticeboards (Figure 2a). We found that such information played an important role in improving people’s know-hows and helping their ongoing efforts. Participants also reported visiting different charity organizations during Christmas and on other occasions to get additional support offered by third-party organizations that provided, for example, medical kits and free health checkups.

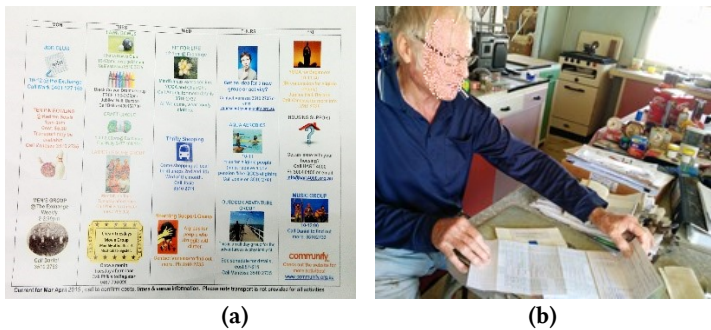


Figure 2: (a) A weekly schedule of free and low-cost activities advertised at the community care center and (b) a participant showing his account books.

5.1.4 Managing Finances and Negotiating with Lenders

Keeping track of their finances and upcoming payments was important to leading a resilient and resourceful lifestyle. Apart from Dean (74), all our participants used online banking applications to keep track of their finances and to make sure that enough funds were available. Dean did not own a computer, but he had a meticulous system to keep track of his finances. He recorded each and every penny he received and spent. In Figure 2b, Dean shows a page from his account books where he has handwritten each and every transaction he has had — transactions as little as 50 cents were recorded.

We observed that most of our participants were able to find ways to pay bills that suited their own financial situations. In Australia, certain household expenses such as energy and water bills, car registration (colloquially known as “rego”), and council taxes are paid quarterly — bringing the sum to an amount that may be considered unaffordable by a financially constrained population. In our interviews, participants mentioned that they negotiated with service providers and managed to divide payments into smaller amounts paid weekly or fortnightly. Forty-six-year-old John said the following:

“Talk to all your lenders, bank, Energex, all of that sort of stuff, and discuss a payment plan with them. Work out what you know is coming in and then work out what you need, what we can do away with.... We broke it down to a weekly figure. ... The bank has bent over backwards for us. When our car broke down they let us forgo two payments, so that gave us spare money that went into the car.” – John

Some companies offered a discount for full payment before a certain date. As a workaround, participants often chose to pay smaller sums of weekly payments to different lenders rather than opting for a discount from a specific lender. In Emily’s (32) case, she was able to divide her payments across different lenders:

“I never pay my bills at once. If you pay your electricity on time, you don’t have gas anymore, but if you pay on time you get a discount. It does mean I end up paying more, but I can’t help it. It just keeps things in track... I’m now \$300 in credit with electricity and gas, so I’m a big fan of direct debit. Stress free. You can also do it with your car rego, though now I don’t drive.” – Emily

5.1.5 Summary

Resilience was well integrated into our participants' daily routines and was exhibited through very mundane aspects of their everyday lives. The importance of community and charity organizations was also quite central in providing a buffer to their budget. Similarly, the know-hows about bill payments and where to get the right kind of information were also useful resilience strategies.

5.2 Spirited Nature of Resilience

This facet of resilience was exhibited through several examples from our field data where participants showed great conviction and applied their strength of will to overcome adverse situations by attaining new skills and embracing a new start to their lives. This facet of resilience was exhibited in a very diverse set of practices.

5.2.1 Attaining Skills and Creating Money-making Opportunities

Though all the participants were unemployed at the time of our interviews, they showed a strong will to acquire new skills not only to find employment but also to come out of their adverse situation.

Will (59) had a job in the manufacturing industry as a fitter and turner. This job was replaced by technological advances; therefore, he was no longer employed. As a part of his Work for the Dole program, he spent 15 hour a week at an electronic waste recycling center. While he started visiting the center for merely completing his 15 hours, he realized that working at the center would help him acquire new skills that might benefit him in the long run. Although his work at the recycling center was not aligned to his fitting and turning skills, working there gave him aspirations to change fields. *"I go there to learn something about electronics. It helps me keep myself motivated until I find a real job. It's hard to keep yourself motivated when you're alone,"* Will said.

Bert (71) was a disabled retiree who used a cane to get around. His superannuation was depleted, and he relied solely on his disability pension and charity support. He had a mortgaged house in a good location but was planning to sell his house so that he could improve his financial situation. He said:

"My only solution is to sell my home. I have been there 40 years of my life. The Main Roads guys built a road around my property, so I am not getting access to my home. They said they can give me an access from the back, but it would mean that I have to move my house which would cost me over thousands of dollars.... When you go to Legal Aid to get some help to sell your house, as soon as you mention you own a house, they don't want to have anything to do with you at all. So you are then at the mercy of real estate agents and developers. You won't realize the potential of the house you've lived in for 40 years, but they will." – Bert

Bert was fighting a legal battle with the Department of Transport and Main Roads and had been gathering evidence and relevant paperwork to fight his case. He regularly visited the state government library where he spent most of his time learning software through which he could represent his case and prepare paperwork. The facility had access to Lynda.com, which allowed Bert to learn how to use a new software — SketchUp. Figure 3a is a page from a report he developed to present his case. Here, he had edited some



Figure 3: A page from Bert's report (a), Judy's living room (b), and an antique phone in Dean's home (c).

images from Google StreetView and developed an illustration of his proposed solution for his house plan using the SketchUp tool. It took several months for him to finish this report, which had more than 50 pages of text and visual illustrations. This showed a highly spirited behavior and a tenacity to fight back against social injustice.

While these examples show how our participants acquired new skills, Dean (74), focused on teaching and informing others. He wrote informational articles in local newspapers, organized sessions related to the history of his neighborhood, and frequently participated in mentoring activities organized by the community center. He had a collection of historical items such as maps, photographs, telephones (Figure 3c) and typewriters, which he frequently had in local exhibitions.

In one case, we found that a participant was able to earn some money through selling second-hand goods. Judy was a 58-year-old grandmother whose son was in jail. She had been looking after her 13-year-old grandson for the last 3 months because of child safety issues. Her grandson had some health issues, and Judy gave up her job to care for him. The support she received from the Centrelink and the Department of Child Safety wasn't enough and she relied heavily on the support from charity organizations such as St. Vincent de Paul to pay her electricity and water bills. As an extra source of income, she sold household items in a nearby market and placed adverts on Gumtree.com (an equivalent of Craigslist in Australia). She also sold what she found left on nearby streets. During our home visit, we observed that her front yard and living room areas (Figure 3b) were full of toys, fans, sofas and other furniture.

"I sort of gather things up and sell them.... People rubbish me for having all this stuff, but hey, if it can help me make ends meet. It's just that I don't have any order in the house. I am running a bit behind, with him around...That one there [referring to the car seat] was a freebie. I'm going to get a bundle cot and put them on for \$250. If I see things by the side of the road, I would take it. People think about the things from the streets and go 'Ewww'. But it's just the stuff from people's house. It might be dusty or whatever; dust it off, wash it." – Judy

5.2.2 Restarting Life with a Positive Outlook

Several participants experienced drastic adversarial life changes such as divorce, child responsibility as a single parent, employment loss, and prisoner re-entry. These events required that they start a new life with a greater strength and resilience. Emily (32), for example, was a single parent who for many years earned a decent living as an exotic dancer. She described her experience as a recovering drug addict, mother, student, and job seeker:

"For a long time I was an exotic dancer and I had a good income back then, but then I had a drug habit, I didn't save any of the money I made. That was before I had my daughter. Then I was a student at a Uni and I moved in with my mum and saved a lot of money while I was studying. Then I had my daughter and as a single mum, Centrelink is more generous to single mums, so I could have my own place. I was looking for jobs with my qualifications, but then a lot of the jobs want you to have completed your degree in the last 2 years. And mine was 5-6 years ago. So that's why I'm studying now." – Emily

She aspired to become a teacher's aide and showed a strong resilience in starting a new life as a single parent. As a second example, we got in touch with Annie (42) through the community care center. She recently came out of a prison after serving 3 years. At the time of our interview, Annie volunteered at the community care center and helped out older adults who needed transportation in and around the city. She showed great resilience in starting her new life by volunteering for the community care center with an expectation to gain enough experience to find a more stable job later. When she was released she only had a driver's license and she had to apply for a birth certificate to avail certain government services. Because of her driver's license she was able to volunteer as a chauffeur for aged members of the community care center. She said:

"If I don't have work, they will put me back in prison. I can't get jobs in McDonald, because I am a parolee. Driver's license is the only good thing I have that keeps me going." – Annie

Family intimacy and care also came out very strongly as part of a positive outlook for starting a new life. All of the single parents who participated in our study were very conscious about providing a better future for

their children. Sally (36), who was recently divorced, had experienced a drastic change in her lifestyle with her two daughters. When she was married she had a career but after her first daughter was born, she became a stay-at-home mother. She hadn't worked for the last 6 years. After her divorce, she made sure that she found a good neighborhood to raise and educate her kids. She appreciated the value of education and decided to spend a higher amount of money to live in an area that had good public schools. Sally said: *"We are the poor people of a rich locality, but at least the kids are getting a good school. That's very important."*

5.2.3 Summary

In addition to the everyday nature of resilience that was discussed in the previous section, this section described a particular facet of resilience, where our participants showed their strengths in instances that required them to acquire new skills and start from the scratch to bring positive changes to their lives.

5.3 Social and Care-focused Nature of Resilience

During their financial struggles, we observed that our participants (1) made the most of their situations by sharing goods and services with their friends and other members of the community and (2) frequently relied on their social networks. While there were practical reasons for sharing, we found that there was a strong focus on community care and activism.

5.3.1 Sharing and Helping Others

During our interviews and field visits to the community care center, we learned about a wide range of social activities that helped our participants thrive in unfavorable situations. These included participants' sharing of Wi-Fi data costs with neighbors, magazine subscription costs with friends, school uniforms among parents, carpool duties and fuel costs with friends, and Groupon meal vouchers with close friends. Bartering skills for food was another effective way to use social connections. Convenience was seen to be one of the major aspects in supporting sharing activities. Participants shared their Wi-Fi with next-door neighbors because it was a very convenient choice that did not require much additional effort. Similarly, carpooling and sharing meals and other resources were driven by convenience of people living in a close proximity. The following is an example of how close proximity helped in supporting sharing practices.

Two of our participants — Emily (32) and Sally (36) — lived less than a kilometer from each other. When we interviewed Emily, she had the following to say about her sharing practices:

Emily: *"Sally and I have a couple of dinners together each week and that allows us to save a little money as she'll buy some ingredients and I'll buy some. If I'm taking my daughter to swimming ... I'll take her daughters too."*

Interviewer: *"Do you share with anyone else, too?"*

Emily: *"With the next door neighbors I share the internet costs. I share whatever I have to make it go a little further."*

Interviewer: *"How did you meet Sally?"*

Emily: *"We met through [community center]. There are a lot of things she's trying to catch up with. She gets stressed when bills come in. I spent a couple of years living in a community in New South Wales who were big on sharing meals together. Sally is big on things like she'll come and pick me up and we'll share the petrol. I think when you're low income if you can find likeminded people, you know you can pass things on each other."*

Sally was recently divorced and needed financial support. Emily had good knowledge about how to get around in financially stressful situations, and they shared costs on several joint activities. Although there was a strong desire to reduce costs, this example showed how a more experienced person was helping a relatively new person facing financial stress.

Care was an important motivation in sharing. While our participants themselves were financially struggling, they were quite considerate about others in similar situations. Out of the 14 interview participants, we observed that in two cases, participants used bartering as another sharing strategy. John, though unemployed, was able to barter his skills as an electrician to obtain some of the things he enjoyed and needed. Here he provided some examples:

“Yeah I do bartering. Coz I’m an electrician I’ll occasionally do something if someone asks me to do. The reason they call me in is they’ve got no money to get it done. I’ve done stuff like that but I don’t try to make money out of people. I do it for friendship and not for profit. I could probably go around and knock on doors and get a couple of hundred dollars per day that way, but I stay away from it. I do it for no cost. What the cable cost me is what I’ll charge. They might take us out for dinner or come over and give us a hand when we need to do things. I might end up with a bottle of drink or a couple of cartons of beer. I say ‘keep the cash, give me something I can use.’ I do a bit of work for the church down on the Rosemary Street. I do electrical work and they pay me back in food coz they run a food bank.” – John

John sometimes got contract work for providing electrician services; however, this type of work was not very profitable: *“I make very little — probably \$600 per year in contract work; 99% of times it’s barter.”* For John, this was more than a lifestyle issue. It wasn’t that he was getting a good deal out of bartering; rather he knew that others were in the same kind of situation where they may not be able to give him money.

5.3.2 Maintaining a Strong Community/Network

In addition to sharing and bartering within groups, we also found that quite a few participants actively contributed to social groups (both online and offline) that allowed them to stay informed about new things happening in their locality. Jane (44), for example, was a single parent living with her 10-year-old son. Jane mentioned taking her son to the community care center’s activities and having him volunteer in their community so that he could build his own connections:

“You walk into a community center and you will learn a dozen things that are happening in your local area. Sometimes, internet would not be enough to get up-to-date information. It’s about getting out there and contributing to the community. That’s part of living well in a healthy thriving community.”
– Jane

Several participants also mentioned Facebook as a way to keep in touch with their online community groups. They were able to check new events and activities organized by the community care center. We found that several participants such as Emily, Dean, Annie, and Jane were quite active in the activities organized by the community care center. They believed that being closely associated with the center would help them build social connections (Dean), create employment opportunities (Annie and Jane), and improve their general know-how on navigating through adversity (Emily). Jane was actually able to create an employment opportunity for herself while being at the community care center. When she had organized an interview, she received help from her community center.

“I had a job interview and I didn’t have proper interview clothes. I learned from my network of community centers about a group called Dressed for Success. They are a charity organization who helps women get back to the job market. They gave me a nice suit and all sorts of helps that I needed for your job interview. They even gave me a voucher for a haircut. They also supported me for the first 6 months as it was a very critical stage.” – Jane

Jane had not known about the Dressed for Success program, but as an active member in her community care center, she soon learned and benefited from it.

5.3.3 Summary

This facet of resilience showed that our participants’ resilience practices were socially situated and that participants relied on their social networks to get things done in adversarial circumstances.

6 DISCUSSION

While the practices presented in this paper may not paint a complete picture of everyday resilience of people with low SES, they shed light on how well these practices are habituated into the everyday lives of our participants. Using the strength-based approach, we provided an account of practices connected to how financially stressed individuals with low SES exhibited resilience in wide-ranging adverse situations. Our account highlights three main facets of resilience: (1) resilience as an integral part of everyday lives, (2)

resilience as a spirited phenomenon, and (3) resilience as a social and care-focused process. These facets are not mutually exclusive; in fact there are overlapping themes that contribute to all these facets. For example, the role of community centers was emphasized across all these facets in different ways.

In the following subsection, we discuss how our findings compare to and extend prior CSCW, HCI, and broader social science findings. We then describe how our findings add a *nuanced account of resilience* and apply an empowering perspective on people with low SES. Resilience is not a pre-defined or a stable concept; neither is it limited to any individual traits. It is contextual and always evolving in nature. For our participants, resilience did not entail achieving goals in extraordinary ways; rather resilience was achieved in the process of attaining everyday tasks. Finally, we conclude our discussion by proposing that designers build on the existing and natural ways people already maintain resilience and achieve empowerment. This provides designers with an opportunity to support individuals with learned resilience and coping skills.

6.1 Positioning Our Findings in the Existing Literature

Our findings were consistent with Benzie and Mychasiuk's prior findings in social work that identified several factors that foster resilience [10]. We identified family, community, and individual-level protective factors as well. For example, our participants relied heavily on public assistance to support aspects of their familial life (e.g., Work for the Dole, Centrelink), which is consistent with our own earlier work on financial management in low-income families [75] and the role of community care centers in providing reassurance and safety [84]. Participants maintained a strong community network by caring for the neighborhood and volunteering, which allowed them to create new beneficial social networks. We found that the positive behavior our participants demonstrated such as relying on charities and social ties are in line with previous social science studies [31, 33]. Our participants exhibited spirited nature to attain skills to create money-making opportunities, had supportive mentors, and maintained economical and positive lifestyles to make ends meet [31]. Finally, our results did not show aspects of spiritual thinking or aspects of emotional regulation as identified in prior social sciences research [33].

6.1.1 Participant Demography

We first acknowledge that our participant demography is quite different from those in developing regions, and even from low-SES population studies from other developed regions. Our participant demography was from Australia and had different levels of access to government and non-profit facilities compared to U.S.-based counterparts [3, 18, 22, 41, 42, 58, 87, 88, 89, 90], which we discuss in detail later in the discussion. Overall, our participants were not homeless [41, 88], displaced [2] or racially and financially segregated [18], which is quite different compared to what is frequently studied within the HCI research.

6.1.2 Analyzing Resilience to Other Geographic Regions

Our findings related to resilience in everyday lives resonate well with the findings from Vines et al. [81], where participants negotiated with lenders and prioritized certain payments over others. However, negotiation with banks may not be an option for those outside of this context. For example, banks are not always responsive to low-income and minority households in the United States [67]. In the context of developing regions, several studies have shown how certain sustainable and resourceful practices in countries like India and Bangladesh fostered resilience to enable people to conserve household energy and resources (e.g., water) [74, 83] and share and appropriate infrastructural resources between neighbors [2]. This finding was also true for one U.S. study of energy use in low-income communities [23, 24]. However, these specific resilience practices were not identified in the Australian context. In our study, we observed "economical" behaviors that included strategizing bus travels and dividing large bills. On the spirited nature of resilience, we found some differences between our findings and the studies done in other developed regions. Although other studies [18, 41, 88] showed that technologies were used to look for accommodation and employment, the spirited nature of resilience was not visible in these studies. While one may attribute this to the fact that our participants were not homeless, displaced, or racially or financially segregated, this facet of resilience was not identified in our own previous work within the Australian setting [75, 76, 84, 85]. This is a new facet of resilience to be explored further. In addition, attaining and maintaining education and

skills to fight legal battles and putting in effort at the community care center to create job opportunities appeared to be unique to our participants. However, using a strength-based approach to frame research of the use of Massive Open Online Courses [25, 26, 39] would have certainly led to similar results across all regions.

When drawing parallels between our findings and those of other regions in terms of the social and care-focused nature of resilience, our findings echo how social parameters enable sharing with neighbors [2, 56], conserving and saving [74], and relying on strong ties [56] in the developing world's context. Our findings of people maintaining a strong community network by caring for the neighborhood and fostering social capital share similarities with other research in developed regions [18, 58]. Certainly, reciprocity and sharing resources, and maintaining a strong community network foster resilience and are critical dimensions across all geographic contexts.

Unsurprisingly for HCI and CSCW, the use of technology is salient in terms of fostering the three facets of resilience across all regions. Information and communication technologies were used to generate extra income in all contexts, and to obtain access to resources such as tools for fighting legal battles, Wi-Fi, and discounts (i.e., Groupon) in more developed regions.

6.2 A Nuanced Account of Resilience

As stated earlier, our participants had access to government and non-profit facilities compared to other geographic regions [3, 18, 22, 41, 42, 58, 87, 88, 89,90]. This clearly affects the equilibrium of an individual's resilience and calls for a deeper understanding of the drivers at play. Next we discuss the advantages of incorporating a strength-based approach in developing a nuanced account of resilience. In particular, we highlight ecological characteristics of resilience that differentiate our findings from the existing HCI and CSCW literature, and particularly the ICTD literature.

6.2.1 *The Impact of a Strength-based Notion of Resilience*

When identifying members of society who have fallen on hard times as “marginalized,” “vulnerable,” or “disadvantaged,” we run the risk of attaching unnecessary labels and stereotypes that might further disenfranchise them. Traditional approaches that use needs-assessment logic focus mainly on gaps and weaknesses of such members of society (e.g., [51]). This does not allow HCI and CSCW practitioners to acknowledge the existing practices of people, which can be leveraged to support better outcomes for them. Design that provides quick fixes to such wicked problems might not serve people well in the long run to attain wellbeing. HCI and CSCW researchers have acknowledged and advocated for developing new approaches that cannot only fix specific problems but also empower people by leveraging their existing skills [59, 60, 82].

The notion of resilience informed by the strength-based approach provided us with a lens to look at a particular low-SES population from the perspective of their strengths, capabilities, and existing skills. While the previous CSCW literature on resilience [46, 47, 68, 69] looked at people's resilience during large-scale disruptions, our paper focuses on the everyday nature of resilience. Resilience is clearly not a specific instance or an individual trait that is only exhibited during specific life events; it is an ongoing, evolving phenomenon that can be seen in any conscious individual. We believe that such a notion shows how embedded resilience is in the everyday routines of people. It is important to note that the previous CSCW studies [41, 58, 87, 88] predominantly focused on the use of technologies in supporting people with low SES. While our findings show that participants used online services like Facebook to keep in touch with others, Lynda.com to learn new skills, and Gumtree.com for buying and selling goods, our results also highlight the use of non-digital practices. These include better know-how about where to obtain appropriate services, sharing/bartering goods and services with friends and neighbors, effective negotiation with lenders for more manageable bill payments, and volunteer efforts on behalf of community organizations to help develop social capital. While technological solutions might help to solve specific problems — and can be used to enhance people's existing activities and practices [78] — many non-technical practices are also beneficial.

Our strength-based practice allowed us to dig deeper into people's everyday routines and highlighted specific practices that were resilient in nature. Our findings show that, at times, resilience was an inner phenomenon where there was a strong inclination toward positive living. This becomes apparent via recognition of our participants' existing commitments toward staying healthy, learning to use new software, managing monthly household bills, and finding and collecting household goods to sell in the local market. These examples demonstrate participant resourcefulness as well as the determination to succeed. Resilience was also shown to be an outer phenomenon informed by the socio-cultural elements where friends and community members helped one another to achieve positive outcomes. Bartering for food in exchange for electrician services; carpooling; sharing Wi-Fi, meals, and other activities with neighbors and close friends; and volunteering at community care centers to help others in need were a few examples highlighting the social side of resilience. Sensitivity toward other people's situation is an important characteristic of resilience that was exhibited in various ways. John, who was unemployed, bartered with friends and a nearby church where he provided his electrician skills in return for food vouchers. Of this, he said, "*I do it for the friendship, not for profit.*"

Our application of the strength-based approach draws similarities with Hunt et al.'s [38] use of this approach in the context of the aboriginal Australian communities. These authors found that community organizations, neighborhood networks and extended family members played an important role in supporting resilient strategies. Lenette et al.'s [44] use of the strength-based approach showed how refugee single women relied on religion, social networks, and education to make ends meet in Australia. Although these studies are from the social work domain, our findings are well aligned with these studies.

6.2.2 *The Impact of an Ecological Nature of Resilience*

The ecological parameters, aided by cultural aspects, are important differentiators between developing and developed countries. The availability of welfare and health care support and the social infrastructure provided by community care centers and charity organizations played a huge role in bringing successful outcomes through different resilient practices of our participants. Although none of our participants was involved in any kind of paid employment, they all received welfare payments from Centrelink. Having some amount of money at their disposal helped our participants make ends meet. Similarly, during the interviews we did not hear about any expenses incurred through medical bills, which was an indication of how the Australian Medicare system helps people from low-SES backgrounds. Similarly, the community centers and charity organizations also helped our participants by stretching their budget, echoing findings from [82]. Our participants indicated that being part of a physical community (as opposed to a virtual community such as Facebook) would increase their chances of making personal connections with others, which may not be possible in the digital environment. As we saw in the cases of Emily, Sally, Jane, and Annie, in addition to relying on the community center for food relief, they leveraged the use of these physical locations to their benefit. For example, by being in close contact with her community center, Jane learned about *Dressed for Success* — an organization that helps women during the job interview process.

6.3 Supporting Resilience through Design

Our findings show that existing strategies and practices can provide a better understanding of what already works, i.e. the practices that allow our participants to maintain resilience and achieve positive outcomes. These practices can be further sustained through design in at least two ways: by supporting social opportunities and by encouraging storytelling to increase community engagement.

6.3.1 *Supporting Social Opportunities*

We noted that members found offline and online social networks helpful in their efforts to barter, reduce costs, generate income, and participate more actively within a community. As the relevant literature has shown, this was a very common thing to see given that our study involved a population that lacked resources. In line with the findings of prior studies (e.g., [18]), our participants relied heavily on their social connections to share Internet, magazine subscriptions, and meal costs. We propose to support rather than replace these practices. An ongoing stream of research is investigating peer-to-peer sharing at the

community level [9, 21, 40, 45]. However, very little work has been done on conceptualizing and designing shared economy models similar to the likes of Airbnb, TaskRabbit, and Uber within the context of community care centers. It has been argued that a shift from public care services to informal community support and civic engagement not only empowers people but also reduces dependencies and public finance burdens [8]. A peer-to-peer sharing service hosted within specific community care centers could allow members to share resources, goods, and services with other members. Such opportunities could enable participation and engagement within the community, thus creating a much more inclusive environment. Additionally, when members know they can rely on one another's support, a more self-reliant, sustainable culture within the community center is likely to emerge [55]. Similar systems based around "timebanking" [9] and some bespoke peer-to-peer platforms [40, 45] have shown the potential to enable sharing within specific communities; however, issues related to trust and accommodation of localized needs require more work. Although understanding the various contexts of when and why these timebanking systems succeed or fail is an open research problem, establishing transparency and equitable relationships among community members is a design challenge. Designers could apply reciprocal mechanisms that focus as much on establishing relationships as they do on sharing things.

Often participants did not know about all the possibilities and resources available to them. We see potential for using crowdsourcing platforms, where specific problems and requests can be accessed and handled by different members of the community including social workers, volunteers, and government officials. Dillahunt's [20] work proposed to connect low-income jobseekers to volunteers who could provide resume feedback, for example. We also derive inspiration from other crowdsourcing applications that help blind individuals to select food items [14] and access public transport [36]. We discussed how organizational resources are not available across all contexts, but perhaps a crowdsourcing model in the context of developing regions could serve as a substitute to such organizations; this is a design concept to be explored further.

6.3.2 Supporting Participant Stories

Designers could explore how technology could support individuals in sharing their stories related to resilient practices to help motivate other community members to reach out and assist one another. Digital storytelling has been shown to have empowering effects on underserved populations, including youths in refugee camps [66], low-income neighborhoods [34], and housebound older adults [86]. While people are able to create stories around their resilient practices, this in turn recognizes and legitimizes the problematic situation in the first place. Recognizing and identifying injustice, risk, or an adverse experience should be the first step in making any type of social change [28]. When these experiences and their associated resilient behaviors are shared within a community, it could lead to a constructive and positive exchange of ideas within the community. In our results, we found that Emily mentored Sally, who was in an unfamiliar crisis situation, and helped her navigate through her circumstances. For somebody without such peer support, storytelling could play a useful motivational role. Second, designers could provide opportunities for community members to build resilient capabilities by learning from others. This could be done in connection with storytelling services (such as [66]), but also as an independent platform. Our findings show that education, volunteerism, and a healthy and positive lifestyle were some examples of how our participants scaffolded individual behaviors to bring about positive change in their lives. In design, this could be understood in terms of developing strengths and helping people take advantages of existing opportunities through technology.

6.4 Limitations

All of our participants were recruited from one community care center. This was useful in the sense that our participants all lived nearby and had a level of similarity in their available resources and environments. This does, however, constrain our findings, especially as related to reliance upon organizational support. Our results may be limited to a narrower set of resilience practices; however, our analysis of resilience to other geographic regions suggests otherwise. Another study limitation was our use of the strength-based

approach. We used Saleebey's strength-based approach to conceptualize and study resilience. The strength-based approach originated from social work. Within the domain of ICTD, Sen's capabilities approach [70] has been very popular. It focuses on understanding individuals' freedom to achieve well-being in terms of their capabilities. It is primarily an economics-based theory, however. We chose to use the strength-based approach because it brings a stronger focus to resilience and is closely aligned to community-based social work, rather than a large-scale developmental theory (as in the case of Sen's capabilities approach). While Saleebey's strength-based approach is useful to study participants from a community care center, a thorough discussion on capabilities [70] and asset-based approaches used in community development literature [48] would add value to this discourse. For example, under what contexts should we use these approaches?

Finally, although our findings identified the importance of reciprocity and sharing and maintaining strong networks and communities, we did not conduct a deeper analysis to explore the various factors and characteristics that make up such communities. Future research building off this work could detect these factors and support common factors among resilient communities [19]. We also observed that the spirited nature of resilience could be further studied to develop more refined categories because this has not been strongly investigated in the existing CSCW and HCI literature.

We would like to highlight the challenges of applying the resilience framing to understand the everyday lives of people from low SES backgrounds. We believe that it is impossible to think about resilience without considering the local culture and the larger contexts. What is considered as resilience in one context may not be considered resilience in other. Similarly, specific acts such as sharing toilets and kitchens with neighbors, seen as resilience in one country [2], might be expected in certain cultures and might not occur in other cultures. It is also important to note that in some cases resilience is learned or developed as a result of a specific crisis situation as a means to recover, whereas in others resilience might become internalized as part of people's everyday routines — as can be seen in our own findings. These challenges point to the fact that resilience needs to be seen as a situated and dynamic process where pre-conceived notions of resilience may not be useful.

7 CONCLUSIONS

Resilience can take many forms among people, representing positive adaptation in the context of current adversity. Understanding how individuals who are economically constrained rise above adverse circumstances can lead to the design of more appropriate and inclusive solutions that work well toward enhancing resilience and empowerment. Using the strength-based approach, we provide here an empirical account of existing practices of people with low SES that highlights three important facets of resilience: resilience as an integral part of everyday lives, a spirited phenomenon, and a social and care-focused process. We synthesized our results among other developed and developing contexts and contributed a set of user-generated design solutions that meet the current needs and existing practices of our targeted population. Our results identified the importance of community care centers based on its socio-physical qualities and their application of resilience strategies. Finally, this paper contributes to the design community by providing a fresh point-of-view toward designing to further support a remarkable population that has already found ways to successfully navigate economic hardships.

ACKNOWLEDGMENTS

We would like to thank our participants and the community care center that helped us recruit participants. We thank Stephen Snow, who collaborated with us on the earlier parts of this study, and Mark Brough for his comments on the paper. We also thank our anonymous reviewers who helped us shape this paper.

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Received April 2017; revised July 2017; accepted November 2017