Autonomy Work:
Personhood, Expertise, and Activism of Disabled AI Data Workers in China

by

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ABSTRACT

This dissertation examines the labor and life of disabled workers in China's artificial intelligence (AI) data annotation programs. The study draws on 14 months of ethnographic fieldwork, conducted over three years, with disabled activists, disabled workers, employment advocates, tech company staff, and government officials. This is supplemented by five years of my professional experience in disability nonprofits. My primary field site was a disabled people-led NGO founded in 2006, which I refer to as ENABLE. In recent years, ENABLE has developed numerous projects with tech companies to hire people with visual and physical impairments as data annotators for AI systems and to design assistive technologies for the community.

In ENABLE's case, what appears to be a familiar story of capitalist exploitation of disabled people turns out to be, instead, a story about the struggles of disabled Chinese people over different ways of being, living, and relating. I use the term "autonomy work" to describe disabled people's labor to make "autonomous" machines (*zidonghua*) (Chapter 1), build an "autonomous" life (*zizhu shenghuo*) through work (Chapters 2 & 3), and design tools for "independent" navigation (*duli chuxing*) (Chapter 4).

I argue that disabled activists seek to construct greater autonomy for their community by reconfiguring social relations in and around technology. I call this mechanism "rerouting." Instead of a complete departure from asymmetrical power relations, my interlocutors "reroute" the pathways between different human and non-human nodes without changing the nodes per se. They do so within the sociotechnical systems they build, the technological institutions they navigate, the kinship structures they seek to remake through tech work, and the physical terrain they navigate with assistive devices, all in pursuit of multiple forms of autonomy. "Rerouting" contributes to the rich scholarship on the intersection of disability and technoscience by highlighting the effects of disabled people's unorthodox knowledge and practices that bend the world towards disabled bodies and minds. Furthermore, it specifies a key mechanism through which these effects are realized. Disabled people hack lives, build access, and improvise affordances by

reorganizing the pathways between objects, bodies, and environments that were originally designed with other intentions.

With deep knowledge and lived experience of the social issues they advocate for, disabled activists in China approach technology as a puzzle piece, not a magic bullet. They make technology useful for their lives, work, and activism by returning the technical to the social. Rather than displacing the slow work of social movements with neoliberal techno-solutionism, I show that this community-driven technological engagement is part of a larger effort to sustain that very slow work within a shifting political environment.

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I dedicate this dissertation to my parents, Yanping Sheng and Wenyou Wu, who gave me an unconventionally free life.

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INTRODUCTION

In an unlit, minimally decorated conference room, I am sitting quietly next to Haiyan,[1] trying to minimize my movements in order not to disturb her while she listens to her Wechat messages, read out loud by her iPhone's screen-reader software which transcribes texts on her phone into synthetic speech. Haiyan is the new blind intern at ENABLE, a disabled persons' organization (DPO) that runs a full-time AI data annotation program entirely made of workers who are blind, low vision, or wheelchair users. Today is her orientation.

Haiyan and I sit next to each other in the office and live in the same dorm building on different floors. She seems comfortable not wearing headphones when listening to messages around me, knowing that the high-speed speech her screen reader broadcasts is completely unintelligible to me. But when Luo Ping comes in, she puts her phone aside.

Luo Ping is the human resource manager of ENABLE's data annotation program. And she does a lot more. As one of the most proficient screen-reader users I know, she is also ENABLE's earliest data worker who tested for tasks to assess how efficiently they might be adapted for fully blind workers like herself. She came in with her laptop, keyboard, phone, and headphones, and sat across the table from Haiyan and me.

[1] All companies, organizations, and individuals involved in this study are given pseudonyms, and personal identities are rearranged to protect anonymity to the extent possible. Exceptions are given to public figures and those who explicitly requested to use their real names. Although public information exists about the program examined, and the identity of some parties may be recognizable to those familiar with the issue, I strive to minimize representation that could bring economic or political risks to my interlocutors. Sources that contain identifiable information are not cited to protect anonymity.

I was excited about sitting in on the orientation. I thought this would be a great opportunity to observe what skills the disabled workers need to be good data annotators. Since Haiyan is an intern, she is also being assessed for her potential to become a full-time data worker. I have heard that ENABLE's data annotation program is competitive for disabled job seekers and I have been curious about how they select the "right" candidates.

Smiling while putting one headphone in her ear so she could listen to the screen-reader on her laptop, which was closed because she did not need to see the screen, Luo Ping began asking Haiyan questions. The first question is: "Are you born blind or is it acquired?" I was taken aback by the directness between two fellow blind women. While listening to Haiyan speak, Luo Ping began typing on her keyboard. The headphone in her other ear was presumably reading Haiyan's resume. After a few questions about demographic information, career aspirations, and communication skills, Luo Ping took the conversation in a direction I did not expect.

Ping: "Do you go out a lot?"

Haiyan: "Yes."

Ping: "Do you walk by yourself or with others?"

Haiyan: "I walk alone in school. At home my mother would be worried and walk with me."

Ping: "If your parents are too worried, would you resist?"

Haiyan: "In the residential area I don't care. When I go out, though, I want to walk by myself. After all, you won't always have someone next to you if you go far."

Ping: "How do you fight for yourself then?"

Haiyan: "I inform them with reason and move them with emotion [giggling]. I left home for high school. I have to go out all the time, for college, and for work. They get used to it when they see enough examples."

The two of them continued a long conversation about the means of transportation Haiyan uses, how she learnt to use the white cane, whether she tap-taps the long cane or sweeps it from side to side on the floor, and how she asks for help when she's out alone. Towards the end, Luo Ping did ask Haiyan about IT skills. But for this job, she repeated at the end of the session, "hard" skills are not the most important. I was surprised by how much Luo Ping focused on general life skills that are seemingly unrelated to the work of data annotation. These life skills, as I later found out, are what ENABLE calls "autonomous life" (*zizhu shenghuo*) skills.

That evening, Haiyan and I took a taxi together back to the dorm after work. When we were about to arrive, Haiyan took out her phone and insisted that she pay for the taxi. I was initially hoping to split the cost. She began listening through her screen reader, looking for her digital wallet. I told her I could cover it since she is still an intern and I have research funding, so I paid with my phone instead. Exiting the taxi, we walked together towards our dorm building, one of her hands lightly holding my elbow as a navigation guide. "Thank you Wu Di *jiejie* [older sister]. You don't have to come with me," she told me in her gentle sweet voice at the entrance of the building. I said I lived in the same building. I live on the 7th floor. She lives on the 18th. She seemed concerned that I would want to escort her to her floor, so she pre-empted me again: "Then I can go up by myself." "Ok." I pressed the elevator buttons for 7 and 18. "Bye Haiyan!" I got out on the 7th floor as promised, but admittedly felt uncertain about leaving her alone in the elevator.

"Did you arrive?" I texted her minutes later. Haiyan responded yes with voice messages, and sent me a digital "red envelope" on Wechat. She said she's too shy to persuade me but I must take her money. I opened the red envelope. It was the entire taxi

fare. It took me many interactions like this to realize how terribly wrong I was. What Haiyan was expressing was precisely her desire to go out alone, as she told Luo Ping in the orientation. I was the “parents” who worry too much and the figure she had to “fight for herself” against. I was a barrier to her “autonomous life.”

Why seek “autonomy” in a data annotation program? And why would a data annotation program look for “autonomy” skills in its workers? After all, we have learnt from the scholarship on data labor how exploitative such work can be. Contemporary machine learning systems are not only powered by algorithms and computing power: they also rely heavily on enormous volumes of data (Tubaro, Casilli, and Coville 2020). Human data workers are essential for collecting, categorizing, coding, and moderating such data so they can be made “legible” to the machine. For example, early computer vision systems required human workers to recognize a designated object in an image and mark it out in an annotation portal to “train” machine learning algorithms to “recognize” images. More recent hype over “Generative AI” also drew attention to the human workers in East Africa hired to clean up harmful or violent content for chatbot technologies like ChatGPT (Hao and Seetharaman 2023). Most data annotation tasks are tedious at best, and traumatizing at worst. Typically organized in forms of platform-based crowdwork or business process outsourcing (BPO) and often based in the Global South, data annotation work is notorious for underpaying, deskilling, and surveilling workers (Irani 2015; 2016; Ekbia and Nardi 2017; Gray and Suri 2019; Roberts 2019; Altenried 2020; Vallas and Schor 2020), who are often at the bottom of the data supply chain and lack power to contest their labor conditions or the content of their work (Miceli, Schuessler, and Yang 2020; Miceli, Posada, and Yang 2022; Miceli and Posada 2022).

The precarity of the digital work can further exacerbate for disabled people despite its empowering promises (Yu et al. 2019). On the one hand, information technologies may provide new affordances for people with certain disabilities to bypass discrimination (Gray and Suri 2019), to work around physical inaccessibility (Dobransky and Hargittai 2006), to forge communities of resistance and self-governance (Lin and Yang 2020), and to express agency, self-identity (Goggin et al. 2019), and a sense of contribution (Boellstorff 2019). On the other hand, new forms of algorithmic cruelty (Irani 2016; Gray and Suri 2019), digital inaccessibility (Zyskowski et al. 2015), trade-offs between flexibility and security (Qu 2020a), and exacerbated precarity (Lin, Zhang, and Yang 2019) abound in digital work for people with disabilities. Some disability theorists question the capitalist imperative to be productive altogether (D. Mitchell and Snyder 2010).

If anything, algorithmic systems are often experienced by users and workers alike as “traps” (Seaver 2019; Renwu Magazine 2020), the opposite of autonomy. More, the latest Generative AI zeitgeist brings the debate of technological automation and human labor displacement to a new height. ENABLE started their disabled data annotator program in 2017. By early 2024, they are threatened by Generative AI’s own capabilities to annotate basic data. Though the emergence of Generative AI does not eliminate its need for human labor, the kinds of labor and profiles of workers are shifting. For ENABLE’s workers, the tasks they have been trained to do are being automated at threatening speed.

When I introduce this research topic in conferences or conversations, the first reactions I receive are often something like this: disabled workers must be cheaper than non-disabled persons; disabled people must have no other choice than to be exploited;

or disabled people must be better at data annotation in some ways — perhaps they are more attentive to detail. The common assumption is that disabled people are involuntarily enrolled into the data annotation industry by techno-capitalism which preys on their vulnerability. The structure of capitalism overshadows any agency that disabled people may have.

This is not entirely true in the case of ENABLE. When they started experimenting with data annotation in 2017, no one thought blind people could label data. Operating a computer is imagined as requiring vision. When they approached their first major client AITech, the tech company was concerned that hiring disabled people to do such work would somehow harm their brand. Their rationale was that users may question the quality of their products if they know the data is processed by disabled folks. When ENABLE eventually got their first contract, AITech paid them the same price as non-disabled data suppliers with no additional financial benefits from the state disability employment quota policy. Disabled people do not have a natural advantage of some sort to work on data annotation. In fact, they would have been disadvantaged, if ENABLE did not negotiate and redesign the labor conditions. It took ENABLE's activists tremendous effort to build a high-performing disabled data annotators team and to embed themselves into a competitive commercial labor market. AITech became more comfortable with narratives of "tech for good" after the fact. Capitalism seems to operate here with less of a coherent logic than surviving "parasitically," in STS scholar Timothy Mitchell's words (T. Mitchell 2002). The power of techno-capitalism did not enter this relationship prior to ENABLE's mobilization of it, and should not be overdetermined or given a coherence it does not have.

More crucially, from the vantage point of the disabled activists, to enroll techno-capitalism into their decade-long advocacy was a decision they consciously made. Qin Fei, a blind activist at ENABLE, half-jokingly terms it “reverse co-optation.” This is not just hyperbole. It at least more accurately represents the sequence of events than simply equating all capitalist engagement in the social domain as nothing but neoliberal co-optation. If all knowledge draws on “views from somewhere” (Haraway 1988), this dissertation aims to look through the perspective of the disabled actors instead of looking at them, a distinction that ENABLE’s activists make as standing “side by side” versus “face to face” to the disabled community. Departing from the debate over whether technology empowers or exploits, includes or excludes people with disabilities, I see disabled people as not merely on the receiving end of technological promises and perils, but as experts involved in producing sociotechnical systems like AI, and I focus on their meaning systems and practices.

Tracing the story of ENABLE and data workers, I came to realize how multiple, sometimes contesting notions of autonomy are pursued through the labor of the workers and the activists. Their labor simultaneously goes into making machines “autonomous,” creating work conditions for “autonomous life” from families, constructing bureaucratic networks that make hiring disabled annotators appear natural and automatic, and designing assistive devices that enhance blind people’s autonomy in outdoor navigation. Disabled people’s labor to construct these multiple regimes of autonomy is what I call “autonomy work.” A fraught concept, autonomy and its different connotations deserve some elaboration.

Human-Machine Autonomies

The autonomous subject figures centrally in the Western liberal tradition. Popularized by Enlightenment thinkers as the core attribute of the ideal rational human being, autonomy is considered “the ground of the dignity of human nature and of every rational nature” (Kant 1785, 4:436). It is the fundamental condition of free will. In this tradition, agency, autonomy, and independence from others are the essence of humanness.

20th century science and technology, particularly the “new sciences” of cybernetics and artificial intelligence, became fascinated with the notion of autonomy and agency in non-organic entities. Cyberneticians viewed all systems as objects of communication and control. In *Human Use of Human Beings*, Norbert Wiener, known as the “father of cybernetics,” argues that it is the form rather than the substance that matters in the transformation of an entity. In this conceptualization, purposeful behavior is primarily the result of information and feedback, a goal that in theory every system — human or machine — can achieve. In their famous “Behavior, Purpose and Teleology,” cyberneticians Norbert Wiener, Arturo Rosenblueth, and Julian Bigelow used the target-seeking torpedo as an example to illustrate machines’ “intrinsic purposeful behavior” to self-adjust and achieve a pre-given goal. This capability to physiologically adapt and achieve the same goal, suffices as “autonomous” to the cyberneticians, without requiring a subject that is self-aware cognitively.

Early research in artificial intelligence built on this idea of the “autonomy” of machines, but shifted to an approach that privileges representation of knowledge through

symbols and logic, over physiological information and feedback (J. Weber and Suchman 2016). These logic-based symbol-processing machines worked well in rule-based environments (such as chess playing), but performed poorly in more dynamic real-world environments, a distinction that STS scholar Lucy Suchman describes as pertaining to "plans and situated actions" (Suchman 1987). Suchman argues that actual, particular occasions unfolding through interactions can never be fully specified, and that plans are at best cultural devices.

Later approaches in artificial intelligence and robotics began to stress the importance of embodiment, learning, situatedness, and sociality. Conscious naming strategies designating machines from vehicles to weapons as autonomous, and increasing coverage of the technological automation in displacement of human labor, triggered renewed public debate about the tension between autonomy and automation of humans and technologies.

In 1978, STS scholar Langdon Winner examined how technology's potential autonomy from the control of their creators had become "a persistent obsession in modern thought" (Winner 1983, 306) in Western political and social debate. Winner writes about three common beliefs challenged by the idea of autonomous technology: "that men know best what they themselves have made; that the things men made are under their firm control; that technology is essentially neutral, a means to an end; the benefit or harm it brings depends on how men use it" (Winner 1983, 25). Yet the "colossal passivity" that we have towards technology is already implied in Mary Shelley's Frankenstein. To Winner, what characterizes technologists' attitude towards technology is not just fear of man's creation being imperfect or disastrous, but Frankenstein's act of sending his creation "into

the world with no real concern for how best to include it in the human community" (Winner 1983, 313). Technology becomes a "license to forget" (315), "an unfinished creation, largely forgotten and uncared for, which is forced to make its own way in the world" (316). In Winner's view, how we think about machine autonomy is nothing but our perception of human autonomy in a different light. By claiming the inevitability of machine autonomy, we are relinquishing our responsibility, or the moral dimension, from Kant's original articulation of human autonomy, and projecting a false sense of agency assumed as an essence intrinsically present prior to any social relations.

This critique echoes feminist STS scholars who have been thinking about autonomy and agency in terms of relationality and responsibility. While Actor-Network Theory points us to the agency of non-human actors (Callon 1984; Latour and Woolgar 1986) in a sense that "the world kicks back," feminist theorists such as Karen Barad reminds us not to assume some innocent symmetry between the subject and object (Barad 1999). We are responsible for what exists, they argue, "not because it is an arbitrary construction of our choosing but because reality is sedimented out of particular practices that we have a role in shaping and through which we are shaped" (Barad 2007, 390). Agency therefore is "not an attribute" of either humans or machines, but "the ongoing reconfigurings of the world" (Barad 2007, 141), enacted through the "intra-actions" between subject/objects. In other words, agency is relationally produced and responsibility is not evenly distributed across involved entities. Lucy Suchman calls our attention to the specifics of particular human-machine configurations (Suchman 2006), as different configurations beget different forms of agency. Autonomy of human or machine must be examined in their specific assemblage, not in abstraction.

In disability studies, the hegemony of the Enlightenment figure of a bounded, inherently autonomous self has been further problematized. Sociologist Bill Hughes argues that Western modernity invalidates disabled persons by casting them as alterity to the independent, autonomous subject (Hughes 2001). Disability studies scholar Susan Wendell, in the very first issue of the Disability Studies Reader, argues that instead of a culture of "self-reliance," disabled people need a culture based in "interdependence" (Wendell 1997). That dependency diminishes someone's personhood falsely assumes that anyone exists independently in this world, a myth called out by disability justice activists such as Mia Mingus (Mingus 2010). Mingus' rearticulation of the ethics of interdependence has been increasingly echoed by recent disability studies scholarship, which considers disability as fundamentally a relational and political category that is produced through interactions between bodies, tools, and environment, an approach that Alison Kafer calls "the political/relational model" of disability (Kafer 2013a). Through analyzing disabled persons' experience with sociotechnical systems, scholars have also revealed the facilitated nature of the subjectivity and agency of all human beings (Wolf-Meyer 2020; Moser 2006). The insight that humans are fundamentally interdependent with other human and non-human entities has inspired new approaches to how we design and appraise science and technology (Hamraie and Fritsch 2019; Bennett, Brady, and Branham 2018; Dokumaci 2023).

Finally, anthropologists have long denounced the universality of Western personhood as the model for all humans. As Clifford Geertz writes, the "Western conception of the person as a bounded, unique, more or less integrated motivational and cognitive universe" is in fact "a rather peculiar idea within the context of the world's

cultures" (Geertz 1993, 59). Nor are these conceptions static. The Chinese self, as anthropologists of China have traced, is constantly undergoing transformation. Traditionally conceptualized as situated in the collective, the Chinese self has been increasingly "divided" (Kleinman 2011a) between the individual and collective (Yan 2009), the past and future (Liu 2002), as well as the public, moral self and the privately "desiring" (Rofel 2007), "therapeutic" (L. Zhang 2018) inner self. Xin Liu sees the post-Mao reform era as characterized by a total breakdown of social relations, creating a moral vacuum where individuals can manipulate fixed old cultural forms to express flexible, new ethics and meanings (Liu 2000). In this context, the quest for "autonomy" by disabled persons in China is not a rupture, but a variant of the shifting multitudes of Chinese personhood. Taken together, the scholarship of STS, disability studies, and anthropology of China have established that agency and autonomy are relationally, multiply, and unevenly produced.

This dissertation adds another dimension. To my disabled interlocutors, autonomy is not only relational. It is malleable. They take the constructed nature of autonomy to the next logical step by proactively seeking to reconstruct it. Autonomy is not a given, especially for disabled individuals in China, but it can be made. This dissertation traces disabled people's processes of remaking multiple forms of autonomy, defined on their terms, through reconfiguring specific human-machine relations in networks where they hold less power. I use the term "autonomy work" to capture the "multiple regimes of value" (Friedner 2015b) that disabled people's labor produces to make "autonomous" machines (*zidonghua*), build an "autonomous" life (*zizhu shenghuo*) through work, and design tools for "independent" navigation (*duli chuxing*).

I argue that disabled persons in China sought to enhance their autonomy, precisely by reworking social relations. I call this mechanism “rerouting.” Instead of a total departure from asymmetrical power relations, my interlocutors “reroute” the pathways between different human and non-human nodes without changing the nodes per se. They do so in the sociotechnical system they build, the technological institutions they maneuver, the kinship they seek to remake through tech work, and the physical terrain they navigate with assistive devices, to achieve multiple forms of autonomy.

I consider “rerouting” a crucial form of disabled people’s expertise in knowing and making the world. My work is inspired by a rich scholarship on the intersection of disability and technoscience, which rejects the technoscientific objectification of disabled people as mere metaphors, inspirations, or use-cases of mainstream science and technology, a pattern Mara Mills calls “assistive pretext” (Mills 2010), and critiques the rhetoric of what Ashley Shew terms “technoableism” which “at once talks about empowering disabled people through technologies while at the same time reinforcing ableist tropes about what body-minds are good to have and who counts as worthy” (Shew 2020a, 43). Anthropologist Michele Friedner details how urban deaf workers in India end up providing “multiple regimes of value” to information technologies through reinscribing their stigma as value in late capitalism (Friedner 2015b). The value of disability is a spectrum. Other than the extractive and ambivalent, many scholars have spotlighted genuine contributions that disabled people bring to the making and knowing of the world. Instead of seeing disabled people as a resource, problem, or afterthought in technoscience (Wu 2021), this body of scholarship, proclaimed by Aimi Hamraie and Kelly Fritsch as “crip technoscience” (Hamraie and Fritsch 2019), centers disabled people as experts in technoscience and as

agents who can harness science and technology for political change. Design historian Bess Williamson documents the rich history of post-polio maker community that designed adaptive technologies as consumer goods (Williamson 2012). Critical access studies scholar Aimi Hamraie calls attention to the kinds of “access-knowledge” grounded in the lived experiences of disabled makers, who are often unrecognized as legitimate engineers or researchers (Hamraie 2017). Or as design scholar and advocate Liz Jackson puts it, disabled people are “the original life hackers” (Jackson 2018). Anthropologist Cassandra Hartblay writes about other forms of knowledge that disabled people develop through embodied or intimate relationship with disability, about “unorthodox configurations of agency, cultural norms, and relationships between selves, bodyminds, and the designed world” (Hartblay 2020, S26), such as managing the normate’s perception, living with different temporalities (“crip time”), and living under surveillance and domination. Hartblay calls these forms of knowledge “disability expertise.” Anthropologist Arseli Dokumaci details the everyday acts, or what she calls “microactivist affordances,” through which disabled people become affordances for one another, or improvise affordances through non-normative ways of deploying bodies, tools, and environment, in the absence of readily available access (Dokumaci 2023).

“Rerouting” joins concepts such as life hacking, access-knowledge, crip technoscience, and activist affordances in highlighting the effect of disabled people’s knowledge and practice in bending the world towards disabled bodies and minds. It further contributes to the disability expertise literature by specifying a key mechanism. Disabled people hack lives, build access, and improvise affordances by reorganizing the relational and physical pathways between objects, bodies, and environment designed

with other intentions. I use this concept to capture the technical, institutional, social, and material dimensions of the labor of my interlocutors. Rerouting is a metaphor of unexpected approaches, connections, movements, terrains, and malleability.

Crackdown, Computers, and "Crip Technophile": Encountering ENABLE

I have known ENABLE since 2015, when I began managing the disability rights portfolio at an international organization based in Beijing, which partners with Chinese NGOs like ENABLE to implement programs. At the time, ENABLE was already well known among international development groups. Established in Beijing by a few physically impaired and visually impaired activists in 2006, ENABLE was one of the earliest "DPOs," or disabled persons' organizations in China, namely organizations not just for but led by disabled persons. ENABLE's early programs centered on media and policy advocacy. They hosted a successful radio show for disabled people on China National Radio made by blind producers, covered the multiple Special Olympics and Paralympics games as disabled reporters, and trained media professionals to be more conscious of disability rights issues. In 2008, China's ratification of the *Convention on the Rights of Persons with Disabilities* (CRPD) and the Beijing Olympics gave the works of ENABLE and many disability NGOs huge momentum. The CRPD further boosted the legitimacy of their work, and popularized the "social model of disability," a new conceptual paradigm that considers disability as an interaction between one's impairment and societal barriers, for the first time in China. Though the social model of disability has been critiqued and revisited by

critical disability studies scholars in Europe and North America in recent years (see Kafer 2013; Shakespeare 2013), till this day, I would still meet disabled Chinese who learnt about the social model through advocacy groups like ENABLE, telling me that the social model has changed their lives by showing them that disability is not their fault.

The air of the early 2000s was filled with genuine enthusiasm about international cooperation, civil society, and rights advocacy. Chinese NGOs are colloquially known to have birthed after the 1995 World Conference on Women in Beijing. Two decades later when I joined the sector as a young professional, international cooperation on social justice issues was already a norm. But that did not last long. In 2015, the government arrested five feminist activists before International Women's Day, and launched a campaign against human rights lawyers in July (Pils 2018b). Yirenping, one of the leading anti-discrimination NGOs in China, which also works on disability discrimination, was forced to shut down. A year later, China passed the Law on Administration of Activities of Overseas Nongovernmental Organizations, widely known as the "Foreign NGO Law," which significantly raised the threshold for foreign NGOs to register or operate in China (ChinaFile 2017). Grassroots NGOs that once relied on funding from international donors, now must pivot towards domestic resources. Increasingly, grassroots disability advocacy groups began shifting their focus from advocacy to service provision, a more politically and financially palatable strategy (S. Huang 2019), ENABLE included.

In search for new program models, ENABLE found itself in the heyday of the Chinese tech industry. Li Feng, a co-founder of ENABLE, had always been, in the words of a colleague of his, "a real kind of technophile." He is the kind of person who would list

“technology” as a core value of the organization on the sticky notes in strategic planning workshops. In his defense, though, his relationship with technology is personal.

When he was an elementary school boy, Li Feng repeatedly failed Chinese language exams. He did better at math, not because he was more gifted in math, but because the print in math exam papers is less dense than the Chinese characters. Born with a visual impairment, Li Feng struggled to see what was on the blackboard despite sitting in the front row in mainstream schools.

The Tongren Hospital in Beijing is considered one of China’s best in ophthalmology. Families from across the country pay pilgrimage every year to seek cure for the vision of their loved ones. The line for getting an appointment is notoriously long for those without connections in the hospital. Li Feng’s family could not afford a hotel in Beijing, so they squeezed in a basement apartment waiting to get an appointment. The rent for the basement at the time was 50 CNY per night. The appointment, it turned out, cost them 1500 CNY (roughly 200 USD today).

Days later, a doctor was finally able to see him. Li Feng and his family eagerly showed up. Five minutes after they sat down, the doctor sent them away. Li Feng’s mother pleaded with the doctor to check on him again. They came a long way from Fujian Province (a southern province nearly 1000 miles from Beijing), says his mother, and it was not easy to get an opportunity like this. “Everyone came from faraway places,” the doctor shook his head, “the last one was from Hainan!” a province farther south than Fujian. The five-minute doctor’s visit in the country’s best hospital effectively declared no

medical cure for Li Feng's condition. Nor did it, as Li Feng later lamented, provide any clues to how else he should live his life as a person with low vision.

Li Feng discovered the magnifier in the second semester of first grade. At fourth grade, he learned how to use binoculars. Low-tech gadgets like these changed his life in a material sense. He now could see the blackboard. He could take exams, although during one of the most important exams to enter college, his magnifier was confiscated. It would not be until 2014 that China began to allow disabled exam takers to use reasonable accommodations such as large print and Braille exam papers (Cui et al. 2019). Li Feng was born a decade too early. He did end up attending a STEM college. Yet had the doctors mentioned a word about tools like a magnifier, it would have saved him from much pain and wasted time. The system that Li Feng grew up with, it seems to him, was only interested in fixing his impairment and, when cure was beyond grasp, had no alternative plans for people like him.

Li Feng now carries a small magnifier everywhere, uses color inversion and large print on his smart phone, and is often playing around with some new gadgets in the office. Together with Luo Ping and a few other colleagues, he opened ENABLE's Shanghai office in 2015, hoping to build a "social enterprise" that could sustain itself better than traditional NGOs, always opportunistically waiting for the next "call for proposal" from donors.

ENABLE's Shanghai social enterprise experimented with many programs, all technology related. Building on their experience of operating hotlines for the radio show production, they set up a call center hiring blind workers as customer service specialists. In 2016, Luo Ping remembers hearing about AlphaGo wining the DeepMind Challenge

Match with world top Go player Lee Sedol, and feeling that artificial intelligence was going to be a big deal. For ENABLE, that did not immediately translate into opportunities. Rather, it was a crisis. Customer services calls were increasingly replaced by robot calls. ENABLE struggled getting contracts for their call center, especially long-term ones. Like many business process outsourcing (BPO) programs, ENABLE saw data processing as an opportunity to reskill and adapt their customer service work, conceived not just as a business, but as an employment program for the blind community.

By the time I began my PhD research in 2019, I had known Li Feng and ENABLE's data annotation program for quite some time. I was intrigued by this program because my own previous attempt to co-found a "social enterprise" and mobilize corporations for disability inclusion had been a failure. Bending corporate resources towards the disability community seemed a mission impossible. I was curious how a DPO like ENABLE, whose work was rooted in advocacy, managed to run a viable business while retaining its edge for social justice. In early 2020, right before COVID-19 became a pandemic, I visited Li Feng in their first data annotation office in Shanghai. During summer 2020, under lockdown in the US, I remotely interviewed 19 data workers from four cities. I took another in-person fieldtrip in summer 2021, before starting a year-long fieldwork based mostly at ENABLE from October 2022. In total, this dissertation builds on 14 months of ethnographic fieldwork spanned across three years, supplemented by five years of my own professional experience in the same field.

In this dissertation, you may find the line between my voice as a scholar and as an ally sometimes blurry. My knowledge is "situated" (Haraway 1988) not in the lived experience of disability, but in a professional identity formed through close encounters

with the struggles and hopes of disabled communities in China. Balancing the roles of participant and observer was at times challenging for me during the fieldwork. This dissertation is therefore my attempt for “partial translation” (Haraway 1991) of the “disability worlds” (Ginsburg and Rapp 2013a) of my interlocutors. My knowledge is also, as Stefan Helmreich terms it, “oriented knowledge” that is for and toward specific aims (Helmreich 2023). It is oriented towards shedding light on the unseen agency of disabled actors striving to reconfigure change in stubbornly challenging times.

Chapter Overview

Chapter 1 “Making Machines Autonomous” details the technical processes entailed in natural language processing (NLP) data annotation for a smart home system developed by ENABLE’s client AITech. The work of consistently synchronizing interpretations of the ambiguous data and elusive rules of smart home systems prefers a stable annotation workforce with coordinated cognition and trained judgment. This technical demand has come to be met by a committed team of skilled disabled workers, who are pushed out from the mainstream job market by systemic ableism, and pulled in by disability-informed expertise that reconfigures space, time, and political economy to meet non-normative bodyminds. I argue that the disability expertise and disabled people’s labor, a form of autonomy work, affords a technical edge to AI systems in China’s current political economy.

Chapter 2 “The Bureaucraft of Autonomy” tells the backstory of ENABLE’s negotiation with their Big Tech company clients that makes the labor conditions described in Chapter 1 possible. It costs corporations in China little to discriminate against — but a lot to include — people with disabilities. Mobilizing corporate resources in this context necessarily requires systemic change within corporations. In this heavily tilted playing ground, ENABLE sought to rewire different corporate nodes such as business units (BU), human resource (HR), and corporate social responsibility (CSR) into a new assemblage of relations, without changing the operating logic of individual units. Drawing on literature of STS and the anthropology of bureaucracy, I describe three key techniques they deploy — immersion, experimentation, and re-orientation. Rerouting corporate workflow and relational pathways between different human and non-human nodes allows activists to integrate disability into corporate circuits, without relying on one-off charitable acts. As disability is fundamentally relational, it necessarily requires coordination. Building an institutional infrastructure for coordination, I argue, is a form of work key to sustaining the sense of autonomy experienced by the workers.

This is the subject of Chapter 3 “Working Out Independence.” It turns to the daily lives of the data workers and elaborates on the meaning of data annotation work for them. Through five months of co-living experience I had with the workers in their Shanghai dormitory, I learnt how working at this particular data annotation program has come to be associated with “going out” (*zouchulai*), especially from home. I draw on anthropologist Kathleen Millars’ conceptualization of work as “a form of living” (Millar 2018) which attends not just to the livelihood but the way of life afforded by particular kinds of work. In this view, work is fundamentally about what it means to have a good life. In the workers’

narratives, the increased decision-making power they enjoy over their relationship with time, space, bodies, objects and other humans is significant to their reasons to stay in this work, despite its many downsides. I argue that the Chinese disabled person is invalidated through their perceived inability to play relational roles and reciprocate dependencies. The quest for autonomy for disabled persons in China, therefore, signals not a break from family per se, but a desire to return favors, mutually care, and share responsibilities.

The final chapter takes a peek into the future with ENABLE through an experimental project. In Chapter 4 “Autonomous Design: The Blind Way,” I focus on a technological object that ENABLE is developing — a device to aid blind people’s independent navigation that they call “The Homecomer.” Failing to mobilize corporate or government support for the project, ENABLE decided to design and manufacture it by themselves. In Designs for the Pluriverse, anthropologist Arturo Escobar proposes we think about design as ontological, in that it is creating ways of being (Escobar 2018). By designing the Homecomer in ways that distributes a blind walker’s awareness through modular sensors installed at different spatial nodes of their choice, the disabled activists are creating ways of being a mobile and autonomous blind subject. Detailing how ENABLE’s community building program trains newly blind people on independent navigation, another branch in Beijing which is separate from the data annotation program, I show that blind navigation is a highly skilled, situated, and embodied activity. What distinguishes ENABLE’s design fundamentally from proposals from Big Tech, then, I argue, is their expertise in reworking objects into the existing sensory network of blind people while centering the decision-making power of the blind knower.

Zooming into agency does not mean foregoing structure. Nor does it suggest things always go according to the agents' will. If anything, a sense of failure and frustration characterizes the experience of most rights advocates in China. In *Activist Affordances*, Dokumaci describes the reduction in possible affordances in a given body-environment relation as "shrinkage." While people with disabilities, chronic illness, and pain may experience shrinkage in everyday life, we are all experiencing some form of "planetary shrinkage." It is in a shrinking world, she argues, that creating alternative affordances within constraints becomes a necessity (Dokumaci 2023). Likewise, operating between political repression, economic downturn, global pandemic, technological reshuffle, and the mundane experience of living as a disabled person under systemic ableism, the expertise of rerouting developed out of sheer necessity for my interlocutors.

If we look at ENABLE's work through the lens of replicability or scalability, many may call them a failure. After all, their story is one of many contingencies. They also seem reluctant to scale up. Li Feng, for one, worries that once the data annotation team grows bigger, they would lose hold of the individualized attention ENABLE seeks to provide, a classic tension between scale and care (Seaver 2021). Their work is about "proving a possibility." Once a new possibility is proved, a new pathway is created, and becomes a route that other people can traverse. Traveled enough, it is hoped, change can happen subtly in the malleable nerves of society.

Chapter 1. MAKING MACHINES AUTONOMOUS[2]

Tech for Good, or Good for Tech?

"Microwork Helps Disabled People Fly Against the Light."

"AI Brings New Jobs for Disabled People's Employment."

"Big Data Annotation Heralds New Disability Assistance Model."

Numerous news headlines in China have proclaimed people with disabilities to be the beneficiaries of new kinds of job opportunities serving the development of artificial intelligence (AI) systems (e.g. Netease.com 2018), such as data annotation. Essential for machine learning systems to recognize patterns from a data set, data annotation often entails a large number of human workers to hand code, label, and sort training data. In recent years, government agencies and technology companies in China have enthusiastically set up programs aimed at recruiting and training disabled people to conduct data annotation work, often branded "tech for good." Such jobs, they claim, empower disabled people by increasing their income, by offering ways to overcome physical barriers, and by making them "useful" to society thus fulfilling these workers' "self-worth" (JD.com 2018).

For government and development agencies, data annotation appears to be a magic bullet to the "problem" of disability and poverty. At a casual tea conversation in the

[2] Part of this chapter is published as "Good for Tech: Disability Expertise and Labor in China's Artificial Intelligence Sector" in *First Monday* 28 (1).

winter of 2022, a Shenzhen-based investor who had a successful track record investing in disability-related social enterprises explained to me his plan to enter data annotation. A rich man whose son studies computer science in the US, he believes in the scalability of AI data annotation. The goal is to build a platform that provides jobs for 300 people with disabilities in every province. Officially, China has 31 provinces, municipalities, and autonomous regions. That “resolves” over 9000 job placements nationwide.

But why data annotation? “Because the entry-barrier is low.” Almost every employment base I have visited, run by NGOs, government, or companies, from Xiamen in South China, Suqian in East China, to Yinchuan in West China, always brings up this argument. Because the tasks are considered so simple, the Shenzhen entrepreneur explains, the job opportunity can “trickle down” into third or fourth tier cities. Many others dreamed about it being made available for disabled people in rural areas, where over 75% of people with disabilities in China reside. Without knowing much what it entails, many development-minded actors and agencies, from local disabled persons’ federations to the Asia Foundation, begin to perceive AI data annotation as a ground-breaking, vastly scalable solution to China’s uneducated, impoverished rural disabled mass, without having to address the thorny, stubborn issues of basic education, accessibility, and deeply entrenched inequalities.

People with disabilities are but one community prescribed a brighter future by AI data annotation. Ethnic minorities and rural women are also among the “natural” beneficiaries of technological opportunities that “trickle down” to where they are, often remote, impoverished areas with poor physical infrastructures for mobility and unequal access to quality education or competitive employment opportunities.

The 2023 World AI Conference in Shanghai was unsurprisingly hyped with large language models (LLMs) and Generative AI. At a massive exhibition center of Alibaba, China's tech tycoon, I accidently came across a corner about their data annotation program in rural areas. The program, celebrated as Alibaba's "tech for good" story, aimed to set up data annotation centers at county levels, especially in western China, hiring at least 60% of its workforce to be women. They call it the "AI-dou Plan" because, the male head of the company's "Women's Charity Department" explains, "every woman can become their own idols in the digital era." The corner deployed every means it could to publicize the program, including sensational promotional videos featuring rural women and their children, grateful speeches by rural women representatives who traveled to Shanghai, and earnest remarks by local data annotation center CEOs who are overwhelmingly men with rural accents.

Their talking points are consistent — data annotation brought jobs to the villages. Women can now "work right in front of home." Women annotators spoke about the benefits of being able to earn a salary while taking care of families and fulfilling domestic duties. Young people came back. There was no bubble tea place in the street of the villages before, but now as more young people returned, a northwest China county program CEO proudly announced, bubble tea places bubbled up. Another representative came from a county with ten ethnic minorities. According to him, the program represents best practices for solving the challenge of women's employment in multi-ethnic area: "Ethnic minority women became more 'sunny,' confident, and independent. They gained 'positive energy,' and premium benefits. This makes her family more harmonious, and the society more stable." He further elaborates on this point, quantifying how creating a job

in big cities like Beijing or Shanghai means differently than making one in ethnic minority areas: “The social value of the employment of our 345 people far surpasses the social value of 1000 people’s employment in other places.” The same day of the WAIC conference, a news story titled “On the Loess Plateau, Women without College Education Are Nursing AI” was circulated on social media as a celebratory account of the AI-dou Plan.

Disabled people, ethnic minorities, and rural women have come to be part of a sociotechnical imaginary that presents data annotation labor as not the resource extracted by AI companies, but a generous endowment to communities plagued by underdevelopment. Providing labor for technology companies thus becomes a means for self-development for the marginalized, rather than a source of value for the desperately data-thirsty industry of Chinese AI — an old discursive tactic rehashed from turning the “low-quality” (*suzhi*) migrant workers into productive labor forces in the name of their own improvement (Yan 2008).

These charitable imaginaries contrast starkly with the reality of labor conditions of most of these jobs. Data annotation work, often organized in the form of microwork or crowdwork, is known for exploitative labor conditions that underpay, deskill, and surveil workers, who must stay hypervigilant to compete for tasks, with little means for collective action (Irani 2015; 2016; Ekbia and Nardi 2017; Gray and Suri 2019; Roberts 2019; Altenried 2020; Vallas and Schor 2020). Disability studies scholars have also detailed how digital work may simultaneously empower and exploit, include and exclude, people with disabilities (Yu et al. 2019). On the one hand, information technologies have provided affordances for people with certain disabilities to bypass discrimination (Gray and Suri

2019), to work around physical inaccessibility (Dobransky and Hargittai 2006), to forge communities of resistance and self-governance (Lin and Yang 2020), and to express agency, self-identity (Goggin et al. 2019), and a sense of contribution (Boellstorff 2019). On the other hand, new forms of algorithmic cruelty (Irani 2016; Gray and Suri 2019), digital inaccessibility (Zyskowski et al. 2015), trade-offs between flexibility and security (Qu 2020a), and exacerbated precarity (Lin, Zhang, and Yang 2019) abound in information technology work for people with disabilities. Some disability theorists question the capitalist imperative to be productive altogether (D. Mitchell and Snyder 2010).

This chapter moves beyond assessing whether tech is truly "for good." Rather than debating how tech work may empower or exploit people with disabilities, I focus on how disabled people's labor may in turn transform technology. I show that the labor and expertise of disabled people can in fact be "good for tech." The disabled workers I examine here provide highly competitive data annotation services to their Big Tech client, "not by playing the charity card or fighting a price war," in their own words, but by fulfilling a key structural need of the AI system. I approach people with disabilities not as on the receiving end of technological promises and perils, but as experts involved in the quotidian construction of "intelligent" systems. This is inspired by STS scholarship's attention to the materiality of technical configurations, as well as disability studies' emphasis on the agency of disabled people. Taken together, the two fields shed new light on the intricate relationship between disability and information technology.

My analysis focuses on one data annotation program run by ENABLE, an organization run by disabled people themselves, or a disabled persons' organization (DPO). I draw in this chapter upon 19 remote interviews and two fieldtrips between early

2020 and summer 2021, as well as my own five-year professional experience of managing disability advocacy programs in China's nonprofit sector. My interlocutors are a team of workers with visual or physical impairments, hired to label Chinese language AI training data for smart home technologies developed by a leading Chinese tech company I call AITech. ENABLE recently outperformed many non-disabled competitors and became a major data annotation service provider for AITech. This case is rather an exception to data annotation programs in China. As I will elaborate, run by disabled people themselves, the examined program has distinctive approaches to data labor.

Centering on the embodied experience of disabled workers and the inner workings of sociotechnical processes, I argue that the labor and expertise of disabled workers offer the AI system a technical edge, and became instrumental to the creation of seemingly "autonomous" digital agents. My argument is three-fold. First, as ENABLE's workers taught me, data annotation for smart home AI systems entails human interpretations of highly ambiguous data, to which the rules can iterate on a weekly basis. To consistently formalize tacit knowledge that improves the system's response to user queries, a stable workforce of human annotators with coordinated cognition and trained judgment is preferred. Second, this technical demand has come to be met by a committed team of skilled disabled workers, who are pushed out from the mainstream job market by structural ableism. Third, and more importantly, the workers are pulled in by the DPO's unorthodox configurations of workplace to meet the workers' heterogenous bodyminds. I use anthropologist Cassandra Hartblay's concept of "disability expertise" to unpack the disability-informed knowledge of flourishing in uninhabitable worlds (Hartblay 2020). In addition to non-normative spatial and temporal strategies, the DPO deployed a form of

disability expertise that I call “resource hacking,” optimizing precarious resources in ableist political economies for maximum disability gain, or in one interlocutor’s words, “making resources serve you even when you don’t have any.” Specific mechanisms of resource hacking — a process I term “rerouting” — is detailed in Chapter 2. Disabled workers offer what anthropologist Michele Friedner calls “multiple regimes of value” to techno-capitalism, not only by reinscribing stigma (Friedner 2015b), but also by deploying genuine expertise acquired through the lived experience of disability. Through this case, I bring to the fore the role of disabled people as system-builders of technologies rather than users, victims, or inspirations, and highlight the transformative potential of disability expertise. Disable workers at ENABLE became a crucial node in the web of relations woven to make machines appear “autonomous,” while searching for their own autonomy from limited job options and notorious work conditions.

Objectified Resource, Undervalued Expertise

Disability has routinely figured as an epistemic and material resource in the history of information technology (Wu 2021). The sound spectrograph, a precursor to speech recognition technologies (Xiaochang Li and Mills 2019), was initially proposed to improve deaf education (Mills 2010). Early time-compression technologies were popularized by blind aural speed-readers (Sterne and Mills 2020). At robotics and AI labs at MIT, analogies between disabled bodies and machines were a recurring tool to theorize disembodied intelligence (Richardson 2015). Disability frequently serves as a metaphor, precursor, or advertisement for the research, production, and commercialization of

technoscientific objects that are ultimately designed for non-disabled users, a pattern that historian Mara Mills calls an “assistive pretext” (2010). Disability is also constantly invoked as a “narrative prosthesis” (Mitchell and Snyder 2001) to metaphorize arguments in cultural studies of technoscience, in over-objectified and under-constructed ways (Jain 1999). In contemporary urban India, anthropologist Michele Friedner shows that the immobility, sociality, and affect of deaf workers added multiple forms of value to their employers, many in the information technology sector, in ways that do not always benefit deaf people (Friedner 2015b).

While the technoscientific extraction of value from objectified disabled body-minds proceeds apace, the actual knowledge and expertise of disabled people are ironically ignored. Science and technology studies scholar Ashley Shew (2020b) laments that disabled people are too often enrolled as “marginal cases” and objects of “thought experiments” in technoscientific imaginaries, while being subject to “epistemic violence” (Ymous et al. 2020) that denies them a role as real experts and legitimate knowers. Disability scholars Aimi Hamraie and Kelly Fritsch (2019) urge us to center disabled people as experts in technoscience, and as agents who can harness technology for political change, proclaiming what they call a “crip technoscience.” Likewise, anthropologist Cassandra Hartblay calls attention to “disability expertise,” forms of knowledge that “disabled people develop about unorthodox configurations of agency, cultural norms, and relationships between selves, bodyminds, and the designed world” (2020, p. S34).

This chapter brings the critique of value extraction and the recognition of disabled people’s expertise into conversation. In the case examined, legitimate disability expertise

— in tension and in tandem with objectified resourcing of disability premised on stigma and inequality — forms a crucial part of the value added by the disabled workers. I show that when crip technoscience and disability expertise are practiced, the value of disability need not be created entirely at the expense of disabled people, and labor relations in information technology can be otherwise.

Stability as Technical Edge

Data annotation for smart home AI systems is far more complicated than rote "click work." To excel at such work takes expertise. As of 2020, ENABLE has outperformed many non-disabled competitors, becoming a major supplier of data annotation services for AITech. In my experience as a nonprofit professional, most corporations' motivation to hire disabled people was to fulfill a disability employment quota mandated by the Chinese government, because non-compliance could result in a significant financial penalty (J. Liao 2020). Often, even such strong incentives could not persuade employers. Many would rather pay the fine, or rent a disability certificate as a token of compliance without giving the disabled person real work (Qu 2020b). Surprisingly, at the time of this research, AITech had not claimed any disability employment quota from the hiring of ENABLE's disabled workers. Neither, as is often the case, were the disabled workers receiving less pay for the same work as non-disabled annotators.

To understand what makes ENABLE's labor so competitive, we need to unpack what the job entails. Tasked with classifying user intentions, rating sound qualities, or

sometimes determining the gender and age of smart device users, the annotators engage in complex decision-making processes that demand skilled listening and selective in/attention (Semel 2021). I argue that the act of classifying human intentions and interpreting sounds amidst constant iterations of commercial AI algorithms, is intrinsically ambiguous and volatile. This technical condition makes a committed data annotation workforce with trained judgment and coordinated cognition more productive than forms of labor that are highly flexible and contingent.

Ambiguous Data

Contemporary voice-based AI systems built on supervised machine learning algorithms require huge data sets of high-quality, annotated user requests (Tubaro, Casilli, and Coville 2020). The blind and low vision workers' official job title is "intent annotator." Tasked to assign human intentions to often contextless user queries, they are a crucial link in the "neural networks" of AI systems that help create the right semantic associations between human query and machine action. In a substantial sense, intent annotators assign the correct pathways between words and meaning. They form the invisible wires that connect the technology's machinery with "intelligent" behaviors. Every day, they listen and determine the intention of user queries to voice-activated smart home systems, and code them into thousands of specific "features" that trigger the correct machine response. For example, if a user query reads "turn on the AC" in Chinese, annotators will sort it into "hardware control." It sounds straightforward. But not all queries are this clear-cut. For instance, a surprisingly large number of users engage these devices in casual

conversations. In this case, annotators need to determine what emotions are conveyed, whether the user is talking with another human or interacting with the device, making a command, or simply saying nonsensical words. Sometimes, the name of a song could sound like a conversation and escape an ear unattuned to the latest trends in pop culture. Lihua, a well-educated blind annotator, often finds herself frustrated by the ambiguity of the data. She describes it as making meaning out of “a broken conversation.”

The conversation is “broken” for many reasons. In between the annotator and the user lie multiple layers of cuts and transcriptions. The user’s speech is first cut out of their social context, converted from analog audio information to digital data, then transcribed from speech to text, and segmented into short phrases for annotation. Annotators, without ever hearing the voice of the human and the context of their query, or even the full sentence, now need to judge the user’s “true” intention. Here is an example given by an annotator. In Mandarin Chinese, the written form of “you say you like me huh” (*ni shuo ni xi huan wo ma*) can at least allow three interpretations: “Did you say that you like me?” “Say that you like me!” or “Do you think you like me?” Without knowing the intonation and punctuation from the original speech, it is difficult to judge the precise meaning or emotions. The goal is to not only make the machine seem functional and responsive, but also, emotionally and socially, “intelligent.” Annotators train machines about what emotions users are displaying, how not to misunderstand users’ intentions, and how to respond with appropriate emotional registers. They make human sociality explicit.

Blind annotators use screen readers — software applications that convert text into synthetic speech — to read the textual data aloud. Screen readers are key access tools for the blind and low vision workers. Through ENABLE’s negotiation, AITech made their

annotation system screen-reader compatible, so workers can listen to the content of the data and navigate the portal aurally. One may assume that annotating with a screen reader would be a disadvantage for blind workers. But sighted annotators' experience suggests that the confusion was less caused by sensory differences than by the data's lack of social and linguistic context. Kai is a sighted annotator with physical impairments, who works on the same types of data as the blind annotators. To him, reading those texts with vision is just as "brain burning."

The act of classification is intrinsically reductive (Bowker and Star 1999). User intent classification attempts to impose an artificial social order (Suchman 1993) onto the messy, complex inner world of human users so their needs can be made legible to the machine. Data annotators are part of the layers of mediation that render the technology and end users mutually legible and constructive to each other (Robbins et al. 2020). Far from an impartial, objective, and rote act of simple "click work," data annotation is a "sense-making process" (Klein et al. 2007), in which human workers with heterogenous lived experience assign meaning to snapshots of decontextualized content with prescribed labels. To excel at such work means producing consistent interpretations for not only the ocean of "commonsensical" data, but also the "brain burning" edge cases. Consistency comes from experience and coordination.

Elusive Rules

If reading minds in broken words is challenging, judging sound in isolation can be equally frustrating. Staffed by predominantly sighted wheelchair users, ENABLE's team

in western China focuses on sorting sound clips, such as identifying the “wake word” (for example, “Alexa” or “Hey Google” are wake words for their respective devices), determining the age or gender of the speaker, telling speech from nonspeech, and rating the clarity of speech. These sound clips are sent to the annotators for manual identification, precisely because they were accented, unclear, or confusing. Their job is to literally separate signal, or the lack thereof, from noise.

Though meticulous rules for how to annotate exist, interpretation of the rules is to some extent arbitrary. Wenbo is a young man with a humorous and relaxed demeanor. Sitting in his wheelchair, he had a cup of green tea and a cigarette on the table while we video called. The moment I asked him about annotation standards, he suddenly got serious:

> Speaking of this, let me just say — there is no standard! If a lighter costs fifty cents, it costs fifty cents. But for things like sound, everyone’s ears are different, and everyone’s accents are different. […] If the wake word was spoken very fast, I may find it OK and clear. But if the Quality Assurance (QA) person finds it unclear, then it’s not OK.

The ambiguity of judging sound is a recurring theme among workers who sort audio data. Meihui has a college degree and uses a wheelchair. For her, the hardest part of the job is to listen “objectively” and mechanically to something “subjective” and animate. In her view, “sound is meant to be a living thing! […] But the QA would apply dead rules to judge our work.” Multiple annotators were frustrated when they listened to the same thing as the QA person but heard differently. The QA has the power to determine the “accuracy rate” of the annotated data by spot-checking datasets. If the set has an accuracy rate lower than 98 percent, the entire set would be sent back for the annotators to rework.

The heterogeneous, situational, and immersive qualities of sound (Sterne 2003; Helmreich 2007; Zdenek 2015) frequently clashed with the rigid corporate quest for a single absolute meaning of an isolated sound bite, arbitrarily ruled by ears with higher epistemic authority. To mediate such tension, the workers' strategy is to train themselves to listen like the QA (who supposedly represents the client) irrespective of what they actually hear. As human-computer interaction scholars argue in the context of computer vision data annotation, power dynamics and organizational hierarchy have a more profound impact on the outcome of data annotation than individual bias (Miceli, Schuessler, and Yang 2020).

Most challengingly, the constant iterations of commercial AI algorithms demand frequent updates in the annotation rules. The annotators recall modifications in rules on a weekly basis. Each time a new specification, combination, or option becomes available, the calculation of the "correct" label is subject to change. Not only are annotators required to learn the rules promptly, but the more knowledge they have about the genealogy of the existing rules, the quicker they can preclude wrong interpretations of the new rule. In other words, annotators with stronger institutional memory can better recognize patterns in the ever-changing rules, and make more accurate predictions of interpretation.

The disabled workers' long-term knowledge also brings direct improvements to AITech's product. To synchronize data interpretations among the annotators, QAs, and the client, the disabled workers attend weekly meetings with the developers. In these meetings, the annotators provide direct feedback on trends, problems, and recommendations. Often, the developers end up adjusting the feature of the product based on common queries that the annotators observe. As Danni, a geeky, young blind

woman, remarks, “we are the ones who understand the users most.” The close feedback loop ensures that developers know what is happening on the ground.

The disabled workers function as skilled technicians who glue together elusive tacit knowledge derived from shifting managerial and technical specifications in a fast-paced institution. In the face of endless new data and new rules, high-quality data annotation means consistently predicting the preferred interpretations by the client and QAs. The best way for the annotators to hone such skills is through long-term, close collaboration, with iterative feedback from QAs, developers, and users. ENABLE’s director Li Feng takes pride in the fact that their annotators “get” AITech developers better, because they have been around longer, and are more familiar with earlier versions of the annotation rules, than the non-disabled QAs who have a much higher turnover rate.

Data annotation tasks and labor forms are not homogenous. While some tasks can be satisfactorily performed by part-time, flexible crowdworkers managed by platform algorithms, or short-term annotation “factories,” other tasks may favor a full-time, trained workforce that is in close coordination with the developers (Lavee et al. 2019; Semel 2021). Forms of labor are contingent upon the nature of the data and tasks, level of secrecy, project duration, layers of outsourcing, and localized political economy of annotation labor. In the case of AITech, to synchronize the interpretations of ambiguous data and elusive rules, a constant workforce of data annotators who have rich tacit knowledge, good institutional memory, and a strong working relationship with the developers, stands out as superior to other more flexible workers. The quality of the data is thereby closely tied to the stability of the annotation workforce. Here, stability is not achieved through platform-based labor that is always-on, spatially heterogenous, and

temporally flexible (Altenried 2020), but by capitalizing upon structural ableism and disability expertise.

Escaping Ableism: “I’d Do Anything but Massage!”

The stability of disabled workers has come to be instrumental to the quality of data annotation for AITech. As ENABLE’s workers note, it is not easy to find so many experienced annotators, and most non-disabled workers would not stay in the job as long because it is “too tedious.” However, disabled workers are not naturally stable but are rendered so. In this section, I argue that the disabled workers, pushed out of mainstream labor market and pigeonholed into a few job options by structural ableism, long for a sense of mobility that, ironically, hinges upon supplying their immobility to the AI company.

The labor regime of disability in contemporary China is strongly shaped by state biopolitics and unchecked ableism. *Canji*, the legal category of disability, defines disability based on biomedically measured deficits in bodies and minds (Kohrman 2005). This medicalized ideology imposes rehabilitation as the pre-requisite for disabled people’s full participation in society, deprioritizing accessible infrastructures (Cui et al. 2019), equal education (Hu and Lin 2017), and competitive work opportunities. Although official data estimates that 56 percent of working-age disabled people are employed (Chinanews.com 2019), nearly half of these jobs are categorized as agriculture and cultivation, and over another quarter are “flexible” employment (CDPF Rehabilitation Department 2021), namely temporary or part-time jobs. Key targets of poverty alleviation campaigns,

households of disabled people earned only 57.1 percent of the national average income in 2018 and the gap continues to widen (Cheng 2021).

Since the market reforms, the state has attempted to leverage economic incentives for private employers and self-employment, in contrast to the direct state investment in welfare enterprises during the Mao era (J. Huang, Guo, and Bricout 2009). The employment quota policy is a major instrument. Instituted in the 1990s, the policy mandates public and private entities to reserve at least 1.5 percent of their workforce for people with disabilities. Failure to comply shall result in financial penalty. In practice, however, the system is poorly enforced, and has created perverse incentives (J. Liao 2020), such as performing “fake employment” that rents a disabled person’s certificate without real work.

Coupled with the lack of systemic opportunities is the abundance of restrictions. For many blind and low vision workers at ENABLE, their life trajectory was prescribed early on — go to special schools, take separate exams, and, if lucky, go to a special education college to study massage and become a massage therapist. Introduced as vocational education programs for students in blind schools in the 1930s (Tie, Guo, and Chen 2011), massage programs have gradually morphed into an institutionalized effort to generate scalable jobs for blind people in contemporary China (X. H. Li, Xu, and Hu 2022). The protective policies had constraining consequences. Massage has since been culturally imagined as the default occupation for people with visual impairments, and blind people as incapable of other professions (Dauncey 2020; X. H. Li, Xu, and Hu 2022). As a result, while mainstream universities remain inaccessible to most blind students (Hu 2022), in special higher education, few majors are open to blind students. Roughly 80

percent of visually impaired students in special colleges major in massage (Xuehui Li and Fu 2015), many of ENABLE's workers included.

"Escaping from massage" becomes a key drive for ENABLE's blind and low vision workers to explore data annotation as a new profession. Some blind annotators lamented that they would do "anything but massage." Similarly, when asked about their interest in data annotation, sighted workers with physical impairments frequently speak about the desire to "leave home," "go out," and "experience life," instead of interest in the work itself. At play is less of a "politics of destination" where immobility is experienced as displacement (Chu 2010), but a "politics of escape" in which departure from an assigned destination is an end itself. With a few exceptions, most workers at ENABLE came from an urban, lower to middle class background. Compared to China's predominantly rural disabled population, they had relatively more means to defy their "destiny" and endure the precarity of constant circulation between gigs, trainings, and jobs. Data annotation emerged in the array around 2016.

Paradoxically, the workers' yearning for mobility has come to rely on marketing their "stability." Workers often cite "stability" as their comparative advantage to their non-disabled competitors. Probed further, however, they would speak of "lack of better options," or "taking jobs more seriously." To them, "stability" is essentially a euphemism for social and physical immobility. As Friedner has argued (Friedner 2014; 2015a; 2015b), the stigma of disabled people's immobility is often reinscribed as value in the name of stability in late capitalism. Despite constantly moving around horizontally, Chinese disabled workers feel that they barely move upward in the vertical social ladder.

By contrast, tech discourse in China often naturalizes such stability. In a commentary by a well-subscribed tech media, people with visual impairments are described as “naturally gifted” to do user intent annotation, because they are “used to listening to information” and have “very strong meaning comprehension and linear logical abilities” which makes them “understand and reconstruct meaning better than normal people.” Disability hereby is essentialized as a fixed biological reality, rather than a relational and political experience (Kafer 2013b). In addition, the article notes, “with fewer visual interferences, their attention is more focused.” Although reframing a commonly assumed deficiency as an advantage may seem uplifting, the theory is rebutted by the workers for downplaying the structural restrictions imposed upon blind people. Like the indigenous women portrayed as “natural” circuit assembly workers in 1960s United States (L. Nakamura 2014), disabled women and men in contemporary China become naturalized labor for AI companies. Similar discourses can be found today in the United States, where autistic data workers are often depicted as technologically gifted for AI but denied personhood (Keyes 2020). At ENABLE, some annotators themselves may resort to naturalizing narratives when making a case about their productivity; but almost all of them are wary of attempts to pigeon-hole them yet again. As Yang, a shy blind man remarks, “if all blind people start doing data annotation, then it is like massage all over again!”

Unfortunately, naturalizing the stability of disabled workers has material consequences. Despite their evident value and proven skills, ENABLE annotators have limited prospects for upward mobility within AITech. Chunlin is an experienced blind

annotator. When we talked in 2020, she had worked for over two years as an annotator, but witnessed AITech's non-disabled annotators being promoted in less than a year:

Chunlin: "Regardless of how good you are at annotation, your opportunities are frustratingly limited."

Me: "Why?"

Chunlin: "Many reasons. From my perspective, I can see that accessibility is an issue. Currently AITech only made the annotation portal accessible, but not the portal for arbitrators [a higher-level position than annotators]."

Me: "Why didn't they modify the arbitrators' portal?"

Chunlin: "My guess is that they never thought about making us arbitrators."

Indeed, if annotation is where disabled people "naturally" belong, then there is no need to plan for an upwardly mobile path that involves them. The opposite of accessibility is therefore not inaccessibility, but restricted access (Ellcessor 2016), reserved for people who are deemed more mobile and worthy.

Disabled data annotators at ENABLE provided a crucial human resource to enhance the quality of smart home AI data annotation. The absence of better job opportunities due to systemic ableism and the medicalization of disability in China explains what pushed many ENABLE workers out of the mainstream job market. In the next section, I unravel what pulls many workers to stay despite limited career development.

Disability Expertise: Rerouting Work Conditions

Limited opportunities aside, data annotation is not automatically a superior job option. Multiple ENABLE workers have previously conducted platform-based, home-bound annotation work, and suffered from the same kinds of algorithmic and human cruelty often dubbed as “ghost work” (Gray and Suri 2019). I argue that it is the disability expertise of ENABLE and their workers that made “ghost work” more humane, pulling many workers to stay in this particular workplace. Disability expertise refers to disability-informed, non-normative knowledge of inhabiting the world. Domains of disability expertise include strategies of managing perception, claiming citizenship, and living under domination (Hartblay 2020).

Here, I show how disability expertise unfolds in high-tech workplaces. I elaborate on three domains of expertise deployed by the disabled workers that reconfigure space, time, and political economies to serve bodyminds with disabilities. Particularly, I propose a new form of disability expertise that I call “resource hacking,” a set of pragmatic skills that disabled activists, especially in resource-poor contexts, develop through navigating different variants of ableism in government, corporations, and the society, while leveraging their fragmented resources to move the needle for disability advocacy.

Co-creation of Access

ENABLE’s operational model stands out from other disability AI data annotation programs — platform-based or non-disabled people led business process outsourcing —

in their deliberate efforts of community building. To this end, a shared physical space is crucial. ENABLE devoted tremendous efforts in locating, partnering, and mobilizing funding for accessible and affordable offices and living spaces in major cities. Accommodation is not an afterthought, but a precondition. ENABLE had to reject many clients to avoid compromises on accessibility. Free dormitory space in big cities and a stable salary made it possible for many workers to experience life in different cities with "financial and psychological independence," as one worker puts it. Many of them became friends through work and organized weekend trips together. Rongfei came from a small village in central China. Growing up, she never met anybody who used a wheelchair like herself. The relentless staring at her wheelchair by people in the street used to discourage her from going out. But now traveling with a dozen wheelchair users together brings her a sense of pride. Meihui, who used to walk with crutches to appear less "crippled," also echoed how she was liberated by, rather than "confined to," her wheelchair, thanks to a community of wheelchair users who taught her how to roll. These physical spaces that are made accessible allow ENABLE's workers a sense of "membership and mattering" (Lynch 2013).

The meaning of physical space can also be symbolic. ENABLE's Shanghai office is a typical, white-collar office with about 30 individual cubicles and computers, located in a high-tech compound. Some annotators have posted photos of their office on social media, or have invited parents to visit the office, to show that they now live "a decent life." Many workers recognize that this does not fit the "inclusive employment" canon as promoted by the United Nations Convention on the Rights of Persons with Disabilities (CRPD), in that they are not working alongside non-disabled colleagues. Nevertheless,

annotators feel more socially integrated by doing ordinary things like commuting, working for eight hours a day, or even squabbling with discriminatory neighbors. A few disabled women especially highlighted to me how they appreciated working “with a computer” and inhabiting an office that looks “white-collar” to their family and friends. The physical workspace and particular appearance of informatics work can be integral to workers’ job experiences and even their identities (Freeman 2000). These embodied, physical “disability worlds” (Ginsburg and Rapp 2013b) made the work much more meaningful for the annotators than just clicking alone on a computer at home earning the same income.

Digital spaces are also made accessible, a feature essential for the blind and low vision workers to annotate texts. According to director Li Feng, who himself is a man with low vision and uses magnifiers and screen readers, the negotiation with the client to advocate for screen-reader compatibility is a delicate process: “If you ask for too much, the client freaks out and finds you troublesome. But if you ask for too little, then the system is not usable.” It requires constant “frictioned negotiations of access and privilege” (Hamraie 2017, p. xiii). One advocacy success, in ENABLE’s view, is that after working together and witnessing the productivity of blind people, AITech developers started proactively consulting ENABLE for accessibility advice before significant system updates.

Even if the portal is made screen-readable, effective access still requires situated knowledge of diverse epistemologies. All visually impaired people do not work alike. As education researcher Lucia Hasty points out, visual learners process information from “whole to part,” whereas non-visual learners may approach from “part to whole” (Hasty, n.d.). Each of these categories of epistemology is an infinite spectrum. For example, screen readers typically read a webpage from top-to-down, left-to-right. Blind annotators

find it inefficient. Jiabao is one of the programming enthusiasts in the office. In his words, “screen reader compatible systems are merely functional, but not efficient. Efficient systems should create a near-non-disabled experience.” I interpreted his words as not a desire to become normates, but the demand for considering blind people’s epistemic approach as the starting point of access, rather than rigidly translating one sensory modality into another (Lundgard, Lee, and Satyanarayan 2019). This is the job of Wenyu, ENABLE’s in-house blind programmer, who develops shortcuts and add-ons so annotators can “fold” the linear reading sequence of screen readers using keyboards. Meanwhile, low vision workers like Shujun do not necessarily use screen readers. Her access needs are an appropriately sized monitor and a laptop stand that allows her to lean her face towards the screen. Because she sees shapes and colors, Shujun often jumps to where she wants to click based on her memory of the shape of the text.

Access is also profoundly relational at ENABLE. Sighted and blind workers are paired to work on the same data set, so they can compare results and ensure a higher success rate. Off work, blind workers put their hands on the shoulders of low vision workers and walk to the subway station together. While travelling, those who use crutches and those with wheelchairs assist each other in different tasks. The disabled workers are relying not on high-tech solutions, but rather on what anthropologist Arseli Dokumaci calls “microactivist affordances,” namely, everyday acts through which disabled people become affordances for one another in the absence of a readily accessible environment (Dokumaci 2020). Tacit techniques such as left-and-right hand coordination, or monitor settings that do not hurt eyes, are circulated among workers and staff members through collective trial and error. Access at ENABLE is not a standardized checklist, but a never-

ending process of “care work” (Bennett, Rosner, and Taylor 2020) centered on the ethics of interdependence (Mingus 2010).

Crip Time at Work

The second important practice that made ENABLE a productive workforce for AITech, and a relatively satisfactory workplace to the workers, is their non-normative management of time, namely, “crip time” at work. “Crip time” is a concept and practice deployed by disability activists and scholars to complicate the temporal norms set by industrial time (Hendren 2020). As disability scholar Alison Kafer puts it, “crip time bends the clock to meet disabled bodies and minds” (2013b, 27). Crip time is often imagined as incompatible with work. Words invoked to describe the presumed lack of productivity of disabled persons, often implicate time — “inefficient,” “slow,” “late,” “chronic illness,” or “cannot handle long hours.” ENABLE’s workers recall constant struggles against these temporal stereotypes. Disability scholars and activists, meanwhile, use the notion of crip time to urge a reimagination of human worth that is not bound by economic time (Kafer 2021).

Workers at ENABLE sought to reconcile the tension between crip time and work within the bounds of corporate production. Instead of segmenting linear, progressive schedules and maximizing unit time productivity, ENABLE created a separate timeline in parallel to, but also intercalated with, corporate time. They negotiated a contract with fixed salaries for the workers specifically to set weekly group-based performance indicators rather than indicators based on individual piecework. Unlike platform-based

crowdworkers, who must remain hypervigilant to compete for tasks, the disabled annotators as a whole become a production team. Because labor time does not unfold evenly across the team, individual crip time is respected.

The customization of pace did not necessarily compromise their performance. Delivering in teams guarantees that workers meet the clients' targets while no one must work overtime. Nevertheless, the fluidity of crip time management can run into conflict with disciplining corporate time, especially with the prevalence of corporate surveillance technologies. For instance, when some workers needed a longer bathroom break to get around in wheelchairs, the QA questioned why they were not detected as "active" in the system for over 30 minutes. Overall, however, through protecting the boundaries of collective crip time, most ENABLE workers with whom I spoke experienced their work as reasonably paced.

Crip time is often perceived as slower than industrial time. But it can also get ahead. To gain control over speed, the annotators developed unconventional listening strategies. For example, if speeded up, screen readers can afford annotators with "speeds that appeared fast to the normate, while feeling timely to disabled people" (Sterne and Mills 2020). However, most blind annotators find high-speed reading challenging in the context of annotation, because the data itself is already ambiguous and confusing. What they do instead is to disrupt time. As Danni explains,

> At first, you may listen to every line in the dropdown menu in order. Once you become familiar, you can directly cut in. You may only listen to a single word of that line and move on. […] You can just feel that the correct label is in this line.

Rhythms of work become increasingly aligned with the skilled ear. By shortcutting time, the annotators disrupt the imaginaries of linear, progressive time that deem their ways of knowing as necessarily inefficient.

Crip time also encourages budgeting significant time buffers, planning for uncertainties, and refusing to adhere to oppressive timeframes. As Katzman et al. (2020, p. 521) put it, “crip time reflects the unpredictable, at times defiant, nature of human body-minds.” Contingencies are a built-in feature of crip temporality. ENABLE’s management is aware that the next iteration of AITech’s system may demand more vision in completing certain tasks, such as reading multiple rounds of conversations or labeling underlined content. This is hardly any surprise to the disabled workers, for whom living with uncertainty and exclusion has been the norm. They are prepared for hard negotiations, and more importantly, reserving the option of refusal. Li Feng’s plan for when that day comes is to “first, advocate for accessibility. If that’s not possible, then we will negotiate to see if it is OK for us to slow down a little.” Switching clients will be their last resort, but they remain firmly against short-term contracts.

As the COVID-19 pandemic reshuffles scheduling, pace, and the experience of time, many disability scholars argue that we now are all living in crip time (Samuels and Freeman 2021). Out of sheer necessity, we are finally allowed to be “asynchronous,” to take the time, and to be together in time in ways for which the disability community has long been advocating (Goggin and Ellis 2020). ENABLE’s practice demonstrates how crip temporal strategies can work in a corporate setting, to bargain with regimes of time where simply no human is fast enough.

Resource Hacking

Finally, ENABLE's expertise of consolidating fragmented resources in ableist political economies for maximum disability gain, or what I call "resource hacking," is what made the collaboration with AITech possible in the first place. The term is inspired by ENABLE's director Li Feng, who describes their approach as "making resources serve you even when you don't have any." In Chapter 2, we will look in-depth into the specific mechanisms of resource hacking in the context of corporations. Here, I introduce the concept to capture the general approach to creating financial affordances when shrinkage happens (Dokumaci 2023) in the political and economic environment that disability NGOs in China operate. We have seen how the AI company profits from the skilled labor, the naturalized immobility, and the collective expertise of disabled workers. But these benefits were not self-evident to many corporations. Rather, it has been through ENABLE's proactive construction of value that disabled people's previously denied access is now credited as a "tech for good" success story.

This collaboration is afforded by ENABLE's slow work of trust building with key allies in AITech, and savvy maneuvering of the precarious political economy of disability in China. Initially, many clients were skeptical that blind people could label texts. ENABLE started with two blind annotators testing the tasks, optimizing the workflow, and modifying accessibility. Piecing together resources from governmental and philanthropic actors, such as subsidies for office space and donations for trainings, while drawing on years of experience in running information technology work programs, ENABLE made the data

annotation program viable and competitive. After a year of comparing annotators from ENABLE and other non-disabled contractors, it became clear to AITech that ENABLE workers provided higher quality services.

To ENABLE, this is a great advocacy proof for the productivity of disabled persons in China, whose citizenship is often tied to their contribution to economic production (Dauncey 2020). The tech sector can also be mobilized as an ally to the increasingly under-resourced NGOs in China (S. Huang 2022). ENABLE therefore saw the “feel-good” corporate promotions as an opportunity to leverage the charisma and resource of AI to showcase disability value. However, despite supportive internal advocates, some people in AITech were initially unconvinced of the collaboration’s promotional value. They worried that if the world knew that a bunch of disabled folks were building their systems, users would question the quality of their products. AITech’s users are China’s urban, middle-class, young professionals, who call upon smart home technologies to organize their own overworked, fast-paced lives. The presence of disabled workers, it seems, may threaten the image of the frictionless, efficient, and competent virtual service worker who always obediently stays out of sight (Atanasoski and Vora 2015).

After years of working closely together, AITech has moved from treating ENABLE like a “small experiment” to recognizing their value across the company. At a dinner I joined, workers spoke of a recent visit to AITech campus as a milestone. The pride and joy of finally earning respect and building genuine trust with powerful corporate actors cannot be read merely cynically. AITech’s senior leadership is recommending ENABLE to more teams and even other tech companies, which, to the workers, marks an appreciation of their value, and a success of “counter-eugenics activism” (Garland-Thomson 2012).

While assisting the technology through their labor and expertise, ENABLE and many disabled workers also sought to co-opt resources for community gain through hazardous engagement with techno-capitalism in uneven power terrains.

In sum, thanks to disability expertise, annotating at ENABLE turned out to be a better option for many disabled workers than being a massage therapist, doing digital piecework at home, or being excluded by non-disabled colleagues in mainstream workplaces. ENABLE's access work (Hickman 2019) improved many annotators' work experience and work performance. Being in a vocal community about disabled people's capabilities also adds a sense of purpose to their labor. Of course, ENABLE's workers only constitute a small elite of disabled Chinese, and the DPO had to turn down many eager job candidates and select particular kinds of workers to keep the business viable. Nevertheless, these exceptional individuals have the potential to redistribute their gained advantages and renew visions for community betterment (Mauksch 2021). I strive here to spotlight the pragmatic efforts and creative workarounds that Chinese DPOs make to further their advocacy agenda under an increasingly hostile political environment (S. Huang 2019). Prioritizing workers' experience and enacting collective bargaining, ENABLE's practices can also offer a model for cooperative ownership and worker-governed "platforms" that digital labor scholars are advocating for (Vallas and Schor 2020; Posada 2021).

Autonomous Machine, Human Autonomy

At ENABLE, the “autonomy” of the machine hinges upon the labor of a group of disabled workers seeking to carve out a space for their own autonomy (see Chapter 3). This is not to rehash claims of techno-utopianism that proposes to solve all social ills with a technological fix, which often leads to more harm than good (Irani 2019; Ames 2019; Lindtner 2020). Nor am I trying to argue that access to work itself brings a sense of autonomy by nature. The imperative to work can be its own hegemony, especially to disabled people, not to mention work conditions that are disabling (D. Mitchell and Snyder 2010; Rose 2017). The specific configurations of the technology and work matter.

Though many “tech for good” projects in China claim to empower people with disabilities through data annotation, few of them truly center the dignity of disabled workers. Most of the programs I visited, including annotation sites in south China, west China, and east China, run by government and entrepreneurs, are either driven by profit or by charity. While profit-driven programs tend to enroll disabled workers for tasks that are otherwise undesirable to non-disabled people, charity-driven programs lack the competitiveness to negotiate for better contracts for the disabled workers. As a result, these programs either struggle to retain workers or maintain clients.

	Job	**Worker**	**Challenges**
Profit-driven	Unmodified: low pay, long hours,	Unsupported: people with severe physical disabilities: work from	Hard to retain workers or ensure data quality

	undesirable for non-disabled people	home; people with less severe physical disabilities: no additional access needs	
Charity-driven	Unmodified: uncompetitive work, low market value	Supported: protective, segregated environment; top-down accessibility; often people with physical or hearing disabilities	Hard to obtain business orders or ensure data quality
Rights-driven (exception)	Modified: decent pay, standard hours, stable source of business orders	Supported: accessible workplace; community building; people with fewer chances of finding good jobs, e.g. visually impaired or people with severe disabilities	Need additional resource to afford negotiations, job modifications, and workers' support

Table 1. Types of data annotation programs that hire disabled people in China

ENABLE's case is an exception in that it strived both to accommodate the worker and negotiate with the client. They redesigned a set of work conditions that made stronger autonomy of the workers possible. When negotiating with the client, they would demand the tasks to be long-term, stable contracts; fixed salary, rather than piecework; prioritizing quality over speed; open to modifications for accessibility; and very crucially, adjustable for workers with severe physical impairments, or visual impairments. These two groups,

according to ENABLE, are the least appreciated in the labor market despite their talent (*huaicai buyu*). These negotiations create the room for utilizing various kinds of disability expertise for workplace adjustments discussed in this chapter. We will zoom into the backstory of the client-side negotiations in Chapter 2. The activists' interventions on the workers' side will be incomplete without their corporate interventions.

Conclusion

Contrary to mainstream corporate mythologies of "tech for good," this chapter finds disability "good for tech" in profound ways. In this study, disabled data annotators offer a stable and high-quality human resource to the making of smart home AI systems, so that ambiguous human intentions and unruly human speech could be rendered legible to machines in consistent ways. Disabled people's labor is competitive in this context, not because they are "naturally" more stable than non-disabled workers, but because they are pushed out of the mainstream job market by structural ableism, and pulled into ENABLE's data annotation workforce by its accommodating labor practices. Reconfiguring space, time, and political economy, ENABLE and the workers' disability expertise actively transformed the conditions of "ghost work," and made their work more valuable than other suppliers. In search of their own autonomy, disabled data workers became a crucial node in the densely human network behind machine autonomy.

This exceptional case is made possible because it is led by disabled people themselves, as opposed to typical commercial or governmental programs. I highlight a

kind of disability expertise that I call “resource hacking,” namely, disability-informed, pragmatic skills that optimize resources in precarious political economies for community betterment. Specific mechanisms of such negotiations will be the subject of Chapter 2. The DPO and disabled workers strategically leveraged the charisma of AI to showcase the productivity of disabled people, a form of counter-eugenics activism (Garland-Thomson 2012) not without risks of co-optation. In turn, the AI company benefits from the skilled labor, the naturalized immobility, and the collective expertise of the disabled workers.

Rather than a simple story of extractive capitalism, this chapter strives to illuminate the potential of disability expertise in rerouting the terms of techno-capitalism. I draw attention to disabled people’s underexamined role as technicians in sociotechnical systems, in which disability is often conceived as a problem (Shew 2020a), a pretext (Mills 2010), or an afterthought (K. Nakamura 2019). An intervention of this chapter is not only to lay bare the use and abuse of disability as a resource in contemporary AI development, but also to elevate crip technoscience by teasing out the disability expertise actually entailed in the production of AI. I foreground forms of disability value-making that build on genuine expertise, and are thoughtfully constructed with an activist agenda.

As an organization with deep knowledge and lived experience of disability, ENABLE negotiates on behalf of the workers, accommodates heterogenous temporal preferences at work, and builds workspace like a community space, despite scarce resources. They show that labor relations in sociotechnical systems can be otherwise. Reshaping systems to meet the human, rather than vice versa, workplace disability expertise operationalizes more equitable labor practices in AI.

Chapter 2. THE BUREAUCRAFT OF AUTONOMY

Labs of New Professions

“It sounded like your job is to open a new space for your community. Like how Dong Cunrui blows up the bunker, you bomb open a path to let people behind you move forward.” Dong Cunrui is a communist war hero, who allegedly used his own body to uphold the explosives to destroy an enemy’s bunker.

This is how Mr. Sun, a millionaire and CEO of a disability charity, summarized ENABLE’s work after hearing Li Feng’s story at a dinner table. Initially unimpressed, Mr. Sun saw Li Feng as a potential competitor for his own tech-powered disability charity and called rights advocacy “against business logic” and “moral kidnapping” of companies.

I met Mr. Sun at a study tour for NGO workers on inclusive employment for persons with disabilities, organized by a renowned philanthropic foundation in China. Mr. Sun is someone you would not easily forget. Wearing a T shirt, sneakers, and thin glasses, he could be mistaken for a fashionable youth working in nonprofits. But Mr. Sun is nothing like a typical NGOer — he is filthy rich. As a successful young entrepreneur, his core business, ranging from AI to COVID PCR testing, ranks top 100 in the country. A few years ago, disappointed by the ineffectiveness of professional charities, Mr. Sun and his buddies founded their own charity. Usually, people like him would rarely intersect with NGOers. But in recent years, resource-drained nonprofits amidst the general tightening of civic space in China began branching out for new models of survival, learning from businesses being one. At the study tour, Mr. Sun was invited as a speaker. He became

undoubtedly the center of attention the day after we heard his presentation. We were dazzled by his fancy array of “innovative” charity programs on disability, involving high technologies like drones, AI, and TikTok. Mr. Sun also has a casually enormous budget.

What was most eye-opening was his honesty. To a question about using the correct language to describe people with disabilities, such as avoiding the use of “normal people” versus “disabled people,” Mr. Sun responded with an earnest puzzlement: “This is how the government defines these people. If we avoid such language, will it hurt the companies’ motivation to do good?”

More puzzling for him is this question: “If we all become equal, what’s left for companies to talk about?”

Mr. Sun’s comments, refreshingly unfiltered, represent the most typical corporate reactions to NGOs’ advocacy for disability inclusion in China — an act of charity premised on maintaining the existing social hierarchy, enacted only by government pressure, corporate storytelling, or moral superiority. Nothing else, according to this view, can possibly justify corporate engagement with disability in China.

ENABLE’s story, nevertheless, surprised Mr. Sun. Upon a deep conversation over a fancy dinner to which Mr. Sun treated Li Feng and me, months after the study tour, Mr. Sun articulated what a sharp businessman saw as the “essence” of ENABLE’s work: “You guys proved a new possibility. Only you [disabled people] can do it this way, because only you know the possibilities of yourselves.”

Never having spent a day learning about the *United Nations Convention on the Rights of Persons with Disabilities* (CRPD), Mr. Sun accidentally spelled out the ethos of the global disability rights movement: “Nothing about us without us.” This is accomplished through meeting a sophisticated disabled social entrepreneur like Li Feng in person, and listening deeply to how ENABLE’s approach differs from his own.

What did Mr. Sun mean by “a new possibility”? What did he consider not possible before? At a glance, Mr. Sun himself has developed many new job opportunities for disabled people — TikTok livestreaming for global e-commerce, AI call centers, drone distribution of pesticides, and solar panel drone investigations. He invested in an entire building in the center of a satellite city nearby Shanghai, and received numerous awards from local government for his charitable acts. In his words, charity is his “shortcut” to government relations. But he never truly believed that disabled people can do competitive work. When I asked him how he goes about creating new jobs for disabled people, Mr. Sun hesitated for a second, and whispered his “secret” in a lower voice: “Those jobs that you don’t want to do are what suit disabled people.”

Disabled people in China are always already presumed to be unproductive. Low societal expectation predetermines the education, access, and job market that is available to disabled individuals. In the name of “suitability,” disabled people are confined to a limited scope of life opportunities. If massage “suits” blind people the best, the logic goes, then they only need to receive education in massage. If they only have massage education, then they cannot do other jobs. The ableist lack of imagination becomes a self-fulfilling prophecy. This in turn rationalizes relegating disabled people to undesirable jobs as a form of empowerment.

To break the cycle, disabled activists sought to prove that alternative paths are possible, however small scale they may be. What ENABLE seeks to prove is that disabled people's labor is competitive, and that disabled people can have decent work. One just needs to create the right conditions. These conditions can be tested, modified, and replicated with and within employers. Every successful small-scale experiment proves a new possibility. Every possibility opens a new path. Every new path, it is hoped, can become a "hardwired" reality once traveled by enough people with disabilities.

Data annotation is one of such experiments. Indeed, Li Feng literally calls their work a "lab" that can "research and develop" new jobs. Like many options available, jobs for which disabled people are a "natural fit" are usually undesirable to others. Data annotation without negotiating with the client or accommodating the workers can be just as exploitative and restrictive (see Chapter 1). Making data annotation a decent work option therefore takes expertise to redesign the labor conditions with both the client and the workers. In Chapter 1, I show disabled activists' interventions on the workers' side, deploying expert knowledge to bend spatial and temporal labor conditions to meet disabled workers' heterogenous bodies and minds.

This chapter focuses on their corporate interventions with tech companies. The re-creation of work conditions we see in Chapter 1 is premised on successful negotiation with client companies, which determines how work processes are designed, distributed, evaluated, and compensated. It is therefore crucial to understand how a small NGO like ENABLE could bargain with large corporations like CodeX. Another client of ENABLE, CodeX is a multi-billion dollar Chinese tech giant with 150,000 employees worldwide. Disabled activists sought to change the systems within corporations despite the severely

uneven terrain of power, or in Qin Fei's words, to "reverse co-opt" tech companies. Borrowing the term "bureaucraft" to highlight the crafty, tacit engagement with corporate bureaucracies (Caple James 2012; Martínez and Sirri 2023), I unpack the labor entailed in constructing a set of institutional and infrastructural arrangements for enhancing the workers' sense of autonomy (a story we will see in more in detail in Chapter 3).

Through careful reconfiguration of relations between bureaucratic units, persons, and objects within corporations, disabled activists constructed a set of social and material conditions to make the technical solution — data annotation — beneficial. I call this approach "rerouting," which achieves systemic breakthroughs by reorganizing relations between different nodes in a network without changing the nodes per se. I argue that rerouting differs from conventional corporate philanthropy, in that it circumvents the singular motive of corporate social responsibility (CSR) which essentially advances market interests through moral practices (Rajak 2011); and confronts the persistent failures of coordination within corporate actors to deliver material change. To an extent, rerouting can subtly bend corporate bureaucracy towards disabled bodies and minds, but it comes at the cost of immense imaginative, emotional, and interpretative labor from the activists.

Disability Employment in China: A Brief History

Today, working as a disabled person in China is an uphill fight, as we have seen in Chapter 1. The conventional wisdom is that unequal opportunity to education is a

fundamental bottleneck to disabled people obtaining work. Indeed, the popularization of college education in China has made it a basic eligibility criterion for most white-collar jobs. But there is more to it. In this section, I offer a historical perspective to the discussion on employment. Drawing on primary sources, I uncover the complex relationship between education and employment. I show that in the socialist era, education was valued not in its own right, but as a means towards the goal of labor, a powerful technology that would presumably transform disabled people's "uselessness" into contributing forces to socialism. Because special education was designed for labor, assumptions about labor significantly shaped the kinds of education available to disabled people. Expected to work at welfare factories, special education only prepared disabled people for low-skill, manual labor. This legacy continues to shape the labor landscape of disabled people today. Market reform since 1978 shifted the economic structures for disabled people's employment, making private companies rather than the state the main duty-bearer. Yet the social structures necessary for this transition such as education and infrastructure remain resistant to change. As a result, people with disabilities, once believed "useless," must compete in an open market with unmarketable skills and limited access to closed spaces. I argue that poor education is not just the cause, but also the consequence, of the devaluation of disabled people's labor. This self-fulfilling prophecy creates a closed-loop that restricts disabled people's life opportunities holistically, from education and infrastructure to employment.

Labor preparation was central to the goals of special education during the socialist era. In 1955, the Ministry of Education issued a directive to implement elementary school education in blind schools. A key instruction concerned the importance of "manual labor"

(*shougong laodong*). This was in line with the general direction of basic education in early PRC, which prioritized the preparation for participating in labor production, rather than academic progress per se (Peng 2007). According to the Ministry of Education, "the basic mission" of China's blind and deaf schools were "cultivating blind and deaf students to have a certain cultural and scientific knowledge, grasp a certain vocational labor skills, and possess communist moral qualities, so they can become proactive and conscious builders and protectors of socialism" (Ministry of Education 1957, 1596). This party line further sharpened during the Great Leap Forward. For instance, Hong Xueli, the deputy head of the China Welfare Society for the Deaf and Mute, praised Henan Province's special education for "surpassing seventy years in three months." One of their "leap forward" achievements, in Hong's view, was their attention to making special education "from production, for production" (*cong shengchan chufa, wei shengchan fuwu*). Only then could the "physiologically defected people" be educated into "laborers with socialist consciousness and culture" and equipped with both "culture and knowledge, and production and labor skills" (Hong 1959, 2204). Following these top-down directives, local special education schools strived to expand their vocational skills education. The Guangzhou Deaf-Mute School's stated educational goals, for example, were "to cultivate deaf-mute children into laborers that have Socialist consciousness, culture, bodily health, and master a technical skill" (Guangzhou Deaf-Mute School 1961, 1661).

Special education, as these primary sources recurringly show, was primarily designed for labor, not on its own terms. In the views of socialist policy makers, education was a means towards an end — cultivating productive socialist citizens. Yet the kinds of vocational skills offered in special schools were, despite the enthusiasm, not the most

competitive skills. In 1960, Shanghai Blind School shared their best practice with the China Association for Blind and Deaf-Mute People. They listed detailed pedagogical notes for teaching blind students manual crafts, including masoning, paper folding, Braille book binding, “sewing small cotton blankets for dolls” and “sewing four-eyed round buttons” (Sheng 1960). This underwhelming curriculum design reflected the kinds of labor anticipated from the disabled students when they enter the production force. Because education was designed for labor, assumptions about labor shaped the kinds of education made available to disabled people.

In the 1950s and 1960s, one of the best job options planned for blind and deaf graduates was working in welfare enterprises. First set up in the 1950s for disabled veterans, the government-owned welfare enterprises were designed to allow those deemed with work capabilities to participate in industrial work. Welfare factory workers reportedly “[received] the same wages as other workers and have access to free health care and sick leave” (Dixon 1981, 69).

Yet the expectation for economic value from the welfare factories was low. As sociologist Emma Stone argues, welfare factories “placed welfare before factory,” and were “designed to give disabled adults an outlet to contribute to the economy, but was never taken seriously as an economic contributor”(Stone 1998, 203). Even under the planned economy, the performance of welfare factories was among the lowest, so much so that most of them were shut down during the Cultural Revolution, not for political reasons but for being economically marginal (ibid.).

The discursive power of labor under socialism provided many advocates a device to promote education, literacy, and rights for disabled people. One prominent figure was Huang Nai, known as the “father of Chinese Braille,” and son of the revolutionary hero Huang Xing. He served as the deputy head for the first disability bureaucracy in China, the China Welfare Society for the Blind, and later the China Association for Blind and Deaf-Mute People. As one of the highest-ranking blind officials in the Party-state system, Huang advocated relentlessly for the blind community’s right to education, employment, and equal participation. At the Fourth Meeting of the Second Chinese People's Political Consultative Conference (CPPCC) in the late 1950s, Huang gave a highly progressive speech that would later become incriminating evidence of his “right leaning” tendency during the Cultural Revolution (N. Huang 1999, 45). Citing Soviet Union’s best practices, Huang claimed that China’s blind people’s affairs were falling behind. In Soviet Union, he argued, “blind people could master over 500 different majors,” and the companies they work at produced high profits. According to Huang, two basic practices determine Soviet Union’s success: employment and self-organization by blind people. To include blind people in as many labor options as possible, he saw the danger of limiting majors in education very early on (N. Huang 1999, 52):

> Japan only had acupuncture and massage as blind people’s specialties. […] For a big country with a large population of blind people like ours, blind people’s job options certainly cannot be limited to one or two majors; it should diversify. To break the mindset of many comrades that blind people can only do music and should not let them participate in production labor, we must strongly promote the Soviet experience.

This speech is significant for Huang’s advocacy for education. In his *Building Chinese Braille with Chinese Characteristics*, a book Huang compiled to advocate for reforming Chinese Braille towards higher efficiency for blind people’s literacy and

education, this speech was included as part of the justification for a better Chinese Braille. In Huang's reasoning, better Chinese Braille begets better education, and more education can make disabled people better labor for production. Labor, it seems, was the most powerful rhetoric for disability inclusion during the socialist era.

But mobilizing the discourse of labor hits a limit, when the expectation for disabled people's labor was not high to begin with. When Huang Nai sought to promote his new design of Chinese Braille, arguing that it would elevate the literacy and education of blind people, many sighted officials were skeptical. If blind people only needed to do basic manual labor, they questioned, why would they need more advanced education, let alone a more sophisticated Braille system?

Huang was keenly aware of how ableist perceptions of disability can shape the life prospects of disabled people. In the same CPPCC speech, he made it very clear that the core problem is not with blind people's ability, but with sighted people's misconceptions (N. Huang 1999, 50):

> Some cadres still have different degrees of mindset barriers [*sixiang zhangai*] on the implementation of blind people's affairs. Besides the more or less skepticism about the ability and wisdom of blind people, they also have a mistaken view. That is, blind people's problems should wait until sighted people's problems are solved, or more or less solved, only then will they begin to address them. This view is clearly not based on the principle of equality.

One specific example he gave in the speech is labor (N. Huang 1999, 51):

> For example, rural young blind people currently cannot smoothly participate in production labor, precisely because cadres subjectively think it is impossible or do not understand how to arrange blind people's labor.

To Huang Nai, it is the attitudes towards disabled people that restricted the labor they were expected to perform. Labor expectations, in turn, have implications for education — a rhetoric he sought to mobilize for Braille reform. Decades before the global disability rights movement, in as early as the 1950s, Huang Nai essentially articulated the ethos of the social model of disability (Shakespeare 2013): it is not people's impairment but exclusionary society that disables.

Assumptions about employability are not just caused by, but also cause the quality of education for disabled people. This self-fulfilling prophecy is even more manifest when we examine the impact of the market reform since 1978. China's market reform since 1978 dramatically changed the labor and welfare regimes. Labor contracts began to replace the "iron rice bowl" status enjoyed by once permanently-employed state employees in the early 1980s (Lee 2007). Welfare enterprises were no exception. The market reform sought to transform poorly-performing welfare factories into competitive businesses. Departing from Mao, Deng Xiaoping's welfare enterprise policies prioritized profit over welfare. Since the mid-1980s, eligibility and tax incentives to operate welfare factories expanded, which led to a decade-long boom of welfare enterprises (Shi 1999), at least in numbers. In essence, however, these new factories generally hired a smaller proportion of disabled workers, and the priorities shifted from welfare to profit (Stone 1998). Consequently, although the quantity of welfare factories soared in the 1980s (H. Liao and Luo 2010), disabled workers experienced a decline in their rights.

Labor disputes loomed large in the advocacy of official magazines run by China Association for Blind and Deaf-Mute People, the precursor of the China Disabled Persons' Federation throughout the 1980s, as I detail elsewhere (Wu 2024). welfare factory fraud

was common. The mechanism was uncannily familiar to contemporary observers of disability employment in China — “fake employment.” In the first issue of the 1986 new edition, the official magazine dedicated an entire page to the issue of giving blind workers “long holidays,” namely, practices in which factories hired disabled people on paper but did not assign them actual work and only paid them minimally. The practice was so rampant across the country that it had caused noticeable protests (*shangfang*) by disabled workers (Voices 1986). In response, in 1994, the government decided to tighten the regulation of welfare enterprises, setting up authorities to root out fake enterprises and restrict tax evasion (Stone 1998), triggering the demise of welfare enterprise as a main form of employment for disabled people in China.

“Fake employment” practices long preceded the contemporary employment quota policy, instituted in the 1990s (discussed in Chapter 1). Such practices reflect the fundamental disbelief in disabled people’s value and productivity in the society. They also speak to the failure of socialist welfare enterprises in transforming the social perception of disabled people. Contrary to promises of revolutionary egalitarianism, their labor was seen as the equivalent of welfare. In contemporary terms, this translates to framings of companies employing disabled people as “empowering” them, rather than benefiting from their labor. While the Mao era encourages all citizens to be producers of the economy, Deng’s reforms saw everyone as a potential consumer (Stone 1998). Therefore, when the market reform allows profit to be prioritized, disabled workers were considered a burden, rather than a contributing force.

Moreover, socialist special education only prepared disabled people for low performance welfare factory labor. In an open market, being trained in unmarketable skills

under the planned economy becomes a huge disadvantage for disabled people. Fake employment thus is symptomatic of how the presumed unproductivity of disabled people prescribes disabled people limited life opportunities and prepares them poorly for an open competitive job market, which equates disabled people's labor with charity.

The self-reinforcing closed-loop is more than entrenched in institutions; it is also hardwired in infrastructure. For example, in the "blind school-massage parlor pipeline," where most blind school students end up being trained for conducting massage as a profession, space is enclosed. Blind and low vision students only need to navigate confined environment within the periphery of their home, blind schools, dorms, and massage salons. Not only are they barely trained to navigate public environment because the teachers and parents deem it unsafe or unnecessary, but the public spaces also never prepared for the presence of an independently travelling blind passengers. According to the blind and low vision interlocutors who are doing alternative job options to massage I encountered in my fieldwork, 90% of their peers have not been able to leave the physical premise of their familiar environment and navigate public spaces accessibly and independently. This has significantly limited their career options, while many other jobs require commuting.

Workplace accessibility goes beyond the premise of the office. Every node on the pathway to and from work must stay open to allow a smooth passing. Lacking systemic enforcement of accessibility laws and regulations, every step on disabled people's way to work — from housing, transportation, office buildings, to work information and processes — presents barriers. Employers frequently reject disabled candidates based on mobility concerns, in my experience as a former practitioner on employer engagement.

While wheelchair users are often denied based on the company's own lack of accessible bathrooms or elevators, some employers may not even consider an interview with blind and low vision people, for fear of risks involved in commuting.

Concerns become excuses, when disabled people have proven their capabilities. Since 2014, the provision of reasonable accommodations has allowed more people with visual impairments to enter mainstream universities, although their acceptance rate is still disproportionately low. In recent years, blind students began to graduate from top universities. Those who are proficient in English began to study abroad. All these experiences speak to their qualifications for many more job options. Yet even highly educated blind graduates struggle to obtain decent work opportunities. Companies refuse to believe that a blind person who lived abroad can take care of themselves on the way to work, or imagine that a blind person with a Master's degree has their own way of reading documents and communicating with colleagues. Fear, distrust, and sheer lack of imagination show how unprepared the society is for disabled people who have broken through the prescribed pipelines.

Ableist expectations shape the general life opportunities of disabled people in China, from education and infrastructure to employment. When the glass ceiling prescribed to disabled people's life was cracked, few in the public or private sector had an alternative plan to include them. The lack of education and infrastructure is not merely a cause, but also a consequence, of limited job opportunities. These confining expectations have higher stakes in an open, competitive market. It is in this context that advocacy groups like ENABLE are eager to break the cycle by proving possibilities and raising expectations.

Disability Advocacy and Corporate Bureaucraft

The turn to business is one of the few surviving strategies among independent NGOs in China, under the ongoing crackdown of civil society since the mid-2010s (Lei 2018; Pils 2018a). Many remaining NGOs are neither in “withdrawal or resistance” but exist on the spectrum of collaboration/co-optation on one pole, and accommodation/adjustment on the other (O’Brien 2023). Some evolved to depoliticizing their cause by being absorbed into the state, such as actively taking projects from government procurement funding, and deploying rhetorical allegiance to state discourse (Tian and Chuang 2022); and some sought to avoid the state altogether (C. L. Hsu and Jiang 2015). Many turned to the private sector for economic resources (Hildebrandt 2016), its depoliticizing effects (Zhu and Lu 2022), and the market’s perceived advantage of sustainability over opportunistic, donor-driven philanthropy.

But mobilizing businesses for social issues is not easy. In China, companies face little legal or cultural pressures to be inclusive. For most companies, employing people with disabilities entails cost, while discriminating against them bears no cost, fiscally or reputationally. Despite the existence of an employment quota policy for disabled people, most companies, including government entities, opt to pay the penalty or find ways to circumvent the policy (J. Liao 2020). STS scholars call the kinds of objects that are plastic enough for interpretative flexibility from different sites while robust enough to maintain a common space between sites “boundary objects” (Star and Griesemer 1989). The “boundary object” between activists and corporations in China is rather thin.

Moreover, NGO people do not necessarily run good business (C. L. Hsu 2016). My own experience of struggling to run a social enterprise concurs. In 2023, one of the most well-resourced disability foundations organized multiple cross-organizational workshops to discuss how to effectively engage employers, indicating it as a common challenge across disability NGOs. At the workshops, Li Feng was seen as one of pioneering figures that has made breakthroughs with corporations. He described his corporate advocacy approach as “playing poker.” In a tilted playing field, of course. You never know if a company is even willing to sit at the same table with an NGO. When they do, they often have better cards, and always get to play first. Your job, as an NGO advocate, is to figure out how to win the game with little leverage. In real life, “winning” means mobilizing resources from corporations, while trying to change them for your advocacy goals.

The poker metaphor suggests that successful corporate advocacy requires craft — an act that is, as anthropologist Heather Paxson argues, located “at the nexus of art and science”(Paxson 2013, 131). ENABLE’s advocacy cannot be reduced to flowcharts and standard operating procedures (SOPs). Nor is it devoid of strategy and precision. Like craft, it hinges on “a particular cultivation of the senses—sight, hearing, smell, taste, touch/tactility, temporality” (Paxson 2013, 136). They apply their craft to the seemingly mundane and mechanical setting of corporate bureaucracies. Building on Erica Caple James’ term “bureaucraft” (Caple James 2012) which likens certain aspects of bureaucracy to witchcraft, José Ciro Martínez and Omar Sirri expanded the term to capture the resourcefulness and creativity entailed in skilled and nimble labor to enact bureaucracies (Martínez and Sirri 2023). As they put it, “taming people, machinery, and

materials to make them congenial to the task of government takes a great deal of intricate movement and maneuvering" (Martínez and Sirri 2023, 393). While neither ENABLE nor their tech company clients are the government, corporations in this context are nonetheless governed with similar instruments and working to provide a form of "public goods." Bureaucracies are often known as "rationality machines"(M. Weber 1968) rampant with "bureaucratic indifference" (Herzfeld 1993), structural violence (Gupta 2012), and stupidity (Graeber 2015). Working through "audit culture" (Strathern 2000), indicators (Merry 2016), and documents (M. S. Hull 2012b), bureaucratic practices function as classic forms of governmentality that both discipline and produce subjects. Building on these seminal works, I join the recent scholarly call among anthropologists of bureaucracy to move beyond the governmentality approach, and pay attention to the "public good" (Bear and Mathur 2015), the creative strategies, and affective engagement of actors with bureaucracy (Billaud and Cowan 2020). I focus on a different set of actors than typical bureaucratic actors such as civil servants, and explore how NGO activists maneuver the cracks and incoherence of corporate bureaucracies for their own cause. As a relational experience enacted by the interactions among changing bodies, environment, and tools, disability necessarily requires coordination. For example, as corporate human resource staff working to hire disabled employees have complained to me, a small decision to put a removable ramp in front of their office building requires at least coordinating with company's property management, the building's management, and sometimes even urban management officials. Disability hence poses an inherent challenge to bureaucratic systems that protect themselves by divisions and siloing.

Rerouting Corporate Logics

An apparent entry point for activists aimed at mobilizing business for public good may be the explicitly moral functions of corporations, such as units in charge of corporate social responsibility (CSR), diversity, equity, and inclusion (DEI), or more recently, environmental, social and governance (ESG).[3] These functions, often interchangeable and intersecting within corporations, have a long legacy from corporate philanthropy. Studying the logics of CSR, anthropologist Dinah Rajak argues that CSR plays a key role in sustaining the power of corporate capitalism. Rather than being reshaped by social values, corporations extend their authority over the social order through mechanisms like CSR, and gain access to a wealth of social and moral resources instead. In other words, CSR represents market interests advanced through moral practice, not vice versa (Rajak 2011).

Activists are well aware of such risks of co-optation. In fact, Qin Fei, one of ENABLE's partners, explicitly called their strategy "reverse co-optation" of companies. Corporate philanthropy become a new site of what Anna Tsing calls "friction" in global development encounters where actors with divergent motivations agitate to move things forward (Tsing 2005). In this chapter, I detail how, under immense power imbalance, disabled activists in China sought to move the needle towards disability justice in and through tech corporations. The goal of my analysis here is not to prescribe corporate

[3] ESG has been used by US corporations for about 20 years. While the term is losing popularity in the US, in recent years ESG became a buzzword in China due to Chinese companies' need to comply with overseas investors. See: https://www.wsj.com/business/the-latest-dirty-word-in-corporate-america-esg-9c776003?st=f80npbfrz7qhfww&reflink=desktopwebshare_permalink

engagement as a necessary strategy for activism in China; nor to celebrate it as a solution to social injustices under heightened authoritarianism. It is to spotlight the politics of inventing conditions of possibilities under precarious circumstances and the activist expertise and labor entailed, or as I termed in Chapter 1, “resource hacking.” In other words, rather than an evaluative account of corporate philanthropy, this chapter describes the strategies, tactics, and expertise that activists deploy to exploit the precarious space within corporate philanthropy. Although bureaucratic engagement may not be the most glorious aspect of activism, it builds the necessary foundations for an infrastructure to sustain any change achieved.

For NGOs, following pre-existing corporate workflows often lead to dead ends. If a disability NGO seeks to create employment opportunities in a company for disabled people, their first interface is usually CSR, or human resource (HR). These are nodes that the corporations consider most relevant to disability — a matter of charity, almost never core to any companies. Each of these nodes contains different logics and assesses the NGO’s demand through its own lens. In most cases, CSR cares if the cooperation can become a successful public relations or government relations story. HR measures how many successful hires disabled people can make for existing “headcounts.” Neither of these units, however, have authority over business units, which are the actual decision-makers of hiring new employees. While creating new “headcounts” requires significant “managing up” and internal lobbying, hiring disabled people for existing “headcounts,” to business managers, translates into reduced productivity.

This is where most NGOs’ employer engagement ends. The initial interfacing nodes lack the power or incentive to coordinate with core business units. The best they

could do within their paygrade is a few events with NGOs to showcase commitment or promote positive affect among existing employees, or philanthropic projects that are separate from the company's core businesses. As Ma Yu, an experienced advocate on the employment of persons with intellectual disabilities once commented, companies are more willing to donate money than to offer jobs for free. This distinction reveals a fundamental reality that disabled people face — no existing corporate structures currently have room for a disabled employee in China. Put another way, including disabled people necessarily requires systemic change in corporations.

Systemic change is both a prerequisite and a goal for more substantive corporate advocacy. In Li Feng's words, "good jobs [for disabled people] are necessarily redesigned." There are no good jobs in the wild for disabled people. They can only be manufactured in "labs." Often when we talk about systemic change, we think about top-down, total overhaul of existing structures. Under massive power and resource gap, this is not a viable option for NGOs in China.

But a corporation is not a monolith. A system like a Big Tech corporation is made of countless small systems. Each sub-system contains different nodes of people, objects, and the personal histories and performance indicators that regulate their relations. These sub-systems may overlap or may in fact be quite siloed. For instance, most people working at CodeX, a now 100,000 staff company, never have to interact with the CSR unit. Even within CodeX's over 100 people CSR team, there were once four different people working on disability issues without much coordination.

This is the scale of systemic change that ENABLE's activists are operating at. In corporate jargon, if a project cannot meet its stated goals, it fails to "close the loop." Working with CSR or HR alone under existing workflows often creates open loops that cannot be closed. In activist terms, this means no employment or other program opportunities are materially created. Existing workflows leave the "loop" open, because there are no natural pathways in the company to achieve the goals of the activists. This is unchartered territory. Untraveled path. Unfinished steps.

The pathways must be created; they are not out there, waiting to be found. They can hardly be created by these corporate units themselves because each node is confined by predefined roles within the current structure. It will also be difficult to rely on top-down change because the route to reach, mobilize, and trickle down from the top can be even longer.

ENABLE sought to rewire these nodes into a new assemblage of relations. I argue that they achieved this through three key techniques: immersion, experimentation, and re-orientation. By immersing themselves in the corporate environment, disabled activists closely observe, analyze, and dissect the language, logics, and relations of the corporation, learning what Li Feng calls the "ground logic" about each node. Immersion also helps ENABLE build relations with individual allies in the company. Next, ENABLE experiment with their proposed change at small scale to prove its viability. Through experimentation, they build a body of "visual" evidence for different corporate actors to imagine a scalable reality. This evidence will persuade corporate actors of the concept, but it takes more to materialize it. The final step of creating an institutional pathway is therefore crucial. This is done through thinking holistically about the different nodes, and

re-orienting their relations towards the proposed project and each other without changing the “ground logic” of the nodes per se. The rerouting is achieved through the eventual re-orientation of individual actors towards a common project, constructed through immersive experimentations.

Immersion

Decades of policy advocacy have taught ENABLE that buy-in from top leaders may only get things started; to get things finished, you need support from mid-level staff, and not just one, but many of them. Rather than organizing or attending high-level events with corporate leaders, ENABLE’s activists spend a lot of time figuring out the work scope, reporting sequence, performance indicators, and personal stories of mid-level individuals working in different units of CodeX. This is the classic “power map” approach in the activists’ toolbox.

For months, Li Feng, as the director of the social enterprise branch of ENABLE and their only business development person, was immersed in the corporate culture of CodeX. He inserted himself and other disabled activists into numerous CodeX initiatives, including hiring blind accessibility testing engineers, advising their AI4Good hackathons, and becoming a registered vendor for data annotation service. Through these engagements, he gained access to CodeX staff from CSR, business units, AI teams, outsourcing, and procurement. Some of them became enrolled into ENABLE’s network as key corporate allies.

More importantly, these interfaces with multiple nodes in the company become data points for ENABLE. Over time, disabled activists have gained fluency in the logic and language of the company. At a meeting with a key person from CodeX, I witnessed the discursive tactics used by Li Feng and Luo Ping, a blind woman who pioneered data annotation for blind people and manages human resources at ENABLE.

The person they are meeting is Jack, leader of a team on audio AI systems. Li Feng got a tip that Jack was travelling from Beijing to Shanghai for business, and had an opening in his schedule this morning, so he jumped on the opportunity to invite him over to ENABLE's Shanghai office. ENABLE's data annotation team currently works on natural language processing (NLP) for audio AI systems. It would be ideal if Jack's team could become another client for ENABLE. Another goal is to mobilize Jack's team's technical capabilities for the assistive technologies that ENABLE seek to develop (see Chapter 4).

Jack was not in a superb mood when he sat down in the dim, small conference room that ENABLE could afford. He was on his phone, asking for WiFi, and even took out his laptop during the conversation. He agreed to travel all the way to ENABLE's outskirt Shanghai office, mainly because he took part in a AI4Good hackathon that CodeX's CSR department organized, and Li Feng was one of the judges. All he wanted from ENABLE was some user experience feedback from blind folks who used CodeX's products.

To turn the conversation towards ENABLE's goals, Li Feng began with a straightforward business question: "Does your team have big pressure on ROI [return on investment]?" ROI is the performance indicator that hangs over the head of every CodeX employee. Corporations like CodeX are among the most bureaucratized institutions,

skilled at governing at a distance with numbers and metrics (Porter 1995). Their highly strict "audit culture" (Strathern 2000) is publicly known in China. The question caught Jack by surprise. In his mind, engagement with NGOs like ENABLE was purely a matter of charity. He was merely doing AI "for good." It has nothing to do with the ROI of his team. If anything, this ROI belongs to the CSR team.

Anthropologists of science and technology hold that expertise is not what people have, but what they do (Knorr-Cetina 1999; Latour and Woolgar 1986; Carr 2010). Linguistic anthropologists, in particular, have shown how expertise is enacted in communicative practices and "semiotically accomplished" (Carr 2010, 27). As Carr points out, terminologies such as jargons and acronyms, are not intended to obscure knowledge, but to signal expertise.

If jargons show proficiency in the vocabulary of a corporation, accurately applying the jargons in context demonstrates mastery of the grammar. Speaking with expert rigor, Li Feng confessed that calculating "user increase" will not make the ROI look impressive. The blind user base is simply too small for CodeX, a company of multiple "hit" social media platforms with over 2.5 billion monthly active users globally. Li Feng's comment, despite talking their case down, signaled a realistic comprehension of Jack's logics and sparked a genuine interest from Jack, who stopped checking his phone.

Jack began thinking out loud: perhaps the ROI can be based on the "2B" (to-business) logic, not the "2C" (to-customer) logic. While the 2C ROI measures customer increase as "return," 2B ROI counts the revenue generated by business clients. In other words, there is another route to make a business case for ENABLE, beyond counting the

number of blind users. ENABLE could act as a business client that purchases the technical capabilities from Jack's team, and the cost can be covered by third party donors. This insight later proves to be critical. Understanding this new logic helped ENABLE crack open a new pathway within CodeX.

Interactions like this are common in the practice of ENABLE. In Li Feng's words, key to successful corporate advocacy for NGOs is understanding the "ground logic" of individuals, their roles, and the organization's core business. "Ground logic," a concept akin to "first principle," is one of the fleeting buzzwords used by Chinese tech professionals. Each interaction is a "trading zone" (Galison 1997) for ENABLE to exchange language, ideas, and norms with different corporate nodes, and gain knowledge about other nodes in the organization. Through immersion, ENABLE learnt not only to talk like tech companies but also think like them. This sets the foundation for effectively translating disability advocacy into new institutional pathways.

Experimentation

The goal of disabled activists is to prove possible what's considered impossible, whether this possibility concerns their power to listen to texts at faster speed than normates (Sterne and Mills 2020), label data without turning the monitor on, live interdependently in a community, or simply the idea that disabled people, too, can perform competitive, high-quality work. To counter the lack of imagination, they must strike with a dose of reality. To "prove" something is to produce it as a "matter of fact." In this sense, activists' job resembles that of scientists. Indeed, Li Feng often thinks in technoscientific

metaphors: he calls ENABLE's employment advocacy "research and development" of new jobs and their employment programs "lab products." This is in part because of his own background in computer science. But almost all the leaders of ENABLE seek the authority of science. As a social scientist, I was often asked to provide "theoretical frameworks" that can help explain or package their work. I was invited to the independent living camp of ENABLE, precisely because the camp leaders wanted a "scientific framing" for what they have been intuitively doing. Making it more "scientific," they believe, would enhance their credibility to donors and participants.

To "research and develop" new jobs, ENABLE takes an experimental approach. After immersion in the worlds of a potential employer, typically tech companies, ENABLE would request the business units to test out a few tasks with disabled workers. At this stage, this request contains no cost to the business unit. It is conducted outside of the company, with no coordination necessary with other units such as HR or CSR. All they need to provide is some real tasks to be carried out in the "lab" of ENABLE.

Data annotation by blind people was "invented" in such a setting. Luo Ping, ENABLE's human resource manager, may well be the first blind person to test run data annotation work for NLP systems in China. During her testing, Ping evaluates three aspects of the job: accessibility, work efficiency, and intellectual satisfaction. Accessibility of the work operating system, such as the data annotation portal, is a foundational criterion. Ping cares less about its current accessibility — it is assumed to be inaccessible by default — than its future adaptability. In other words, she assesses whether the system has the potential to be made compatible with screen readers, the key informational processing tool for blind workers.

Next, Ping measures her own speed in competing the task. As one of the most proficient screen reader users in the community, if she takes too long for a task, it means the job would hardly give blind people any competitive edge.

> I need to know what's my efficiency when I'm new to the task. And how long it takes when I'm more familiar with the job. If the system's accessibility is not modified, what's my performance? What happens when we modify the client's system, or when we do local optimizations? After I measure these things, I can make a judgment call whether this job is feasible [for blind people].

Ping's "efficiency," as her description shows, is not a fixed reality. It waxes and wanes depending on the accessibility of the system, experience on the job, and the assistive tools she uses. Efficiency in disabled activist terms, is therefore a relational concept shaped by the person, the environment, and their tools. Often, employers are oblivious to the fluidity of work conditions, and essentialize disabled workers as necessarily "inefficient." The expertise of knowing how work conditions can be adjusted and optimized for blind workers is crucial to ENABLE's experimentation.

Once a job is deemed feasible, the last evaluation criterion is affective. Luo Ping calls it "intellectual satisfaction." This is something I often hear blind activists say. There is a strong urge to disassociate blind people with manual labor such as massage, and instead emphasize their knowledge, work capacity, and desire. If a task is both accessible and efficient for blind people to perform, Ping assesses how it feels. As an activist, Ping does not just want to create any job opportunities: she wanted the new jobs to give blind people like herself "a sense of value and achievement." NLP intent annotation, after ENABLE's expert modifications, meets this criterion. In Ping's view, that is because:

> It takes brain. These tasks require analysis and judgements. It's brain work. You need good logic [to do the work]. […] If you let [blind people] work on those more

> meticulous and tedious data, I guarantee you in less than three months they will all run away.

Ping describes her approach as “the wild path” (*ye lu zi*). Never trained in business or engineering, Ping developed these experimental methods with her own embodied experience. Through testing accessibility, work efficiency, and intellectual satisfaction, the profession for blind people to annotate NLP data was invented. Later, other companies followed suit, including Apple, which hired a few blind data workers from ENABLE.

Once a concept is proven, a reality is constructed, and a matter of fact is produced, ENABLE moves from the lab testing stage to a crucial step that determines its “scaling” potential — demonstration. This is in sync with the scientific convention for “eye witnesses” of experimental performances; as well as the modern Silicon Valley ethos of “demo” culture. As STS scholars Steven Shapin and Simon Schaffer reveal, collective visual confirmation of the performance of an experiment by reliable members of the scientific community, gave the nascent methodology of experimentation its force to convert ideas into matters of fact (Shapin and Schaffer 2017). The power of an experiment, therefore, depended on being collectively seen.

Though most of ENABLE’s activists are blind or low vision individuals, they are well versed in the power of seeing, in a sighted world that privileges vision over other senses. The meeting with Jack had to happen in ENABLE’s office, not CodeX’s office, because Li Feng wanted Jack to “see” the blind workers, tagging data proficiently in a professional, sleek tech campus office that signals competence. While taking Jack for a tour around the office, Li Feng asked one of the data taggers to turn on their monitor, explaining that the blind data workers can label data through the sense of hearing alone;

no visual information on the screen is necessary. This “trick” works for sighted people every time. I recall being surprised when I was shown the dark monitors for the first time in 2020.

After the tour, Luo Ping brought her computer to the conference room and played a clip of the text she was listening to — it was so fast that it sounded completely unintelligible to an untrained ear. As Karin Knorr Cetina (1999, 135) puts it, “experts are those who have learned to engage with objects in reliable trust relationships and who, therefore, are trusted by colleagues who cannot engage in those relationships directly.” Screen readers are such “expert objects” (Dumit 2004) that always give the normate audience a sense of awe. “We listen as fast as you read.” Ping smiled towards Jack’s direction after skillfully playing with the screen reader. Looking straight into Ping’s face for the first time, Jack began slow-nodding his head and mumbling at a much lower speed than his usual speech: “I……See…… This is actually new to me…… Quite impressive.”

The focus on visual demonstration is not a mere interpellation by technoscientific methods. It is a strategy derived from embodied experience and a deep desire to change stubbornly closed minds. Visually impaired activists seek actively to harness the power of seeing as a device for persuasion and catalyst for change. Because the nonvisual world is so unseen, making it visible can be a shocking revelation. It can make cracks in the firmest conviction of the impossibility of blind agency and expertise and let the possibility of imagining otherwise beam through. For this reason, Li Feng strategically insisted on having an office in Shanghai (despite its skyrocketing rent costs), China’s commerce center where all Big Tech companies have operations, so they can visit and witness the

reality ENABLE has already created. He also wanted to open an office in Beijing as a site for government leaders to see.

There is also an emphasis on physical presence, rather than visual storytelling. Key targets of advocacy must be “direct witnesses” to the matters of fact. Compared to other data annotation programs that hire disabled people, ENABLE is also exceptionally open to researchers, journalists, and interested businesses. In part, these interested parties can turn witnessing into what Boyle may see as “a collective act,” further multiplying the witnesses and facilitating the replication of ENABLE’s experiment — the goal of their advocacy. Moreover, our writings about what we have observed, as what I am doing now, in effect produce what Shapin and Schaffer call “virtual witnessing,” which if done well, can occupy the reader’s mind with an image of ENABLE’s experiment, extending the act of witness to unlimited amount of remote audiences (Shapin and Schaffer 2017).

Re-orientation

Once the experiment is performed and results witnessed, the next step is to “scale” the lab products in industry. Immersion and experimentation are performative processes by nature. The challenge is to transcend the performative stage towards substantive implementation. In my previous experience as a “consultant” on disability inclusion, I never made it past this stage. Yet consultants, as anthropologist Kimberly Chong finds out, can continue getting contracts despite poor track record of implementation. Because for consultants, what matters is the performative expertise of rendering economic

processes ethical (Chong 2018). But NGOs with activist missions are different. Despite the attempt to appropriate the format of consulting to approach business as both targets of change and source of funding, their ultimate goal is the materialization of rights. Employment advocacy is only successful, when employers have devoted headcounts, wage, and benefits, to pay actual workers with disabilities to do real work, ideally for the long term.

Often, knowing the employer inside out and having demonstrated possibilities is not sufficient to move an employer — a labyrinth of bureaucracies designed to eliminate human flexibility (Herzfeld 1993). Instead of treating bureaucracy as an insubstantial nuisance to overcome, ENABLE's activists have come to see it as an integral mechanism to be repurposed for institutionalizing change. This pragmatism derives from a sense of disappointment from decades of idealistic advocacy that disdained direct service, material progress, and everyday life (S. Huang 2020). It also marks a more proactive engagement with the deep waters of mundane, impure, and compromised politics.

Key to the materialization of corporate advocacy, I argue, is the re-orientation of bureaucratic nodes. Each node in the bureaucracy has its own set of rules for functioning. These rules are supposed to aggregate into an efficient, coherent, rational whole, but they often overlap and conflict. The job of activists is to find out what these rules are, and how they may be reinterpreted or reused towards for their purpose, namely, create "oriented knowledge" (Helmreich 2023) for specific goals.

Let us return to the meeting with Jack again. Jack leads a business unit that can potentially become a client to hire ENABLE's workers as outsourced data annotators.

What Jack's node cares about are two things: cost and quality. If ENABLE provides better quality service, measured as higher efficiency per person, then he will consider shifting his outsourcing tasks from other suppliers to ENABLE. But he also needs to convince another node in the company — procurement. Procurement cares about lowering cost. Procurement would ask Jack why he must switch suppliers. Unless ENABLE offers a lower bidding price, it is hard to convince procurement. ENABLE by no means wants to pay the workers less. If anything, they need to cover extra costs to provide a support system for the workers, such as a physical office, free dormitories, and other access needs (see Chapter 1 and Chapter 3). This is when the third and fourth nodes come into the picture. The CSR department of CodeX can potentially make donations to ENABLE to compensate for their extra costs, and the HR department may find it beneficial to contract with ENABLE's workers to fulfill the employment quota scheme. Direct contracts with HR can give the workers more benefits than outsourcing contracts. If this new workflow works out, the non-human node of AI system with training data to be labeled becomes an orienting object that the human nodes will turn to. It gives CodeX not only better annotated data, but also a great CSR story to tell and a lower penalty for failing to meet the employment quota scheme. In exchange, ENABLE negotiates for more job opportunities, better labor conditions, and higher visibility for the disabled data workers.

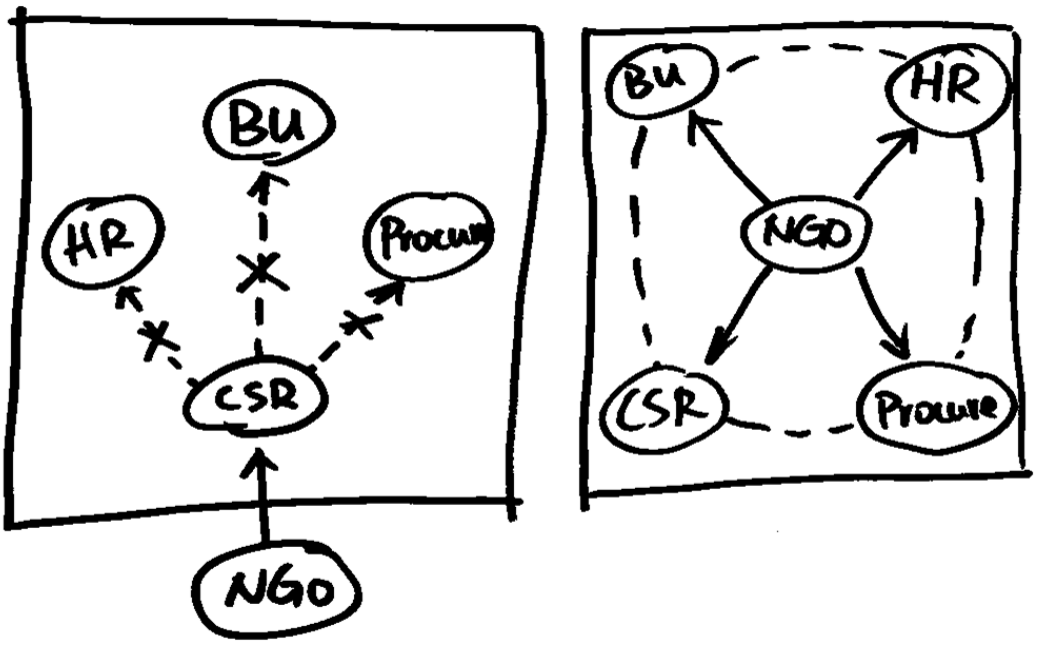

Figure 1. Visualization of re-orientation of nodes (left: traditional approach; right: rerouting)

Of course, this is just one example discussed at the meeting as a potential new route for implementation. The actual implementation could involve even more nodes of the company or external actors. And each company may have wildly different bureaucratic pathways. But the principle at work remains the same — reorganize the relations between nodes, without changing the nodes per se.

By re-orienting different nodes towards a common goal, and translating their own rules into a new logic, ENABLE created a new pathway that was previously non-existent. As discussed earlier, corporations in China have neither enough political nor cultural pressure to be inclusive to disabled people beyond mere performance. For this reason, working with individual nodes, and hoping they can change their company for you is fruitless. ENABLE goes under the radar and works at the sub-system level. Rather than tailoring a project to fit a corporation's moral claims, ENABLE approaches corporate units

as jigsaw puzzles to a picture they have in mind. In other words, they fit corporate actors into their ecosystem, rather than vice versa. They enroll multiple nodes in the company, and build a new network of relations among them, thickening the “boundary object” between them (Star and Griesemer 1989).

Once the roadmap is drawn, the actual construction of the paths depends on the groundwork of bureaucracy — meetings, meals, and crucially for CodeX, documents. I often find Li Feng drafting documents for CodeX, displaying graphics, statistics, tables, and flowcharts, to describe what the rationale is for a proposal. Importantly, these are not just pitch decks that ENABLE submit to their clients; they are documents that their internal allies at individual nodes need to submit to their superiors. CodeX has famously instituted a reporting schedule every two months, reporting on the progress made on employee’s OKR (Objectives and Key Results) at extremely short time cycles. By helping allies solve their reporting problems, ENABLE advances their cause up in the ladder of the bureaucracy. Rather than mere instruments of bureaucracies, documents are generative of them (M. S. Hull 2012a). Translating new ideas into institutionally legible objects, these documents imprint the new route onto the institutional terrain of the organization. Each meeting where the documents are presented, deliberated, and approved, is a footprint further to removing a roadblock and materializing a path.

Compound Logics

The new pathways have some built-in features. First, they are embedded in institutions. Once traveled, it can become a precedent for later projects, and lower the cost for future engagement. Second, like neural pathways, new institutional pathways can become conduits for new learning and even behavior to the organization. Finally, these pathways, by connecting distinctive corporate units, are inherently layered with multiple logics — economic, moral, personal, and emotional. This last point warrants elaboration as it is instrumental to circumventing the overly moralist imperative of corporate philanthropy that often enhances corporate authority over social order (Rajak 2011) or exacerbates ableist paternalism.

The road to employer advocacy is paved with layers of different incentives. And the sequence of the layering matters. Li Feng prefers to start with business units in lieu of CSR, not only because they have decision-making power over hiring issues, but also because they represent different logics. If CSR is involved at early stage, he reasons, the project would be pre-determined as "charity" rather than a business decision. Being labeled as charity is firstly an issue of movement messaging, a symbol of stigma that disabled activists seek to remove. It also undermines sustainability. Using corporate jargon, Li Feng often says: "When the wind of 'lowering cost and boosting efficiency' [*jiangben zengxiao*] blows, charity is first to be cut." The sole dependence on the charity logic is a risky strategy.

The economic logic alone cannot fully protect them either. China's economy in general is going though deep crisis. Structural issues, combined with COVID-19 and

economic downturn have led to mass layoffs of many businesses, especially over-inflated tech companies. In early 2023, AITech, ENABLE's largest client, decided to lay off up to 30% of its own employees. Under this wave, one of ENABLE's core allies who worked on responsible tech in AITech was removed too. CodeX went through downsizing around the same time. Although ENABLE's data workers made through the cut for AITech this year, Li Feng has been constantly anxious about keeping the contract the way it is with AITech. On the day he learnt about the firing of a few of CodeX's blind accessibility engineers, Li Feng, a usually chill, smiley guy, was uncharacteristically worried. At the dinner table, he immediately began strategizing how these laid-off blind engineers can "come back" to ENABLE. All these people, the accessibility engineers, and the data annotators, are not only people recommended or contracted by ENABLE; they are the community. Li Feng felt a personal responsibility to ensure their next steps are figured out, so he thought about hiring some of them for business development. That night he lost sleep.

This was not the first time when ENABLE's "social enterprise" model was put to test. When the economic rationale becomes fragile, the activists had to appeal to the moral and emotional. Two years into the collaboration, AITech was planning to update their annotation system. The new system would have many visual components, such as underlining a paragraph, or phrases. This would pose significant disadvantages to blind workers. In May 2021, in response to this impending crisis, ENABLE and their ally in the PR department, Yang Han, organized a corporate "accessibility week" at AITech. A group of disabled data annotators from ENABLE did a campus visit of AITech's headquarters in Beijing. They built a whole week of programs from annotators working alongside AITech engineers, making documentaries of the visit, drinking bubble tea together in the

corporate canteen, to sharing personal stories at salons, and giving speeches at town halls. In the promotional video that came out of that fateful visit, a senior manager from AITech's technology committee enthusiastically spoke at a fully seated lecture hall, presumably talking to the disabled workers: "Raise your ideas bravely. Don't think of it as a burden to us." The message is that AITech's high-level leadership thinks of the disabled data workers as one of their own. The same senior manager also posted in his personal social media feed about ENABLE's story, recommending them to other AI companies. This connection later became critical ENABLE's survival of AITech 2023 downsizing.

Back to the 2021 campus visit. In one of the storytelling sessions, Chunlin, a blind woman who is also one of the most skilled data annotators, read a letter of gratitude to the leader of AITech's AI department.

> Over the past few years, whenever we encounter difficulties and challenges, we can feel that AITech colleagues are not only helping us face to face, but also standing side by side with us. During the upgrade of the annotation system at the beginning of the year, potential accessibility issues may cause all visually impaired partners in the team to lose their jobs, so we contacted Haining and raised our concerns and accessibility needs, which must be a completely unfamiliar area to him. But Haining resolutely chose to revise it. He held many meetings in the early stage to understand and discuss possible solutions. He led the formation of the "Annotation System Accessibility Discussion Group" and contacted technical colleagues. We cooperated by sending two disabled staff with experience in accessibility development to Wuhan to assist the AITech developers in identifying problems and finding solutions. After more than a week of hard work, we finally completed the modification of the accessibility issues of the new annotation system, allowing visually impaired annotators to continue working.

This letter, drafted by Li Feng, written in Braille, and read out beautifully by Chunlin, famously moved people to tears. Haining, the AITech focal point who helped resolving the crisis, cried hard. Unlike the letter had glorified, he was initially quite resistant to the

accessibility issues. This letter, which made him deeply emotional, changed his attitude for later encounters.

Over the years, ENABLE has cultivated numerous allies in tech companies, each entering the story with their personal motivations and life histories. Some of them were former NGO activists, forced to leave sensitive fields such as gender equality and seeking to make change in new institutions. Some of them see helping disabled people a religious form of “accumulating virtue” (*jide*) or making merit. Some of them were professionally successful but told by their fortune-tellers to make good deeds. Some of them were simply tired of making tech products that “entertain people to death,” seeking some meaning in their own work and life.

The rewiring of corporate pathways for disability advocacy, therefore, is compounded with economic, moral, emotional, and personal logics. When alone, they are prone to risks. A new leadership change, budget cut, or system update could jeopardize the entire project. But taken together, these bundled strings make the connections strong and more durable to the inevitable changes in a precarious environment.

Lopsided Labor

The activist expertise of rerouting comes at a cost. And not every NGO can afford it. The process of immersion, experimentation, and re-orientation is lengthy. In a way, this is the slow work of social movements that neoliberal technological solutionism tends to displace (Irani 2019; Ames 2019; Lindtner 2020). Time is usually not on the side of

Chinese NGOs. Months, sometimes years of slow work can bankrupt grassroots activists, who increasingly struggle with financial resources in a shrunken civic space. Donors that prioritize quantitative results tend to neglect support for process and invisible expertise that makes the results differ in quality by day and night. ENABLE's long-term engagement with Big Tech clients is sustained by their "resource hacking" expertise, namely, piecing together resources from governmental and philanthropic actors, such as subsidies for office space and donations for trainings, while drawing on years of experience in running information technology work programs and community building. This precarious, patchwork resource profile common to many NGOs today, essentially became a subsidy to tech companies.

Rerouting also takes an immense amount of labor, of imagining, emoting, and interpreting. Being an activist means the burden of proof is always on you. It is your job to learn about other people, demonstrate and make them care, and help them work out a way to include you. As anthropologist David Graeber puts it, such work "invariably creates highly lopsided structures of the imagination" (Graeber 2015). In these relations of domination, "it is generally the subordinates who are effectively relegated the work of understanding how the social relations in question really work" (Graeber 2015). Graeber calls this "interpretative labor." Li Feng was intrigued by the notion of "disability expertise" after hearing me present it at an academic conference. He went to read Cassandra Hartblay's original paper (Hartblay 2020) where she coined this term. Among the domains of disability expertise that Hartblay outlined, the expertise of "managing the normate's perception" seemed to have resonated with Li Feng deeply. He repeatedly invokes the concept to explain his job. Though he proudly considers it a form of expertise, the flipside

of such expertise is the disproportionate interpretative labor that disabled people bear to survive and thrive in a society that privileges “compulsory able-bodiedness” (McRuer 2006).

In *Black Looks: Race and Representation*, bell hooks famously articulates what it means for marginalized communities to “manage the perception” of those in domination (hooks 2015, 250):

> Although there has never been any official body of black people in the United States who have gathered as anthropologists and/or ethnographers to study whiteness, black folks have, from slavery on, shared in conversations with one another “special” knowledge of whiteness gleaned from close scrutiny of white people. Deemed special because it is not a way of knowing that has been recorded fully in written material, its purpose was to help black folks cope and survive in a white supremacist society. For years black domestic servants, working in white homes, acted as informants who brought knowledge back to segregated communities—details, facts, psychoanalytic readings of the white “Other.”

The personal lives of these activists are almost unequivocally sacrificed. Back-to-back travelling, late night phone calls, extremely long work hours are endemic among activists. When running the two-week independent living camps, the camp leaders, mostly blind men, can work from 6am to 1am everyday without taking much break. Such disregarding of the body parallels with ENABLE’s deliberate focus on knowledge work as alternative options to manual labor for blind people. This work ethics takes a toll in their own health. Liu Wenlong ran camps while having a fever. Qin Fei is constantly sick and constantly working while being sick. Li Feng sleeps late and is always on standby for phone calls with corporate counterparts that easily last past midnight for hours. They must bear with all the physical pain and emotional burnout to move things by an inch.

In addition, disabled activists must always lift the spirits of their fellow activists, clients, and workers. Their role is to bring “positive energy” to their surroundings, to their community, and to the society. This is similar to Silvia Lindtner’s notion of “happiness labor,” the work to sustain the hopefulness of technological promise, often performed by women (Lindtner 2020). Such labor combines the emotion work to manage their own negativity, the obligation to enlist optimism in others, and the political discipline to always spread hopeful messages and never cross the line demarcated by the state as “positive energy.” For this reason, NGOs like ENABLE are cautiously distant from “negative energy” politics such as impact litigations or the more recent “white paper” protests that ended China’s COVID restrictions (see Chapter 3 for more detail). Disability, in particular, has the cultural register of positivity, warmness, and hopefulness. Few news articles about disability in China escape the trope of brightness, warmth, spring, and flying. Making feel good creates less cognitive friction in the people who the activists seek to change.

To be able to reroute an institution for change takes tremendous expertise and labor that is disproportionately shouldered by disabled activists. In one of our nerdy scholarly text chats, I shared an article on “epistemic violence” with Qin Fei. The notion deeply resonated with him and captures for him the lopsided burden disabled people bear, sometimes to be simply treated as a person. But he sees no other option for activists like himself: they must endure such labor because making the community heard is their job. It is the uphill path they have chosen.

Conclusion

Corporate philanthropy is not known for being the solution to social issues. After all, almost all the corporate allies that ENABLE work with are self-aware about the limitations of their roles. One of them has a vivid metaphor: the speed of companies doing evil way surpasses doing good; CSR is like adding two ant legs to a flying rocket, hoping to pull it back.

Still, disabled activists in China find it imperative to engage corporations, especially technology companies, for work opportunities that not just pay the bill, but also raise the expectation for the disabled community. This chapter focuses on how activists strive to make corporate advocacy work for their cause, with expertise and labor.

Rerouting corporate workflow and relational pathways between different human and non-human nodes allows activists to integrate disability into corporate circuits, without relying on one-off charitable acts. By redirecting divergent logics of different units towards the same sociotechnical object of AI data, the layered incentives built into the new pathway, I argue, make their collaboration with resourceful actors more durable in precarious economic and political environment. It is such labor of bureaucraft that set ENABLE's data annotation program up as a distinctive space for enhanced autonomy for the disabled community, the story of the next chapter.

Chapter 3. WORKING OUT INDEPENDENCE

Before I moved into ENABLE's dormitory in October 2023, I never thought I would be missing it one day. Living with three female data workers for five months in the small studio-converted bunk-bed dorm became the fondest memory and most profound experience of my fieldwork in China. I was exposed to, introduced to, and later accepted into different ways of living, knowing, and relating of which, before, I only had an abstract and intellectual understanding.

In my earlier research design, I conceptualized the dorm as a background to understand the life histories of the workers. That was proven wrong quickly after I moved in. Far from the backstage of data annotation, free dorm life in a metropolis like Shanghai encapsulates the very meaning of doing data annotation work for disabled people at ENABLE — to leave home, gain new life experiences, and form new relationships. Dorm is a new node in many data workers' life that connects home and world, care and independence, and kinship and self. It became clear to me that the re-design of work (Chapter 1) and life conditions are essential for disabled workers to derive meaning from their work, annotation or otherwise.

This echoes anthropologist Kathleen Millar's observation that the meaning of work for different people is fundamentally about what it means to have a good life. As much as it is economic, work is also moral and existential. Millar proposes the concept "form of living" to understand work as not only a livelihood, but also a way of life (Millar 2018). The way of life afforded by ENABLE's data annotation work, in my observation, differs profoundly from other AI programs that hire disabled people as annotators. ENABLE

treated work as a means to life, not vice versa. They designed their employment program as a medium for social change. In Li Feng's "theory of change," employment is part of the three pillars to achieve their vision, which he colloquially describes as "disabled people can have a good life too." Rather than seeing it as a form of "cruel optimism," namely the paradox that the things people desire actively impede their flourishing (Berlant 2011), I find anthropologist Arthur Kleinman's words more accurate in characterizing this situation: "Against this troubled and troubling historical background, isn't the audacity of simply being happy and enjoying life the most remarkable of collective and personal changes?" (Kleinman 2011b, 267).

In this chapter, I show how the meaning of data annotation work has come to be intertwined with a specific vision for good life to disabled people in China — a life with autonomy. Disabled workers frequently invoke the notion of "going out" (*zouchulai*) as their reason for working on AI data annotation, signaling a strong desire for departure from their confining past. While at ENABLE's dorms, workers gained renewed control over space, time, objects, bodies, and relationships. The workplace and dorm afforded by ENABLE became a space for experimentation and experiences, or in anthropologist Cheryl Mattingly's words, a "moral laboratory" (Mattingly 2014) to explore what freedom and autonomy means for disabled people in interdependent relationships. Through my own interfaces with the workers' "disability worlds" (Ginsburg and Rapp 2013a), I unpack the cultural meaning of autonomy to my interlocutors. Anthropologist Yunxiang Yan's framework of Chinese personhood is especially productive here. Yan conceptualizes Chinese personhood as a dynamic process — not a fixed thing — that is enacted by the

constant interactions between what he calls the “desiring individual, moralist self, and relational person” (Yan 2017).

Building on this framework, I argue that disability in China is commonly experienced as a breakdown of a balanced personhood disrupted by the over-representation of the “relational person” at the expense of the “desiring individual” and “moralist self.” In other words, disabled people in China experience a shrunken sense of the individual and the self, while being caught up in overpowering relationships where they cannot reciprocate. As their reactions to my initial “intrusion” into their lives will show, disabled people constantly feel that they owe other people, especially able-bodied people, a ton of *renqing* (“human feelings”). *Renqing* is a kind of “bond of reciprocity and mutual aid between two people, based on emotional attachment or the sense of obligation and indebtedness” (Yang 1994, 67–68). Sometimes such relational debt occurs against the will of disabled people in the name of care. Hence “autonomy work” — the desire to gain autonomy through work and work towards autonomy — is not a rejection of relationality but my interlocutors’ efforts to mitigate their perceived failure to relate in culturally specific ways.

“Going Out” No Matter What

In an inspirational promotional video released by a government-run disability entrepreneurship incubation center which offers free working space for ENABLE’s western China data annotation team, the message about doing data annotation work

became inevitably entangled with “going out.” Huifang, a veteran data annotator whom I interviewed in 2020, has become the leader of a small team in her office in 2022. In a classic northwestern Chinese fashion, she is warm-hearted and earnest. She loves to travel and is full of energy. When she and I traveled to Shanghai Disney Resort together, I could barely keep up with her. In this video, speaking as a data annotation team leader, Huifang could not stop talking about “going out.” This is her origin story of entering data annotation:

> I had a friend, who like me also uses wheelchair. He really wanted to do something entrepreneurial, so he asked me if I had interest in going out. Let’s go out and do something. I said sure. I will go out first, no matter whether we succeed or not.

Towards the end, the video sought to leave a message to other disabled people, with people like Huifang as role models. Huifang’s message is once again, to encourage people to “go out”:

> Everybody, let’s not be afraid of going out. You may face lots of barriers going out, but you must believe that the world is full of good people. There will be kind people willing to help. Moreover, only when you go out, can you be seen and can your needs be discovered. […] Slowly go out, and you will grow. Don’t overthink about other people’s opinions. Don’t care too much if you are good looking or have good degrees. The most important step is to go out by yourself. Only when you go out, you will have more opportunities.
>
> That is what Huifang wanted other disabled people watching the video to take away.

A speech about work and entrepreneurship turned out to be a speech about “going out.” Huifang is not unique in being a strong advocate for going out. In interviews, workers frequently invoke the word “going out” as their reason for choosing to work at ENABLE’s data annotation program. Meihui, a wheelchair user, said she was fed up with working at home, and “just wanted to go out no matter what. I don’t care if it makes money or not.” Rongfei, another wheelchair user who worked at ENABLE’s Xi’an team, said she would

not take the same job if it were home-based, because “that feels different from everyone else again. The point of working is to be like normal people, having a life and a job. Working at home is not living by myself.”

Work alters the scope of space a person inhabits. Disability in China is commonly experienced as home-bound. Disabled people who show up in public spaces and encounter inaccessible infrastructures are often blamed for entering the space they don’t belong in the first place. “Why do you come out if you can’t see?” Blind people often face this question.

Work offers a legitimate entrance into the world, and an exit from home. The fact that data annotation at ENABLE is not merely digital is not trivial. In-person work brings a sense of normalcy, whereas home, to many disabled people, means a mixture of care and control (Ma 2020), protection and prohibition, intimacy and infantilization. Rongfei is a petit disabled woman, who moved from a rural area to work on data annotation. In her words: “Do I want to work at home with the same salary? No. I work precisely so that I am the same as normal people. That I can also work and have a life.”

This is common even among disabled data annotators outside ENABLE. I interviewed Zhu Tong after visiting his workplace, another data annotation program in southern China that hires disabled people, run by a local disabled entrepreneur. Zhu Tong has cerebral palsy, which impedes his speech and motor skills, but he can move around space without many access needs. He holds a bachelor’s degree in information management. He spent a year at home after graduation, taking exams to become a public servant and failed, feeling completely defeated.

> Living at home was not great. Neighbors will ask why other college graduates have jobs and I don't. […] [My requirement for jobs] now is to just to break away from family. I'm a college student. But I spend all day at home, doing nothing. People say I am a parasite. I felt miserable.

My dearest roommate, Miaomiao, who insists that I use her real name, had to take the leap when her mother was physically away. She told me this story when the pandemic "freefall" of 2022 happened: facing the impossible scale of transmission and threatening protests, the government removed all COVID control policies overnight without any readiness for care provision. The result was abysmal. When the wave hit our dorm, Yating, my blind roommate who slept on the upper bunk to me, fell sick first. With known exposure and impending sickness, Miaomiao and I had nowhere to go. So we decided to do a formal interview over a brew of tea and some roasted nuts in the dorm.

Miaomiao began having spinal issues at nine. When she found out one morning that she could no longer move her legs while on the toilet, her first thought was that her homework would be late. She never went back to school to face the consequences, though. After that morning followed years and years of treatments, surgeries, and rehabilitation. Miaomiao was especially upset, she emphasized, that a back-revealing spaghetti dress that she just bought would be wasted, because she now had a scar by her scapula after surgery. I marveled at the edgy fashion taste of a primary schooler, but she made another point: "I only had these simple concerns. We are from rural areas. Because my brother is good at school, they all had high expectations for him anyway. I wasn't expected to do much." Miaomiao's home was on the fourth floor, without an elevator. When she was young, her mother would carry her down, perhaps a few times per year.

Fast forward a decade: Miaomiao left home for the first time by herself to Beijing for an independent living training camp. To make it thorough, she insisted that her mother not go with her. There, she met Su Jie, my third roommate, who later suggested that they apply for an annotation job together. They were hired. But Miaomiao's mother did not approve, even after many hours of persuasion. Shanghai was too far from Henan, she worried. Luckily, an opening occurred. Miaomiao's brother was about to have a baby, and they wanted her mother to look after them in Beijing. Juggling numerous motherhood obligations, her mother went to Beijing. After she was away, Miaomiao stayed home alone, living all by herself for a month, proving that independent living was possible for her. That changed her mother's mind.

Leaving home is a rite of passage for many disabled workers I met, who long for being physically and emotionally independent from their kins and the safe haven they built, entering into the adventurous, dangerous wilderness that "true" adulthood entails.

Dorm as Freedom Laboratory

To go out is to "orient away" from family, from a state of mind, and from one's past self. But workers also need something to "orient to" (Friedner 2015b). Spending five months living with the workers in their dorm and going to work at the office every day, I had a glimpse into the life they chose over being over-protected by families and confined at home. The life they chose to move towards. Dorm provides a space for experimentation

with newly gained autonomy, where they increasingly exercise control and self-determination over space, time, relationships, bodies, and objects.

Space

Yating, my blind roommate and a veteran data worker, took me to the dorm on the first night I arrived. It is in a gated apartment complex three subway stops away from the office, with the word “international” in its name. I call it Sunshine International. Sunshine International is not much different from many apartment complexes in Shanghai, except it is far away from the city’s commercial centers. Rent is roughly 2000 CNY/month for an apartment (roughly 280 USD/month), relatively affordable in Shanghai, and ENABLE has offered the dorm rooms to its workers and me for free. Because of its affordability, Sunshine International seem to have attracted a mix of residents, from busy tech workers whose office is nearby and short-term travelers to migrant workers who, like ENABLE, have transformed a small studio into a six-people dorm room. ENABLE had four dorms here, one for men, two for women, one flexible.

The room is reminiscent of the typical Chinese college dorm room I had, with many small “homemade access” (Williamson 2019) that the girls developed. For example, the front door has a string tied to it, making it easy for wheelchair users to close it without having to reach for the door handle. Entering the room there is a small corridor on the left, just enough for one wheelchair to get through, and the bathroom is on the right. The left side had a low shoe shelf that they turned into a kitchen, a fridge, and a closet.

Figure 2. The makeshift shoe-shelf kitchen

In the bathroom, I didn't see the typical "accessible bathroom" handles and shower chairs, but I noticed that the shower head was taken out from the shower section to sit next to the toilet with an extension cord. The shower section had a door which prevented water from coming out, but that blocked access for wheelchair users. Yating and I took showers in the shower section, and Miaomiao and Su Jie sat on the toilet seat and showered. There was no toilet paper in the bathroom, because it would get wet. I kept forgetting to take the toilet paper out of the way.

Figure 3. Bathroom in the dorm

Everything in the room appears to be placed unusually low for me. Su Jie made a special note to me about it on my first day: “We can only reach the lower shelves so feel free to use the space high up.” Miaomiao further added: “Oh and if you take something, remember to put it back where it was, that way Yating can know where to find them.” Fully blind and short-figured, Yating nodded and reminded me not to put them high up. These reminders took time to translate into practice. Once, I left the bowls at the top of the fridge after washing them, and they laughed so hard when they found the missing bowls. For a while, I was a real barrier in a life that they had operated perfectly well.

Figure 4. The living space in the dorm room

The dorm space is a “crip space” that ENABLE and the workers developed by and for themselves, not meant for an able-bodied intruder like me. Jiayi lives in the other women’s dorm in Sunshine International. One day I walked with her back to her dorm, because I wanted to see what their room looked like. She had packages in her hand so I carried a box of eggs she had bought. When we arrived, her roommate Luna opened the door for us. The room, to my surprise, was pitch dark. Not a single light was on. I stood still in darkness chatting with the two of them for a bit, doing my best to hide my surprise. I commented on the pleasant scent in their room. The nice warmth. Any other senses that I had access to in the space.

Suddenly, Jiayi’s voice turned to me: “You can put the eggs down on the table, Di.”

I responded awkwardly: “Um… I can’t see where the table is…” Laughter, apologies, explanations were all flying around when Luna rushed to turn the lights on for me.

This was not a “swapping places” or “disability simulation” exercise that diversity and inclusion training materials often invoke. Barriers, affordances, and capabilities became radically relative terms for me in a very real sense. Living in a space built by disabled people, I have frequently experienced barriers and even, sometimes, myself become one. I have deeply appreciated my interlocutors’ accommodation to my mistakes, ignorance, and incapabilities. I developed a deep respect for the “disability expertise” (Hartblay 2020) of my friends, and the prospects of co-living in a much more expanded notion of the world when such expertise is taken seriously.

Time

Work also means a reorganization of time in life. The different temporal regime between massage and data annotation is salient in the narratives of blind data workers who “escaped massage.” Jiayi, a young woman, tried to learn massage after losing her sight not so long ago because massage is the most common means of livelihood for blind people. But she preferred data annotation to massage because “you don’t have to stay up late. You have weekends and holidays. The daily life is routinized. At least after work you have the time to watch or do something you like. […] You earn less here, but it is more relaxed.”

Her roommate, Siwen is exceptionally concerned about the effects of the irregular temporal regimes of massage on her appearance. Siwen is a pretty, young woman, has a good fashion taste and low vision. Once at a malatang (spicy numbing hot soup street food) place, Siwen was recalling how much she hated massage because it made her face look bad-colored. Ten years of massage had messed up her sleep, and made her look much older, according to her. So she quit. The lifestyle as a data annotator now seems much more favorable for her. No night shifts, no emotional labor for customers, and enough money to buy anti-aging supplements.

Shifts at night and unpredictable schedules entailed in massage not only interfere with physical health: they also minimize social activities that massage therapists share with the rest of the world. Data annotation explicitly defies such rhythm by demarcating clear, precise temporal boundaries from 9 to 6. It is predictable, certain, and routinized. Outside these hours, time belongs to the workers. Danni has left ENABLE to be an in-house data annotator at Apple. An active gamer in her spare time, she finds data annotation tedious, but she notes the perks of the lifestyle as an annotator:

> In massage salons, they don't have many opportunities to get out. Most massage salons make you work from 10am to 11pm, which means you are always inside the salon. At best, you can eat and have some fun after work, but they don't have the opportunities to go out in a big group.

More control over spare time also means more space for self-development for many workers. Both converted to Christianity, Miaomiao and Su Jie wake up early in the morning to read the Bible in whispers. In college, Suya had switched from majoring in massage to majoring in music (these were the only two majors available for blind students in special education colleges). She soon realized that she could turn neither into a career

— she found the Traditional Chinese Medicine classes deeply mysterious, and her piano tuning training would demand complex navigation to different client's homes. At an ENABLE mobility training camp, she was drawn to the advocacy work they did, and joined their radio team briefly. She loved the creative work of broadcasting, but like many creators, constant production of ideas can be anxiety-inducing. The data work now is admittedly not as creative as she would like. But the regularity of it paradoxically allows her more time and energy, after work, to create.

Not all forms of data annotation, however, offer more personal control over time. Depending on how the labor is organized, time can be controlling. Gao Mei, a wheelchair user who works at another data annotation program run by a government-affiliated foundation, felt like she had less time on her hand. Paid by piecework, the more Gao Mei works the more she earns. She works every day from 9am, or even 8am if she feels energetic that day.

> Then I'll be working all day except eating and going to bathrooms. Recently I often turn off the computer at 1am, and go to bed at 2am […] I used to think the thing that I lack the least is time. I have so much time to spare. But now time is what I need most.

Coming from rural Ningxia, a northwestern province of China, Gao Mei made good money in her early days as a data annotator, when the price by piece was higher a few years ago. Nowadays, however, labor prices have lowered while the difficulty level of data labeling is increasing. She had to work longer hours to make decent money.

Relationships

Beyond relationships with time and space, work also alters the ways that disabled people relate to other people. Being a pretty woman in a wheelchair living in rural areas, Rongfei was extremely bothered by her fellow villagers' gaze. To avoid encountering them, she did not even want to go out. But things changed when she started working, alongside a community of wheelchair users: "These two years after I met my colleagues, I felt that going out together with so many wheelchair [users] is very face-saving. We have nothing to be ashamed of."

While some workers come to ENABLE to find community, others come to be left alone. Luna, Suya and Jiayi's roommate, holds a master's degree in massage, the highest one can get in China so far in this profession. In 2014, blind students were granted reasonable accommodations in the national college entrance exam (*gaokao*) for the first time in history, which allowed blind students to apply for mainstream colleges, expanding the options from merely special education colleges. Luna, graduating in 2013, missed it by a year. She had no interest in massage, but a master's degree, she and her family figured, should be useful in this elitist society. Luna is undoubtedly the nerdiest person in the office, so much so that she is sometimes seen as an outlier by other workers. She would cite Foucault in our conversations, and recommend new social science books to me on Wechat. Folks sometimes gossip about her "strange" behaviors as a self-proclaimed feminist, such as her preference for sighted women over men as navigation guide, who offers their arm above the elbow for the blind person to grasp. Luna, however, seems to be at ease here. She is very self-aware, and finds this job quite matching to her

introverted personality: “It suits my personality to do this kind of immersive work. I don’t need to deal with other people. I find it exhausting.”

Luna is not the only annotator who felt “relieved” in the mechanized work of annotation. Blind women in particular are tired of the emotional labor involved in other job options they had: customer service, call centers, or massage. By contrast, they may not need to say a word during the whole day for data annotation. Many of them, ironically, prefer working with machines over dealing with complicated human relationships. After a quiet day of work, Luna retreats into the world of podcasts, social theories, and literature, uninterrupted by other humans.

Workplace is also a space where romantic relationships emerge. At least two married couples work at ENABLE Shanghai. Gossip and eye witnessing of another budding romance also takes place in Sunshine International. Miaomiao’s boyfriend works at ENABLE’s Xi’an office. During China’s most intense wave of COVID infection in December 2022 after the abrupt ending of zero-COVID policy, he remotely ordered fresh dumplings delivered to our dorm for all of us. Leaving the all-encompassing bonds of kinship makes space for other forms of relationships to occur. In his wildly influential best-seller *Far From the Tree*, psychologist Andrew Solomon writes that children who have different “vertical identities” with their parents due to disability, sexuality, or other forms of differences often seek meaning in communities where they can forge “horizontal identities” (Solomon 2013).

Of course, offices and dorms are by no means perfect utopia free of conflicts or unpleasant relationships. I recall comments from advocates in other disability NGOs

equating the rooms to “Foxconn,” one of the most infamous sweatshops. Adults need privacy, and living like college students is, for many, unacceptable. Another friend, who was a blind sociology student doing research at ENABLE, also found the social life at ENABLE strange. Growing up in blind schools, he told me he expected the workers to be more collegial. Everyone should be commuting together in his mind; life as a data annotator seems too individualistic.

Office drama also happens. Roommates who don’t like each other could be fighting from their beds at 3am. Once Yating told me what she called a “blind ghost story” — that she was in a taxi with another blind colleague, gossiping about another colleague, who sat next to her for the whole ride without making a sound, so she did not know that the subject of the gossip was in the car! Some workers that I interviewed in 2020 had left ENABLE for companies like Apple, because they wanted to take a break from the overly tightknit “blind circle.” On a business trip, I floated this question to Yikun, a manager at ENABLE’s philanthropic foundation, and a sighted man who uses crutches. He used to be a community leader in his hometown in western China, organizing grassroots social events for disabled people. “We could have done more ‘team building’ activities,” he said, “but we did not put more pressure on the workers.” In his view, the data annotation workplace is just like any other “normal” place, where people may or may not like each other, and they choose to come and go. This agrees with my observation of the workers, who come here to be who they are, not to be molded into anything in particular by yet another institution. When that goal becomes truncated, they move on again.

Bodies

In her twenties, Miaomiao left home for the first time by herself to Beijing for an independent living training camp. There, she learnt how to use her body the way it is, and how to move harmoniously with her wheelchair. More importantly, she learned from instructors who were all wheelchair users, who showed her that an independent life is possible with bodies like hers. In Miaomiao's words,

> My injury was in thoracic, and some people may have injury in cervical vertebra. But even if they have trouble moving hands, they would still long for independent living.

Independent living trainings in China are often called "life rebuilding" trainings. Relatively few organizations offer them to people with different kinds of impairments, ENABLE included. Yet not all participants of these trainings get to apply what they've learnt later at home. In ENABLE's experience, a vast majority of participants will lose their ability for autonomous living over time due to family interference (see Chapter 4).

Working as an annotator in Shanghai gave Miaomiao space for independent living. She has all kinds of skills to make life work for her body. Lifting the electric head of her wheelchair like a motorcycle to move over a bump, rolling her chair with one hand, pushing her body up in the chair to ease the muscle of her bottoms, showering on the toilet, or inventing life hacks to make the doors easier to close — Miaomiao has never felt so free with her body since her injury at 9.

Figure 5. Su Jie cooking steaks on the tiny table

One of our favorite activities in the dorm is cooking together. The first time we cooked in the dorm, though, I made a big mistake. I bought groceries, prepared the food, and washed all the dishes. In my head, this is courtesy to them welcoming me into their living space. That is not how it was interpreted. Although they liked the food, Miaomiao was disappointed when she saw the dishes washed. The next day, Yating ordered lots of groceries to fill the fridge, not to mention the entire new fridge she eventually bought for the dorm. Su Jie never charged me for anything she bought either. I then realized, my gestures of politeness were experienced as not willing to exchange favor. Worse, it meant ripping them off from their hard-earned independence. My entire socialization process into the “crip space” of Miaomiao, Yating, and Su Jie, is a process of unlearning offerings of unsolicited care that signal dependence, and learning to blend into their network of

interdependence in a much more spontaneous and fluid way. Arseli Dokumaci may call it “dancing an activist affordance” (Dokumaci 2023).

Objects

With a source of income, work also brings disabled people more power over objects. As we have seen, for disabled people, living independently entails skillful manipulation of tools. In addition, workers have more direct access to consumer goods in life. Beyond typical middle-class consumerism that many workers aspire to, many workers also consume socially.

Consumption is a big part of our dorm life. Every night, after cooking and eating together, the routine of our dorm is to lie down in bed and scroll through e-commerce platforms. The night dorm soundscape is one comprising whispers with loved ones, gossip on phones, speedy audio books, and Douyin (Chinese TikTok) livestreaming. Packages of online shopping are delivered to the dorm on a weekly basis.

These consumed goods are not luxuries. They are often basic living substances such as discounted soap, dishwashing cloths, or groceries. Many workers spend time checking e-commerce or livestreaming platforms on the phone because they often offer bulk sales. Purchasing basic goods can be meaningful as a sign of being one’s own caretaker.

Eight years ago, during Rongfei’s first job, she began dreaming about living in a big city. A few years later, data annotation brought her from her village to Xi’an, a large

western Chinese city. As a young woman and a wheelchair user, Rongfei went through endless troubles to work out a life for herself in the city. Renting a place was the hardest. Kinder landlords questioned her ability to stay safe, but superstitious ones straight up thought she would bring bad luck (*huiqi*). Rongfei's attitude is to shrug it off. Because to her, "this is life." In 2020 when we spoke, she had been living alone for three years, doing everything by herself, from renting and job hunting to cooking and laundry:

> All by myself. It's exhausting sometimes. I also wish I had help. But looking back, I think this feels really good. […] Today I took a shower and realized that my conditioner has been going down fast. I need to buy it again. I never had to worry about these things at home. Never. Now every so often I need to buy stuff.

Rongfei said these words with pride. The ability to purchase mundane goods like shampoo is not simply an expression of economic independence. It symbolizes the power to arrange one's life at a detailed, day to day level. The workers' consumption patterns also reveal an eagerness to contribute to family obligations. Miaomiao bought a cellphone for her niece. Yaohui enjoys buying stuff for his daughter and his pet turtle. Gao Mei gave her first month of salary to her mother, and jokes about going bankrupt every time she goes home because she buys gifts for the entire family. Despite the turn to the world away from the family, disabled Chinese use consumption as a means to participate in the social exchange that signals adulthood. As Becky Hsu wrote: "The mark of growing to adulthood in China is not independence and leaving home but rather is learning to ease the minds of parents and contributing to the overall happiness of the family" (B. Y. Hsu 2019, 10–11).

Doing Disabled Personhood in China

I was a nuisance in the early days of my arrival at ENABLE. My voice was not recognizable to the blind workers. My body was in the way of the wheelchairs' routine pathways. My steps were faster than most steps they are familiar with. My eagerness to make friends often translated into the all-too-familiar triggers of precisely the paternalistic dynamics that the workers are escaping from. Being the only non-disabled person in the office and the dorm, I am dangerously close to the paternalistic caregivers and the overly passionate helpers in their lives. If I do not learn the terms of their "disability worlds," I can end up becoming yet another obstacle to their autonomy.

For a little while, I thought that my relationship with my colleagues and roommates of ENABLE would be perpetually defined by their cautious carving out of boundaries from me. I am reminded of the disability studies debate on the notion of independence. Disability has a fraught relationship with autonomy. As Rosemarie Garland-Thomson writes, "the autonomous individual is imagined as having inviolate boundaries that enable unfettered self-determination, creating a myth of wholeness. […] Conversely, the disabled body represents the incomplete, unbounded, compromised, and subjected body susceptible to external forces: property badly managed, a fortress inadequately defended, a self helplessly violated" (Garland-Thomson 1997, 45). Against the de-humanizing imaginary of dependency, many disabled activists sought to center personal autonomy as a political strategy in the US, a strategy that remains important for the empowerment of disabled people globally. Increasingly, feminist and disabled scholars and activists in Europe and North America call out the myth of the Western liberal notion of autonomy.

They highlight the invisible care, maintenance, technologies, and labor required to sustain the myth of autonomy for all people, disabled or not. Even in the 1970s "independent living movement" in the US, activists were demanding structures and systems of support to make independent choices possible. Building on Actor-Network Theory, STS scholar Ingunn Moser argues that agency is always mediated and the sense of autonomy depends on backgrounding certain relationships, humans, and objects in the disabled person's network while spotlighting others (Moser 2006; Moser and Law 1999). Anthropologist Matthew Wolf-Meyer similarly draws our attention to "the naked mechanism of facilitation," which "make us not what we will in some idealist sense, but into the kinds of persons that the technologies make possible" (Wolf-Meyer 2020, 162). In other words, personhood is always already facilitated by human or non-human technologies (Wolf-Meyer 2020). The tension between care and autonomy is most apparent in the activism of parents with disabled offspring, where parents sometimes must erase their own labor to help their children appear independent (Carey, Block, and Scotch 2020). To recognize the harm of overemphasis on self-sufficiency and reconcile the tension between care and autonomy, some scholars began adopting the notion of "interdependence" as a key "crip" ethic (Hamraie and Fritsch 2019; Bennett, Brady, and Branham 2018; Mingus 2010), demystifying the illusion of autonomy while offering a more relational approach to justice.

The ethics of in(ter)dependence for my interlocutors share the similar valence that perceived dependency discounts disabled people's social membership. But they also had more culturally specific concerns. Contemporary perceptions of disability in China are shaped by many forces, such as Confucianism, colonialism, globalization, and state

socialism. While Confucianism typically considers an intact body as the premise for personhood, China's experience of colonialism and later embrace of globalization pushed the state to reconsider the "quality" of its population and open to new norms about bodies and biomedicine (Stone 1998). Sociologist Emma Stone argues that contrary to personal tragedy, disability is perceived as a familial tragedy in imperial China. Further, she characterizes personhood in the Mao era as based on production, whereas the post-reform China regarded every citizen as a consumer, and consequently a potential source of dependency and burden on the nation-state (Stone 1998). Sociologist Yuanyuan Qu offers a similar shorthand to understand the changing perception of disability in China, where the body transformed from being conceptualized as a basis of personhood in imperial China, to national property under socialism, and personal tool for production and competition in contemporary China. Respectively, the impaired bodies are considered less than human, less contributive, and less competitive (Qu 2020b). These seminal works all point to the erosion of personhood as a result of the bodily and material dimension of disability.

This chapter offers an additional lens to understanding disabled personhood in China — the social and relational. My approach is inspired by anthropologist Yunxiang Yan's tripartite framework of Chinese personhood (Yan 2017; 2009). Using the emic concept of *zuoren*, or "doing personhood," Yan argues that the Chinese personhood is not a state of being a person but a dynamic process of becoming. Doing personhood, he suggests, consists of an interactive cycle of three components — the desiring individual (biologistic), moralist self (psychologistic), and relational person (sociologistic). In this framework, the key difference between the modern Western notion of personhood and

Chinese personhood is not simply individualism versus collectivism, but whether the moral evaluation of the self legitimizes the desiring individual or the relational collective. Of course, even within Chinese personhood, the compositions and weight of each component are constantly changing. Since market reform, Chinese persons are increasingly “desiring” (Rofel 2007) and individualized (Yan 2009), but also remain “divided” (Kleinman et al. 2011) between living for oneself and living for others.

What I am observing in the workplace and dormitory of ENABLE is an effort to “reroute” the interactions between the individual, the self, and the person. I argue that disability in China is experienced as a breakdown of typical Chinese personhood, where the desiring individual and moralistic self are displaced by the dominating figure of the relational person. In other words, people are often forced into a thick relationship with their kins and communities by nature of their disability, and deprived of the opportunities to desire for oneself, and worse, to cultivate proper, reciprocal relationships with other people — the hallmark of personhood in China.

To many of my interlocutors, their disability seems frustratingly to turn every relationship into one of care. Some of them were never allowed to leave the premise of home. Some were prevented from pouring water for themselves after losing sight. Some were stalked by family members who do not trust their ability to travel independently. The dissolving of basic personal boundaries — physically and psychologically — characterized their daily lives, making their connections with kins and communities rather “relational tangles” (Kuan 2020) than meaningful interdependence.

In recent years, Yan observes a rise of what he calls “neo-familism” in Chinese society, which revitalizes the primacy of family interests over its individual members and non-familial organizations (Yan 2018). Individual success has come to be measured by their contribution to family happiness (B. Y. Hsu 2019). Even psycho-therapeutic pursuits of individuals are often more about intergenerational relationships within the family than self-discovery (L. Zhang 2020). The rise of neo-familism is in part facilitated by the state as a tool of governance and a provider of welfare (Yan 2018). Lacking state support, family serves as a main unit of care for people with psychiatric disabilities (Ma 2020) and people with other forms of impairments. In my fieldwork, this has become a source of increasing tension between disabled people, their families, and the state (see Conclusion). These intersecting cultural and political forces make home a place that young disabled people seek to “go out” from.

More crucially, paternalism from kins and non-disabled people renders disabled people failed social persons by excluding them from reciprocal social exchanges. Many of my interlocutors feel constantly in debt to other people’s *renqing* because of their disability. *Renqing* is “bond of reciprocity and mutual aid between two people, based on emotional attachment or the sense of obligation and indebtedness” (Yang 1994, 67–68). They can be an ongoing exchange of gifts, affect, courtesy, or favors. Key to the ethics of *renqing* is rational calculation, moral obligation, and emotional attachment (Yang 1994). Owing debt in *renqing* can cause moral and emotional distress. My act of paying for the taxi fare on behalf of Haiyan (see Introduction), for example, causes considerable anxieties in her because I made her in debt to my *renqing* involuntarily. Disability disqualifies a person from participating in these personhood-affirming exchanges,

sometimes by ways of socioeconomic disadvantages and sometimes by able-bodied people's default projection of disabled people's need of help. Being in constant accumulation of relational debt can lead to moral bankruptcy. In response, disabled people have to constantly pre-empt situations where they may not be able to return a favor or may be prevented from offering a favor. For example, Huifang would rather wait until I have passed by to then try to take her package from a tall shelf that she can hardly reach from her wheelchair. Yating will always climb up to her bunk bed right after dinner insisting she wants to check TikTok so I can shower first. These are their subtle protests to protect their boundaries, and to signal to me that the non-disabled person in the room does not always need to sacrifice.

In a way, ENABLE's resort to business follows similar instincts. In typical philanthropic or charity programs, aid is considered a gift to the disabled community, without expectation for at least material return. One-directional gift giving, however, often indicates power imbalance, breakdown of bond, or closure of relationship, which can lead to resentment from those who are involuntarily indebted (Yan 1996). By contrast, the cold-blooded rationality of the market, by symbolizing equal exchange of value, paradoxically affords the community a stronger sense of dignity and respect.

Importantly, seeking autonomy from overly dense relationality does not mean a total rejection of relationship and care. Rather, I argue that the autonomy work of the disabled data annotators is about shifting more power towards the disabled person to define the contours of such care. One moment in our dorm captured this dynamic well.

One night after our usual roommate dinner, Su Jie rolled to the bathroom — our only washing station — to clean the dishes. The rest of us were chatting. I wanted to wash some fruits so I headed to the bathroom. Su Jie was just finished with the dishes. She put some flat plates on her lap, and was holding the rest of the smaller bowls. She saw me standing in front of the bathroom and smiled. I saw her reach out one hand with bowls towards me and thought she meant “go ahead” and I politely said: “No you go ahead first.” She then laughed out loud. She reached her hand again closer to me with a funny face, and this time, I realized she wanted me to take the bowls in her hand, so she could roll out from the bathroom with both of her hands. The bathroom door has a small bump, and she needed two hands to stabilize herself. Her hand gesture was requesting help, but I misread it as politeness. I thought letting her go out was offering help, but the help she actually needed was my assistance with the bowls!

I often find myself thinking about this moment. It feels like a perfect metaphor for many well-intended help, care, and designs conceived from the perspective of non-disabled people, but are in fact completely missing the point. They represent, at best, one-sided goodwill, but almost never succeed in fully anticipating the real needs of someone with a different embodied experience. There is a simultaneous abundance of unwanted solutions and unmet needs (see more analysis about this dynamic in technological design in Chapter 4).

By reaching out with her hands, Su Jie builds a bridge to ask for my help. I was both embarrassed by my reaction, and excited about the invitation to become part of her network of interdependence. Indeed, over time, we developed a comfortable rhythm and a natural division of labor in our shared dorm. I also began to be invited to parties and

trips with colleagues at ENABLE. I learnt that autonomy is not just achieved through the careful drawing of boundaries but also the making of bridges. Disabled data annotators long for chasing their desires, fulfilling their moral obligations, while also taking more responsibilities in life. Autonomy work is their efforts to restore displaced personhood, and to relate better.

The Audacity of a Good Life

"Disabled people can also have a good life." Li Feng sees this as the message of their advocacy. An epitome of good life is perhaps visiting the Shanghai Disney Resort. A magic land with the reputation of world-class accessibility, Disney is a "playful pilgrimage center" (Moore 1980) for disabled travelers in China. ENABLE's good location, decent salary, and routinized pace, and workers' autonomous life skills, all make a trip to Disney by themselves within reach. Huifang, an ardent traveler back in Xi'an, who came to Shanghai for a month of exchange, wanted to make the best out of her time there. Going to Disney is the thing that she wanted to check off her list on day one.

During the week of November 21, 2022, we saw the news that Disney Shanghai Resort would reopen that weekend, after a temporary closure caused by a COVID outbreak inside the park. The price was as high as expected, and we did not have time to make any sophisticated plan. Thanks to Huifang's enthusiasm, we jumped on the opportunity. Tickets were bought in haste, over a homemade hotpot that four other girls

and I shared in our tiny dorm. Shortly after, it was closed again because of COVID concerns.

The next morning, we left the dorm at 7am. We got breakfast from the convenience store down from the dorm building, and headed to the subway station with our respective wheels — Miaomiao and Huifang on their motorized wheelchairs, and me on a shared bike. But of course, their speed was much higher than mine. I recall biking behind them and realized: had I not known how to bike, I would have been the one slowing everyone down. Indeed, that was my experience at Disney.

The day was perfect. Along the way, we discovered various makeshift strategies to become affordances for each other. By sunset, after walking on foot for over 10 hours, and riding everything we wanted to ride, some even twice, my legs felt like noodles. My normate speed was slowing down their “crip time,” which bends the clock towards disabled bodies and minds (Kafer 2013a). I really needed a break. Huifang, determined to squeeze every drop of juice out of her Disney experience without leaving anyone behind, took pity in me and announced: “Get on my lap!” To be clear, this is not allowed by Disney. But we were going at the fastest speed possible anyway, with Huifang driving the wheelchair, me sitting on her lap, into the golden sunset of a fairytale park.

Figure 6. Huifang driving me in her wheelchair with me sitting on her lap

I slept soundly that night. The next day, I woke up to a world historical event in the same city — the “white paper” protests had broken out in Mid Urumqi Road against the draconian COVID restrictions imposed by the state — while we were watching fireworks

in Disney. Throughout my fieldwork, I sought to understand how broader political and economic change unfolds in my interlocutors' daily lives, many of whom lived through the notorious Shanghai lockdown in early 2022 and we all suffered from the massive Omicron wave after the government's abrupt lift of COVID restrictions at the end of 2022. Yet to my surprise, my interlocutors are indifferent. Compared to my middle-class friends in Shanghai who felt unprecedentedly violated by their COVID experience, many of whom are making plans of emigrating, disabled workers at ENABLE seem to treat these moments as "crisis ordinaries" (Berlant 2011). Even for ENABLE, a veteran advocacy group, their strategy is to distance themselves from more sensitive political movements. In their experience, disabled people are always at the bottom of people's concerns in broader political struggles, sometimes even sacrificed or instrumentalized (*dang paohui*). They are much more interested in building a better quality of life for the community right here, right now, which is by no means an easy task.

Even living a good life can be subversive. In February 2023, I attended a 14-day independent living camp run by ENABLE's charity branch in Beijing as an observer and logistics assistant (see more detail in Chapter 4). On the way back from a day-long training at the Independent Living camp for newly blind adults, I gave my elbow to Zhiyuan as navigation guide. Zhiyuan is the psychotherapist hired by the camp, who also has visual impairments. Meanwhile, my job was to keep an eye on the camp participants in the streets, who were still learning how to navigate busy roads without sight.

Zhiyuan and I were chatting excitingly about his approach to therapy. Newly blind people, in his experience, tend to blame blindness for all the troubles in their lives. But many troubles predate blindness, and the disability should not be the scapegoat.

Zhiyuan's theory bears uncanny resemblance to that of the disabled philosopher Elizabeth Barnes, who argues that disability is a mere difference, not a bad difference, and disability is independent from one's wellbeing (E. Barnes 2016). Zhiyuan put it simply: "In fact, visually impaired people can also live a good life." Just when I was about to dig deeper, an angry male voice cut me off — "You should first do some research about [blind people's] employment rate, before saying this!"

The voice was from Dan, a participant of the camp who recently lost most of his vision due to COVID-19. He had been quietly walking next to us, and probably heard the whole conversation. Perhaps disturbed by this sudden accusation, Zhiyuan dropped his therapist hat and responded with a slightly more raised voice than his usual, calming gentle speech: "I do not need research to know that employment rate is low. But it depends on how you define a good life. If good life only means high income, then it's hopeless. We are doomed. So we should see how it is defined."

This response did not inspire any appreciation or enlightenment. Instead, Dan seemed even more infuriated. In contempt and impatience, he yelled back: "You are so academic! Definitions aren't important!"

We walked in silence for the rest of the trip to the hotel. Dan's dismissiveness of Zhiyuan's "optimism" made two things evident to me. First, work is essential in the Chinese imaginary of a quality life. Only good work can beget good life. Disabled people, deprived of work opportunities, are seen as having reduced life chances all around. Second, disability and good life are considered so fundamentally incompatible, that simply mentioning it can be offensive. This is true even for the very people who have recently

acquired disabilities, and are actively seeking for new ways of living with disabilities. Newly disabled people like Dan often find themselves in the front seat of such tension, between his dire yearning for a good life in a new body, and his strongly rooted, old belief system that utterly denies such possibility. The cultural belief in disability as an unredeemable misfortune is so strong, that even when a clearly more appealing alternative is offered, it can be experienced as a threat. It takes audacity to chase a good life against all odds.

Chapter 4. AUTONOMOUS DESIGN: THE BLIND WAY

Think of a wireless doorbell. A wireless doorbell typically consists of a transmitter and receivers, communicating over specific protocols wirelessly. The transmitter, made of weather-proof material, is usually placed outside the door. Visitors press the button of the transmitter to announce their arrival. Multiple receivers can be placed at different locations inside the home. When a visitor presses the button outside, the receivers would turn the wireless signal from the transmitter into an audio or visual alert for people inside, who can recognize the alert wherever they are inside. The protocols that the transmitter and receivers communicate wirelessly over are mature technologies like radio frequency, Bluetooth, or WiFi.

Now imagine that the receivers, which create the alert (let's say the sound of a chime), are placed outside the home. Suppose they are placed at the entrance of the building of the home, outside the elevator door at the floor the apartment is located, and at the door of the apartment. On the other side, a blind person is holding the transmitter. When they press the button, they can tell how far or near they are from these reference points they mapped out on their route to home, by judging the sound from the receivers. For example, the elevator at the office building ENABLE is located, like most elevators in China, does not have audio announcements about which floor they are at. ENABLE's blind workers, who work at the sixth floor, usually rely on asking other passengers or counting stops to tell whether they have arrived at the right floor. Now with the device,

they can hear the chime outside the sixth floor elevator door and walk out confidently without anyone's help. It is similar to pressing the electronic car key to find one's car in the parking lot from the beep it generates. By extension, the receivers can be placed at any place — subway stations, bus stops, school buildings, classrooms, supermarkets — that the blind traveler frequents but lacks sufficient information to locate themselves.

This is the basic concept of "The Homecomer" (*huijia shenqi*), a nickname ENABLE gave to an assistive device they are developing. As you can tell, it does not rely on any fancy technologies. ENABLE does not need venture capital to make it happen. The device can also be made affordable to the users. It is a clever adaptation from mature commercial products, a classic example of crip tinkering and "life hacking" (Jackson 2018).

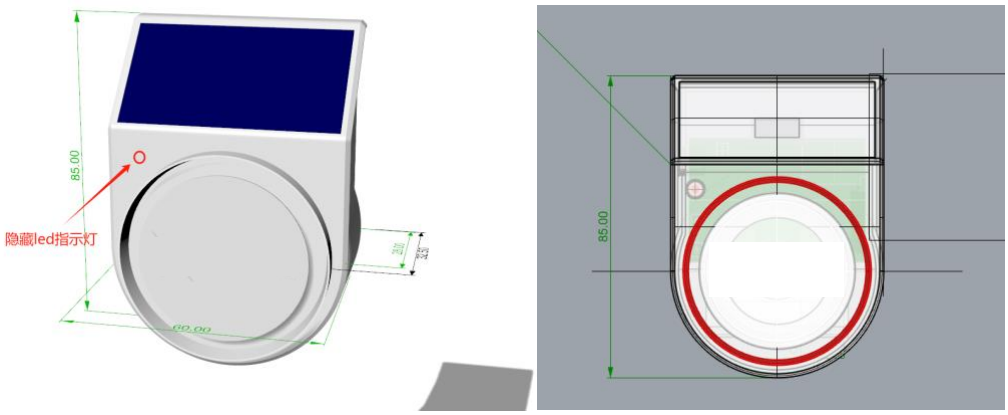

Figure 7. Design demos of the Homecomer receivers

It also emerged out of contexts where accessible environment is barely available. Laws and policies do exist. In fact, China just passed its first *Law on the Construction of Barrier-Free Environment* in 2023. But like its predecessors, these regulations offer meager help for disabled people's everyday reality. Drafted by able-bodied professionals

with minimum meaningful consultation with the disabled community, the law, in the eyes of the disability community, represents at best a compromised political statement that accommodates the interests of different ministries rather than the needs of actual people with disabilities (Minority Voices 2023). A symbolic achievement notwithstanding, the disability communities find it “a law without teeth.” Expectations for the law to change the status quo anytime soon are low. In a way, the Homecomer evades the necessity of lengthy negotiations with all the public places that fail to provide basic accessibility features for blind travelers. It offers a makeshift solution to the patchy access they are granted in limited spaces.

When I first heard of the Homecomer, I was not that impressed. Its mechanism was opaque to me as I did not fully understand the context in which it would be used. Nor did I fully grasp the significance of physical mobility for blind people. The design of the Homecomer began to make sense to me only after I witnessed how ENABLE’s orientation and mobility training camp trained newly blind people to navigate independently. It became crystal clear to me that orientation and mobility are central to the sense of autonomy for people who newly experience blindness. The ability to navigate “independently,” I argue, both depends on and gives rise to a new set of relations with self, community, and the environment. Blind orientation and mobility therefore are highly skilled activities that stem from “a completely new paradigm for navigating and observing the world,” in blind writer and performer M. Leona Godin’s words (Godin 2021, 156). This new paradigm does not “naturally” occur with blindness. It takes a series of psychological, social, and epistemological transformations to achieve. A device to enhance autonomy, then, must be built in and for this new paradigm.

The Blind Way

Work is a pathway towards the wider world, as we have seen in Chapter 3. But not everyone can access the pathway the same way. Even in the best-case scenarios, bodies and their environment must mutually adapt. There is no one-size-fits-all access. As anthropologist Arseli Dokumaci puts it: “An environment that is simultaneously and fully accessible for all of its inhabitants (human or otherwise) is a sheer impossibility: not only because of the diversity of its inhabitants and their access needs, not only because of the ‘conflicts of access’ that would inevitably emerge along the way, but also because the inhabitants and their environments are alive. This means that their access needs change” (Dokumaci 2023, 248).

Living as a disabled person in China means constantly frontloading logistical concerns. Disability affects one’s decisions about all kinds of logistics: from scheduling for taking medicine and hospital visits; budgeting extra time to move between destinations in case of access barriers; syncing with caregivers and sometimes the affordances of assistive tools (e.g. battery life of electronic wheelchairs); managing energy levels necessary to deal with barriers; to planning trips to places that minimize human assistance (e.g. taking a walk in the hallway outside the office vs. outdoor space).

One evening, my roommate Su Jie came home with a long face. It was pouring rain on her way to work. Driving a wheelchair in rain, Su Jie covered her body with raincoat but left her feet out. Since her injury, she could not feel her lower body, so she forgot to

dry her feet out and left them soaking in wet boots for a whole day. “I was so stupid!” She blamed herself for not having thought about this in advance. This was an amateur mistake to her. Like Su Jie, many wheelchair users feel at the mercy of weather. After acquiring disability, anthropologist Robert Murphy describes himself as “prisoner of the weather and the front and back steps” (Murphy 1990, 74). More, notions of traffic, timing, duration, speed, location, all figure into the daily calculations of the disabled workers’ activities. Spatial calculations sometimes manifest themselves through the time it takes for different bodies. Every morning, my three roommates had to wake up nearly an hour before me, to make it on time for work. By contrast, it only takes me 15 minutes to bike to the office.

These spatial-temporal disparities unfold in social settings too. During her brief exchange in Shanghai, Huifang often speaks fondly of her experience in Xi’an, where most data workers are wheelchair users, which allows them to be travel companions for each other. They often take weekend trips together, including getting dressed up in traditional Han dynasty garments and doing photo shoots on the ancient city wall of Xi’an. By contrast, despite best efforts, it is hard for her to hang out in the same way with the mostly blind workers in Shanghai. This is because, according to Miaomiao, blind workers and wheelchair users take different time to arrive at places. If there is a gathering, not everyone can arrive together or access all the places together. Indeed, on my last day, Yating threw a small party inviting her blind friends, me, and Miaomiao. All the blind folks arrived at the outdoor barbecue place around the same time, but Miaomiao came much later driving her wheelchair and had trouble getting to the restaurant because of the stone road blocks outside the parking lot. Logistics is in the foreground of many aspects of disabled people’s lives, from labor, mobility, to sociality.

While no environment is readily accessible for everyone, most places in China remain inaccessible for people with body-minds that are outside the rigid definition of the "normal." In a severely shrunken environment, disabled people must labor harder to make up for the gulf between their bodies and their destinations. Disability studies scholars have developed many concepts to capture different aspects of such labor and expertise — Arseli Dokumaci's "activist affordances" (Dokumaci 2023), Liz Jackson's "life hacking" (Jackson 2018), Cassandra Hartblay's "disability expertise"(Hartblay 2020), and Aimi Hamraie and Kelly Fristch's "crip technoscience" (Hamraie and Fritsch 2019). In this section, I build on these useful concepts and elaborate how such expertise is acquired.

In my participant observation with ENABLE's 14-day independent living camp for newly blind adults, it became clear to me that being disabled does not automatically equip one with the skills necessary to inhabit the world with a disabled body. Some disabled friends I know never had the opportunity to fully develop their skills, and struggled to fit their new body into old ideas about life. It takes work to transform from the medical experience of disability to socially identifying with and skillfully living as a disabled person. It takes work —psychologically, socially, and epistemologically — to gain a sense of autonomy. Autonomy therefore is not a given but an achievement. It is, I argue, actively constructed through skilled work towards new relationships with self, community, and the environment.

Self

The pedagogy of ENABLE's independent living camp is quite revealing. At the camp, newly blind adults learn from experienced blind instructors about everyday life skills, from orientation and mobility, "smart home" devices, life hacks, car hailing apps, computer and mobile phone skills, to makeup and cooking. No single instructor was sighted. Most sighted people are volunteers like me. It shows that experienced blind persons have a thing or two to teach people who are new to blindness. Being blind takes skills.

Newly blind within two years, sometimes months, the participants' proximity to their able-bodied past life makes it obvious how the attachment to a sighted lifestyle has become a barrier to their flourishing under new bodily realities. On top of the trauma that caused their blindness, ableist norms have prevented people who acquire disabilities later in their life from healing and regaining wellbeing.

The camp's core pedagogy assumes that confidence is the premise of competence. Only when one believes and accepts themselves, can they begin to develop new skills as a blind person. This is echoed by Chairman Wang, a leader from the China Association for the Blind, when he gave a speech at the opening ceremony of the camp. As the government partner of this project, the Association offered the official conference room of the China Disabled Persons' Federation for the opening ceremony. An amicable leader, Chairman Wang told the participants that the key is to "untie the knot of your heart." He even shared his own embarrassing story: it took him years to pick up a white cane after becoming blind. He was bothered by the thought of the gaze from his neighbors who all knew him. Two years ago, an opportunity to move gave him the courage to start using the

white cane in a new neighborhood where nobody knew him. “Forget about your face [*mianzi*]. You will get used to it. Even if other people give you strange looks, we won’t see it!” The candid humor cracked the crowd up. His message was repeated by many blind mentors and instructors over the two weeks of the camp — it’s not about the techniques; it’s about mindset.

Though many participants came to the camp to learn skills, especially orientation and mobility skills, the designers of the camp insisted that the work on self is foundational. This work began with the physical separation of participants and their families. After dropping the participants in the hotel, some family members wanted to stay and observe the whole camp or stay in the same hotel room with their family. Wenlong, the director of the camp, and one of the leading blind activists at ENABLE, was strict about keeping participants away from family.

Narratives about kinship recur as a theme at the camp, a theme we have explored in Chapter 3. A former law student blinded by brain tumor was only allowed to pour water for herself years after her surgery. A former prolific middle-aged data scientist felt humiliated by his family for controlling his spending after becoming blind. “Reliving the burden of families,” “overcoming the caring restrictions by families,” “protective rejection by families,” and “being confined by families in the name of love” constantly emerge in conversations among participants. At the opening ceremony of the camp, Chairman Wang also mentioned:

> We must work on our families. Make them understand and support us. Otherwise, as time goes on, we will lose the will [to go out]. We may have the will initially, but families wouldn’t support us. … Families don’t understand our needs. They don’t know our potential. As a result, they restricted our journey of rehabilitation.

The journey towards a new self necessitates setting boundaries with all kinds of paternalism. Even for staff members, we were constantly told to back off. A good volunteer is one who “refrains” (*kezhi*) from intervening too much. We are supposed to give participants the “space” to explore, make mistakes, and learn. As one of the few sighted people on the team, I am expected to stand by, and provide visual assistance when needed only. Specifically, when assistance is requested, it is often strictly limited to visual support. For example, Mingke, one of the blind instructors, often accompanied by a white Labrador guide dog, once asked me to help in a mobile phone skills training session. A participant’s phone encountered an interface for the “reverse Turing test,” namely, proving to the machine that you are a human. The prompt asks to move a piece of jigsaw puzzle to fit into an image. Mingke strictly asked me to not do anything further than this one step that requires vision. I realized that a previous step went wrong and therefore moving the image didn’t work. Still, I was told to refrain. I was only there to provide sensory assistance, not to take the decision-making power, or the detour necessary for learning, away from the blind participants. In other words, to build autonomy, external assistance — whether from humans or objects — must stay strictly informational, and never decisional.

The blind selfhood cultivated in this camp differentiates sensory information from decision-making. Information acquisition can be assisted, but the decision making must be done by the blind self. By offering my vision, and nothing more, I do not displace the person with my other faculties. In other words, a blind self is a full person with alternative sensing schemes. This resonates with blind author John Hull’s description of blindness, which “‘is experienced as being intact, although the scope of activity has in many ways become smaller’. It is not like a round cake from which a substantial slice has been cut

out. It is more like a smaller cake" (J. M. Hull 1997, xii). If sensing is blocked in a vision-centric world, support is only needed to address the sensing issue. Any attempt to extend the support to other domains, is overstepping on the person. To reclaim decision-making power from able-bodied people, families or strangers, is about restoring self-determination. The autonomous blind self therefore acknowledges reliance on relationships with others, but allocates judgement centrally to the blind body-mind.

A new self also requires radically reframing their own views about disability. Being disabled does not necessarily change people's own attitudes towards disability. Although participants who came to an independent living camp have by definition accepted their blindness, most of them struggled to make meaning out of the experience. Why me? What is disability, many of them questioned, other than tragedy? At the first official training session of the camp, one of the blind instructors Zemin, who happens to be the boyfriend of data annotator Suya in Shanghai, made an explicit effort to open the participants to new possibilities:

> If you are willing to try, even if it hurts, you will gain some new experience. You will gain a new value system about yourself. Because according to the old value system, you are a waste product [*feipin*]. If that's the case, then why are you here? Sorry about my bluntness.

Changing the value system is core to gaining new skills for blind people. Identity, it seems, is closely tied to expertise. But how does one change their value system and build a new identity? Or put it this way: how to undo ableism in our heads? The pedagogy here relies on the community.

Community

Blind skills are intersubjective. Instructors at the camp often invoked the word “atmosphere” to describe their approach. The goal is to create an “atmosphere” in which newly blind adults can immerse into the new “disability world” of blindness, demonstrated by all blind instructors teaching them all kinds of life skills in the blind way. The wisdom lies not in one particular mind, but in the ambient affect created through collective brainpower.

These blind instructors, though all but one is a woman, are crucial role models for the participants. Some of them can navigate independently at a speed faster than normates, some are experts of computers, some of them work at Apple as an engineer, some are successful social media influencers, and some work at a Big Tech company’s corporate social responsibility team. Their presence proves the possibility of living independently and thriving as a blind person, an idea previously unthinkable to the participants. Never in their past life have they encountered any disabled persons, who are largely isolated in segregated schools, jobs, and spaces. Becoming disabled is terrifying, because no past experience of theirs ever prepared them for a different way of living. The virtual invisibility of disability in mainstream Chinese society makes a community of blind role models exceptionally important to the participants.

In this “atmosphere,” participants are exposed to a diverse range of possibilities in a blind body. At the camp, instructors show and teach the “normal” things that blind people can do — from playing games, watching movies, listening to novels, travelling, and cooking. In the camp leader’s words, it is about gaining some “blind knowledge” and

showing some “blind fun.” Every program of the camp is designed to help the heterogenous blind selves explore and flex their muscle.

Another element of the “atmosphere” is embracing the blind identity, as the community role models demonstrate. This can be exceptionally challenging for newly blind people who are not yet ready to accept their “illness” as an “identity.” One evening, I was away for other work and saw endless messages popping in the staff group chat. It turns out, “Zhiyuan dropped the bomb!”

Zhiyuan is the camp psychologist who runs an evening psychology salon every day. A former finance professional, Zhiyuan pivoted to being a therapist after becoming blind. He was also an alum of ENABLE’s independent living camps. “The bomb” that Zhiyuan dropped, apparently, was a game that has worked every time to open wounds in order to heal them. In this game, Zhiyuan asked the participants to do one simple task — start every conversation with the following sentence:

“Hi, I am a blind person.”

“Hi, I am a blind person…”

“Hi, I am a blind person…”

One by one, the participants started the conversation with this sentence, and ended in tears. That night, I caught Wan Fen in a dangerous near-miss. Fen was a middle-aged schoolteacher before losing sight. On the way back from the psychology session to the hotel, I saw her walking in tears, heading mindlessly towards the river under the bridge, and rushed to stop her. After returning to the hotel, she had a meltdown. Usually a

considerate person, she cried her heart out with her hotel door open, screaming in pain: "I am a *xiazi* now! I am a *xiazi* now!..." *Xiazi* is a derogatory Chinese term for blind people.

A few days later, Fen made the most emotional speech at the closing ceremony of the camp:

> Three days ago, I thought I was normal. I'm different from the 13 of you. I refused to identify as a blind or disabled person. I bought a white cane but never even removed the package. … I thought I simply fell sick. When I'm cured, I'll be fine. I could not say it out loud. But two days ago, I said it. I cried uncontrollably. Today, I am standing here, as a blind person. I bid farewell to my past. I wave hands at my future. My biggest achievement of this camp, is to have accepted the identity of a blind person.

"Coming out" as a blind person would have been unthinkable without being immersed in a community of peers. To undo ableism, it takes hard work and communal healing.

The intersubjective knowledge within the community also differs epistemologically from other forms of knowledge. As a thought experiment, I wondered whether these skills can be passed on to newly blind people by sighted instructors or through self-learning. It later became clear to me that the difference is not in the techniques, which can be easily found online, but in imagination. A few experienced blind navigators told me about their experience of learning how to navigate in blind schools. Yet they decided to learn again at ENABLE. Why? Shiyu, a blind lifestyle influencer, who also happens to be the wife of Qin Fei, had a brilliant metaphor. Shiyu taught makeup and skincare class at the independent living camp, and I was her teaching assistant. In her experience, sighted teachers at blind schools only teaches students the techniques of using white canes, but never let them walk on real roads for fear of danger: "It's like getting a driver's license without road lessons!" The blind instructors, by contrast, have embodied knowledge of

the potential and limits of blind people, allowing them to imagine a much more expansive scope of using bodies, sense, and cognition to navigate the world. Lacking knowledge or interest in such non-normative epistemology, the sighted world may limit the scope of learning for blind people for sake of their own failure to imagine otherwise. This often translates into the technologies designed by “experts” without embodied experience of disability.

Environment

“Navigation is the ultimate challenge,” said Wenlong, the guru of blind navigation, “All the radars of a blind person’s body must be switched on.” Lacking systemic orientation and mobility training opportunities growing up, Wenlong summarized many techniques through his own trial and error. The more I observe Wenlong and the instructors teach newly blind people how to “walk,” the more I realize how accurate the metaphor of the “radar” is. A blind person’s journey through a space entails numerous highly interactive processes simultaneously taking place between multiple senses, tools, and the environment. In the words of blind artist Andy Slater, “our hands, our mouths, our feet, our canes, and our dogs create a language of mobility through touch and sound. It’s choreography” (Mills and Slater 2020).

In this dance, the blind body with all its senses, the white cane, and the changing environment interact in a highly improvised way. Wind creates a touch on the face, signaling an open door. The fruit stand at the corner did not play loud music today, which may lead to a wrong turn. The white cane taps the floor with a bigger echoing than usual,

telling the holder about an empty space. Tap-tapping the cane on the floor, and sweeping it from side to side creates different effects too. The former gives echo, and the latter suggests texture.

The blind traveler epitomizes the anthropological insight that human beings perceive not with our eyes or ears, but with our whole body (Ingold 2011). The movement of walking, in particular, is crucial to perception. In Tim Ingold's words, "walking is a highly intelligent activity. This intelligence, however, is not located exclusively in the head but is distributed throughout the entire field of relations comprised by the presence of the human being in the inhabited world" (Ingold 2011, 47).

Part of the camp program every day is to train the participants to walk between their hotel and the camp site, which is the Beijing office of ENABLE. Sighted staff and volunteers are only allowed to intervene when the participants are deemed in danger. The route is only 600 meters, but it usually takes over 40 minutes for the participants to arrive. Having accompanied their journey back and forth this route for a dozen times, with heightened attention for risks, I have imprinted in my head a mental map of the route. Sweat, screams, and long tearful conversations, have all left marks on that route. To illustrate the nonvisual processes of navigating the 600-meter route, I offer here my version of the mental map. A caveat is that I have never walked through it without sight. Nor is covering one's eyes temporarily as "simulation" of blindness the equivalent of adapting to blindness as a constant. This mental map represents a sighted person's best effort to imagine what a newly blind person's journey of learning to navigate feels like.

Picture waking up in a hotel. Getting out from the hotel room, you feel the wall on your right with the back of your fingers, because you need to protect your fingertips for more sensitive tasks. The wall stops each time you reach another room's door. You find the wall again by walking past that door. You keep following the wall, until you hit an open door in front of you. Yes, if you forgot it's there, you hit it with your head. Next, you reach for the other side of the open door, find the door frame, and a new piece of wall. Follow that wall, turn right in the corner, turn again, and when your foot kicks the garbage can, you know that the elevator is on the right side of the can. You reach for the downward button, and you listen for the audio signals of the elevator. When it reaches your floor, you listen carefully and see if people need to go out, if not, get inside with your white cane pointing vertical to the floor so it is not stepped on or does not trip people up. But first, test if the door is closing using your white cane so you don't get hit by the closing doors. After entering the elevator, find the buttons for going down. When you reach the first floor, listen for the noises from the lobby. Follow the wall and walk towards the lobby. The spacious lobby is made of marble and does not have carpet; therefore, when your cane hits the floor, it will sound loud and remote. Remember this feeling. Seek for the sound of outside traffic, and an opening of gust — that's where the door towards outside is. You walk outside, go down a few stairs carefully with your cane reaching for the next step before you. Your cane will hit a bunch of parked cars. You feel sorry but they help you locate where the street is. After the parked cars, there is a sidewalk before you reach the street. This is the tricky part. You have to find a way to recognize the sidewalk, either through the tip of your cane feeling the texture of the bricks which are shaped differently from the parking area, or, you reach a pit where the trees are planted. Once you find the

sidewalk, you turn left, and blend into the busy sidewalk with loud passengers staring at you, talking about you, or trying to forcefully help you. You thank them and move on. A few steps later, you reach your first crossing. It is a narrow crossing where two cars can pass in both directions. When you feel the texture change on your feet, you are at the crossing. This is scary. You have to listen extremely carefully for cars and bikes, and walk over when you feel safe. While walking, you must raise your hand up high to signal your presence. This feels like taking a leap of faith and is terrifying. Phew! You crossed it. Now if you have been walking in more or less straight lines, you will find an opening towards a set of steps going down a pathway. But no one walks in straight lines. So you have to use your cane to find the opening. You walk a few steps up and soon you will reach more steps going down. This leads to the underpass of a bridge. You feel the steps one by one with your cane detecting barriers in front of you, and holding the handrail on the other side. After finishing the steps, you reach the bank of a small river. Turn right, and walk along the bank. Stay away from the river on the left, by knocking your cane toward the edge of the right side. You will hit benches, bins, or people's feet, no worries. You keep walking, until you feel another opening with steps. This time, walk up. Once again, cane in front, hand on the rail. After the rail finishes, the steps are over. Here comes the trickiest part of the journey. You are now at the second crossing, and it's a very busy one. You have to aim just right to walk towards not exactly the other side of the street, but an island in between the bike lane and the car lane. The island is roughly 2 o'clock in your direction if your feet are 90 degree to the stairs behind you. Everyone has their own approach here. You may choose to cross to the parking lot in front of you, and then cross right to the island, or walk along the your right hand side curbs until it turns right and then cross left,

or you walk in 2 o'clock direction like your experienced trainers do. One way or another, after encountering a few cyclists frantically ringing their bike bells, you reach the island. The island has tactical pavement, which your feet are still untrained to meaningfully identify. You walk along the island to the left, using your cane to ensure that you are neither in the bike lane nor the car lane. Once you get to the end of the island, the third and final crossing is waiting for you. Here, you will hear the music from a kindergarten near the entrance of the residential area where the camp office is located, you know you are close. You listen for bikes and motorcycles, you raise your hand, and you cross to your left. If you aimed correctly, you will reach the curb that will lead you into the gate of the residency. The security guard would open the gate for you. You then walk along the curbs on your left. You will be annoyed by the openings between curbs, because that could derail you from walking in a straight line. But you persist. After nearly bumping into a low hanging tree branch, you will find the corner to turn towards the right building. After turning, you get on a long ramp that is wheelchair accessible, and your stomach bumps into a motorcycle that always parks illegally there. Now you are in the building of the office! You listen for the audio guide of the elevator again, and it will lead you to the right floor. Once at the floor, you can't miss the office, because it would sound loud and smell of nice food.

You, the reader, may have wished many times to stop this cumbersome narrative. Indeed, this feeling of exhaustion and impatience is what many new blind participants of the camp experienced. This overly abundant description is meant to show you what mobility entails. These skills do not just come naturally with blindness. They are hard learnt, "trained judgement" (Daston and Galison 2007). Every day and night of the

fourteen days of the camp, at least one participant would have a meltdown. Once a young woman participant who's usually quite cheerful and talkative, broke down in the middle of the street after a close call of danger, and cried to me: "Teacher, do you think every step that we walked without dying is on borrowed time?" I was told to offer my vision and vision only, but I could not look away when the participants are in distress. Sometimes I give gentle hugs or patting around their shoulders, but most times, I could only offer my listening to their narratives of pain, disappointment, and self-doubt. I was reminded why the camp insisted that traveling is not a skill, but a mindset. One must first gain confidence to be able to master it. And confidence, builds on self-acceptance.

Every time when a new space is navigated, blind walkers look for signals from all senses. Sound, touch, temperature, texture, air, light, and even pain, all become signposts for non-visual travelers. Sometimes only by bumping, hitting, and running into barriers can one construct a full mental map for a new place. One participant was happy that he bumped into the tree because the most fearful thing for him was empty space, without any check points. In this sense, friction is necessary for access (Hamraie 2017).

Systemized in places like United States, similar techniques are often taught by specialized mobility instructors in "orientation and mobility" (O&M) trainings. Blind people in China, however, receive minimal trainings on O&M beyond the periphery of blind schools, in part because they are not culturally expected to go out (see Chapter 3). China's rehabilitation system is also predominantly clinical. Vocational rehabilitation or independent living trainings are still rare and are often funded by non-governmental resources. ENABLE's independent living camp is one of the few selected "community-based rehabilitation" sites funded by a government pilot program. Still, the community

rehabilitation model has yet been scaled to meet the demand nationally. ENABLE's curriculum partially borrows from free English-language materials they could find online, and partially stems from the instructors' own lived experience.

Over time, blind people like Wenlong become so accustomed to the techniques that he could walk faster than sighted passengers. The pathways are so imprinted in his body and mind that walking this route becomes second nature. Wenlong jokingly describes the "eerie" sensation he has developed, that the skin on his forehead can "feel it" when his head is about to bump into something. This uncanny sense of obstacle is known as "facial vision" (Godin 2021, 162). Skilled blind navigators such as Daniel Kish, who gave a popular TED Talk in 2015 about "How I Use Flash Sonar to Navigate the World," can even apply echolocation skills in mountain-biking expeditions (Godin 2021).

Neurologist and historian of science Oliver Sacks (Sacks 1996) writes:

> Though blindness may at first be a terrible privation and loss, it may become less so with the passage of time, for a deep adaptation, or reorientation, occurs, by which one reconstitutes, reappropriates, the world in nonvisual terms. It then becomes a different condition, a different form of being, one with its own sensibilities and coherence and feeling.

The nonvisual epistemology becomes so biologically entrenched, that even when long-term blind patients gain sight through surgery, they may struggle to adapt to sighted ways of organizing perceptions. In Sacks's words: "In the newly sighted, learning to see demands a radical change in neurological functioning and, with it, a radical change in psychological functioning, in self, in identity" (Sacks 1996). The blind ways of walking and navigation, in a similar way, demand and engender a psychological and physiological rewiring that sighted people have little access to.

The Closed Loop

The centrality of mobility in blind people's lives and the severity of its challenges have inspired generations of technological solutions. It is peculiar, however, that from labs and hackathons to government-subsidized assistive technology (AT) catalogues, few objects have succeeded in becoming part of blind people's daily movement.

The technological world is often filled with objects that Liz Jackson calls "disability dongles," namely, "a well-intended elegant, yet useless solution to a problem we never knew we had" (Jackson 2019). Yating, my blind roommate who shares a bunk bed with me, constantly mocks the useless technologies that she is asked to test for a small amount of compensation. One of them, shaped like a sun hat with sensors attached, claims to be the navigation guide and virtual assistant for blind people. Yating calls it the "silly hat." It is silly not just because it shows little understanding of how blind people actually navigate, but also because no one wants to be wearing the same hat all the time.

Unfortunately, designs like the "silly hat" are not rare in the current assistive technology market in China. For a long time, I have been puzzled by Chinese disabled people's experience of lack of useful technologies. Why is it, in the words of a news article, that China "can build rockets but not a user-friendly walking stick" (R. Zhang 2019)? At the China Disabled Persons' Federation (CDPF), the official bureaucracy in charge of evaluating, procuring, and distributing assistive technologies, a common explanation is

that the current policy is about quantity, not quality. To maximize coverage with limited budget, the rationale goes, we can only satisfy the most basic needs.

But that does not explain why so many "fancy" technologies such as exoskeleton dominate the official imaginaries of assistive technologies.

> I hope one day, deaf friends can "hear," blind friends can "see," the physically disabled can travel without barriers. Now we look around, deaf friends can obtain more information in "smart" ways, blind people can independently walk out of their homes any time, to get things done, to participate in social life, and to share the beautiful world. A further dream is for the physically disabled to walk freely with exoskeletons, expanding their scope of activity to any corners of the world. Mentally disabled people can hopefully receive accurate treatment through brain-computer interface, restarting a healthy life. This is equality in its true sense — let disabled people integrate into the society and live without a difference, instead of asking the world to accommodate them and to open green pathways for them.

This is a keynote speech by Tai Lihua, a nationally renowned deaf dancer and disabled official, delivered in sign language and dubbed with voice at the World AI Conference 2023 in Shanghai. I have heard similar speeches from other CDPF officials, many of whom themselves live with a disability. These official "dreams," it seems, are about technological fix of disabled bodies. They are simultaneously about "empowering disabled people through technologies while at the same time reinforcing ableist tropes about what body-minds are good to have and who counts as worthy," a pattern STS and disability studies scholar Ashley Shew captures as "technoableism" (Shew 2020a; 2024).

Figure 8. A screenshot from WAIC online streaming platform, capturing Tai signing her remarks to the audience on a screen

The limited resource argument also contradicts the costly expenditures that the government is willing to make. One place epitomizes this contradiction in my fieldwork — the municipal government assistive exhibition center. Located on the first floor of a district level disabled persons' federation (DPF) facing the street, the center is the go-to place for the city government to showcase their AT service to leaders from the city and outside. It had the proud history of being featured on China Central Television. It displays a wide range of AT products from children's wheelchairs, hearing aids, magnifiers, to elderly care facilities. A full-time manager, a woman who worked at a PCR testing company during the pandemic with no knowledge of disability or AT, was hired to maintain the place. Her sole job is to watch the place and give occasional tours. After being there from 9 to 5 for three days, I developed a mild migraine, possibly from listening to that one saxophone jazz

music replayed over and over again for eight hours, from the overly scented air, or from the virtually non-stop chitchat of the manager. Other than occasional, scheduled tours, no one visits the exhibition center. I was hence the only human contact that the manager had for a while. Yet she must always be prepared that the leaders may visit any time. She sweeps the floor every day so when leaders come, there are no bugs. A cleaning lady comes twice a week to mop the floor. The accessible bathrooms are not for use, only for display. Because if it is used, the manager reasoned, it would smell bad. What seemed most wasteful to me was the glaring spotlights that must be turned on all day long to make the products on display look shiny. The volume of the spotlights is such that once they are turned on, the room temperature rises. So now the AC had to be kept at an even lower temperature to cool the room down.

Humble dreams like the Homecomer neither promise fix nor evoke the charisma of high technologies. When Li Feng pitched the concept of the Homecomer to Big Tech companies like Microsoft in China, the reactions are lukewarm. Some proposed to work on a digital service dog that, importantly for Big Tech, should be shaped like a real dog. Others told him that for a research and development project to receive corporate support, it needs to involve publishable or patentable, cutting-edge technologies, not Bluetooth or WiFi. In Li Feng's view, "assistive technologies are all moving towards high tech, not towards disabled people. It's using disability to package technology, not using technology to serve disability." Disability becomes what media historian Mara Mills calls "assistive pretext" (Mills 2010) for technology companies.

This is not to say that disabled people don't need technology. If anything, disability has an undeniably material dimension, and as historian Katherine Ott puts it, "disability is

unique in the extent to which it is bonded with technology, tools, and machines as a medium of social interaction" (Ott 2014, 120). Anthropologist Matthew Wolf-Meyer argues that disabled people's technological experiences make evident that all personhood is facilitated (Wolf-Meyer 2020) to some extent: "facilitating technologies make us not what we will in some idealist sense, but into the kinds of persons that the technologies make possible. We are subjects—not solely of personal histories but also of the facilitating technologies that compose our worlds" (Wolf-Meyer 2020, 162).

The problem is, while many technologies offered are not needed, what's needed is often not offered. Though the CDPF claims to have covered an impressive 2.4 million persons with disabilities with assistive devices (China 2019), including white canes, vision-assistive devices, wheelchairs, prosthetic limbs, hearing aids, and cochlear implants, my interlocutors puzzlingly have barely benefited from these policies. Most blind workers at ENABLE use free screen-reading software on iPhone and buy discounted versions from domestic screen-reader companies for their computers. They buy white canes on Taobao.com, because the canes distributed for free by the CDPF are hard to use. Some of them, for instance, have an audio alarm and a flashlight attached to their top, but are way too heavy for long-term use. Although CDPF offers subsidized or even free wheelchairs, my roommates Miaomiao and Su Jie bought their wheelchairs and portable electronic motors with their own money at a cost not trivial for them.

As revealed to me during my fieldwork at a municipal-level CDPF office and its third-party assistive technology provider, the rigidity of a largely top-down planned system is incompatible with the highly flexible and heterogenous demand of people with disabilities. Until recently, most assistive technologies in the city were "centrally procured

and centrally distributed" (*ji cai ji fa*). This means disabled users could only receive standardized products such as shower chairs, crutches, or white canes, irrespective of their highly personal needs. Many users and providers see it as a wasteful misfit. For tools that requires customization, such as hearing aids, prosthetic limbs, and orthotics, DPFs procure services from selected local providers. These products come from designated manufactures, listed in a catalogue designed by the provincial DPF, also through a government bidding process. Disabled users can only go to a few designated providers to get subsidized services and products. Otherwise, users bear the full cost.

During the visits I paid together with the local CDPF staff to designated service providers in 2021, almost every one of them brought up the issue of policy rigidity. At that time, a policy update changed the wording of many subsidy policies. Users of orthopedics used to get "CNY 2,000 per person" as the standard of subsidy. Now it is "CNY 2,000 per person per pair," effectively limiting every beneficiary to one pair, and the word "pair" limits the product to "shoes" rather than any other orthopedic tools. Similarly, prosthetics subsidy policy changed from "one person every three years" to "one leg every three years." This makes double leg amputees only eligible to change one prosthetic leg every three years. In recent years, a few places such as Beijing and Hainan began piloting cash subsidy models (China Disabled Persons' Federation 2022), allowing disabled people to purchase their desired goods and services from the market and get reimbursement from the CDPF.

This predominantly planned, though changing, economy of assistive technology maintains a closed loop between DPF and product providers. Assistive technology developers can live on government procurement contracts, and DPFs can fulfill targets

for assistive technology coverage, without meeting the real needs of disabled users. My interaction with providers at a CDPF assistive technology EXPO captured this dynamic.

In May 2023, Li Feng invited me to check out the Care and Rehabilitation Expo China 2023 in Beijing, the annual national expo, organized by the CDPF on assistive technology. At a small section displaying blind people's assistive tools, a saleswoman approached us, and asked:

"Are you retailers or CDPF leaders?"

I was not sure how to interpret this question. The woman was so confident that we would definitely fall into either one of these categories. Is it because we do not look visibly disabled, and therefore she presumed to be not consumers? Or is it that retailers and DPF leaders are the main target audience of her sales pitch? I told her we are just looking around. And she backed off without further engaging.

Just while I was perplexed by the interaction, and Li Feng was busy checking the products, a man approached us and asked the same question:

"Are you retailers or CDPF leaders?"

This time, I was convinced that all the salespersons at this counter were trained to proactively engage these two categories of stakeholders. Business and government, these are what the EXPO is catering to, and to whom the assistive technology industry is accountable. Consumers with disabilities are assumed to be either unlikely to visit the EXPO, or unimportant. A massive EXPO on assistive technology — 25,000 square meters,

with 300 companies on display — turned out to be about people with disabilities but not for them.

The simultaneous scarcity of useful aid and abundance of unwanted supply persists in disabled people's daily life. This applies to both technological and human assistance. It is this profound discrepancy that pushes ENABLE to take matters into their own hands and design their own assistive technologies.

Design Autonomy

December rain in the southern city of Shenzhen was cooler than expected. Qin Fei did not bring the right clothes, and was having a mild fever, just as an unprecedented wave of COVID infections was storming across the country when the central government abruptly lifted all control measures without any plan for care provision. I tightened my N95 mask and put the hood of my jacket on. I offered my elbow to Qin Fei as his navigation guide on our way to the Shenzhen office of ENABLE. This afternoon, the designers of the Homecomer will visit.

The designers had been late for over an hour. I thought Li Feng would be annoyed by it, but he was quite delighted to finally see them. As they were dressed very casually and down-to-earth, I did not at first impression associate them with the stereotypical appearances of designers. The two young men seemed quite shy and didn't explain much why they were late.

They went straight for presenting the slides about their design approaches. Their slides began with the demographics of visually impaired people, something very obvious to their clients, two veteran disabled activists experienced in training non-disabled people about these facts. Hiding my face behind a mask, I was nervous for the designers. Later I realized that although ENABLE is technically the client, they needed designers like these two more than the designers needed them.

These designers truly “get” it, it seems, unlike many other technical experts that ENABLE has approached in academia and industries. Usually very hard to please when it comes to disability-related work, Li Feng expressed his genuine gratitude:

> You nailed our needs. […] Appearances don’t matter. Lowering the cost is our priority. Time-wise, this is not urgent. Focus on the more profitable deals you have, and work on our request only when you have some free time.

One designer added: “We can also help with marketing. If this project goes well, maybe we can apply for awards.”

I watched Li Feng’s face light up in a millisecond: “Yes! Go get a Red Dot!”

The two designers, who I later learnt were CEO of the small design firm and the former design director of a design powerhouse, humbly nodded.

Qin Fei and Li Feng were undeniably excited. They began dreaming out loud while packing for our next leg of the trip: once the Homecomer is launched, they can pitch them to donors and have media publicity. They can place the receivers in offices, in schools, and in apartment buildings. More blind people can walk out with confidence, be visible, go to school, and go to work.

“See? Small firms really have the sense! They knew it would be award-winning!” Li Feng was thrilled that his idea was finally affirmed, after rounds of failed attempts with Big Tech firms. By the time I left the field, the Homecomer was being manufactured. From ideation to implementation, within a year, I witnessed the birth of the disabled activists’ first technological invention.

The Homecomer’s journey embodied a different power dynamic between the disability and design community in China. ENABLE being the client rather than mere user or beneficiary allowed the disability community to take the driving seat of technological development for them. Design scholar Sasha Costanza-Chock summarizes the ten principles of the Design Justice Network (Costanza-Chock 2020):

> 1. We use design to sustain, heal, and empower our communities, as well as to seek liberation from exploitative and oppressive systems.
>
> 2. We center the voices of those who are directly impacted by the outcomes of the design process.
>
> 3. We prioritize design’s impact on the community over the intentions of the designer.
>
> 4. We view change as emergent from an accountable, accessible, and collaborative process, rather than as a point at the end of a process.
>
> 5. We see the role of the designer as a facilitator rather than an expert.
>
> 6. We believe that everyone is an expert based on their own lived experience, and that we all have unique and brilliant contributions to bring to a design process.
>
> 7. We share design knowledge and tools with our communities.
>
> 8. We work towards sustainable, community-led and controlled outcomes.
>
> 9. We work towards non-exploitative solutions that reconnect us to the earth and to each other.

> 10. Before seeking new design solutions, we look for what is already working at the community level. We honor and uplift traditional, indigenous, and local knowledge and practices.

Without knowing these principles, ENABLE intuitively worked with the designers in ways that are community-led, privileging the knowledge and practices already mature in the community. The Homecomer is premised on a deep knowledge of nonvisual orientation and movement techniques, and on the situatedness of the practice.

Moreover, in designing the Homecomer, ENABLE is creating different "ways of being," or in a term adapted by anthropologist Arturo Escobar, they are doing "ontological design" (Escobar 2018). The Homecomer is meant to assist the "independent traveling" of blind people. The notion of autonomy is central here. But autonomy can be configured wildly differently in specific designs.

A typical lab-made mobility assistance tool for blind people may center on augmenting the blind body. They attach sensors to headsets, eyeglasses, wrist bands, or white canes, seeking to compensate the blind body's lack of visual data with information collected from the environment. The idea is similar to building senses into a mechanical car that claims to be "autonomous." In this framework, the blind person, now augmented, is modeled on the normative sensory experiences of sighted travelers. This what Ana Viseu and Lucy Suchman call the "informed body" imaginary, which assumes the body to be docile, passive, and separate from the mind, waiting to be informed by better-knowing technologies (Viseu and Suchman 2010).

The Homecomer takes the blind sensory experience as already whole. Blind people navigate, as ENABLE's independent living camp shows, proactively and

interactively. They are sensing, perceiving, walking, knowing, while creating the environment all at the same time. The fruit stand at the corner may mean nothing to sighted pedestrians, but becomes part of Wenlong's environment when he uses its soundtrack as sign-posts for direction. Blind navigation is therefore highly located and situational. A device that claims to know it all in any place is what Donna Haraway would call "a view from nowhere" (Haraway 1988).

Instead of feeding back all information available in the environment, the Homecomer reaches out. By attaching multiple receivers in the environment, not the person, the Homecomer distributes the blind person's awareness. It trusts the blind travelers' existing capabilities in navigating the environment and amplifies them. By contrast, the "informed body" approach locates trust in the sensors, assuming that the blind body has no knowledge of its environment until informed by the machine.

Deploying the Homecomer's receivers to form a route that makes sense to the specific person, the blind traveler takes control over which information to collect and when to have it. The Homecomer feeds additional information back only when the blind person chooses to do so by pressing the button. It functions as an extended body-mind of the blind person, rather than concentrated data bites of the environment.

Its inherent modularity allows the traveler to customize a mental map unique to their own routes. While the "informed body" approach describes space, the Homecomer denotes place. Education researcher Lucia Hasty describes visual epistemology as from "whole to part," and distinguishes it with non-visual epistemology which processes information from "part to whole" (Hasty, n.d.). The Homecomer clearly resembles the latter.

In this sensory network, the objects of the Homecomer are attributed a similar dose of agency to other non-human actors in the network — birds, fruit stands, traffic lights, air, bricks, and more. They do not seek to displace these other actors in the blind traveler's network of knowing. It is still the human, however, that is firmly in control of decision-making. Agency here is asymmetrically routed towards the blind person.

The notion of autonomy embedded in the design of the Homecomer is highly relational. Instead of a bounded subject informed with total knowledge, an autonomous blind person is imagined as an open, interactive body-mind moving confidently in a skilled choreography with different tools, other bodies, and ever-changing environments.

Notably, independence in blind navigation excludes to the extent possible the necessity to involve other humans. In STS scholar Ingunn Moser's observation, disabled people's "independence is not simply about disconnection, but also about the shifting out and replacement of some attachments (or dependencies) by others" (Moser 2006). Indeed, blind subjects are less reluctant to depend on non-human animals or objects than other humans. However, this is not because they seek to cease relating to other humans. My experience of being socialized into the dorm and office of ENABLE shows that it is about relating differently (see Chapter 3). Being able to travel without human assistance is about traveling with other people while minimizing their labor, being able to share joy without turning every minute into moments of care, and being dependable for others when they are in need. Independence for blind travelers therefore is not a rejection of human connections but a redefinition of them. Independent traveling enables more genuine interdependence. Or in Escobar's words, autonomy is about "confident relating and greater sharing" (Escobar 2018, 172).

Blind people's autonomy, as conceived by ENABLE's Homecomer, is also oriented (Helmreich 2023). The nickname itself may already be a giveaway. The design of the Homecomer assumes that the blind traveler lives in a community, knows their environment, goes out and about doing their business, and returns to the community with ease. It humbly provides local and locatable knowledge to the traveler. The ability to navigate autonomously therefore signals freedom of moving in and out of socially meaningful places, not just wondering around in any universal "space."

Designing Movement

When something requires tremendous skills, one reaction is awe. Another is fear. The first recognizes value, and the latter may see it as a cost to be reduced. Disability expertise sometimes triggers these two simultaneous reactions. When I failed to unlock my iPhone using its accessibility features, I blamed my own clumsy screen-reading capabilities, but my sighted friends may wish they never needed to use these features. The thought of having to learn these difficult skills if you become disabled is too daunting. Disability expertise both signals competence and implies hardship.

The efforts it takes for blind people to walk independently therefore may appear impressive to some people, while being seen as problems in need of elimination to others. Technological solutions along the latter lines would typically propose to automate the entire process of navigation, offering "autonomous vehicles" that would make life easier for travelers like blind people without ever necessitating any hard trainings. Admittedly,

many blind people I know would welcome this solution. This is not unlike the ongoing dynamics of technological displacement of human labor. Obtaining certain skills for human workers, it is reasoned, costs too much and machines can do it more efficiently. But we cannot talk about the specific meaning of different tasks for different people in abstraction.

Orientation and mobility mean more than techniques to many blind people who master it. As earlier sections in this chapter has shown, they are first and foremost a key adaptive process towards living with blindness. Walking is a form of knowing, as well as "a way of thinking and of feeling" (Vergunst and Ingold 2008, 2). Learning to walk as blind person is about getting to know, think, and feel as a blind person. If learning is what psychologist James Gibson calls an "education of attention" (Gibson 1979, 254), then blind travelers are learning how to attend with blind bodies. The knowledge of living with blindness cannot be passed on through "a transmission of representations" (Ingold 2000, 37), but must be gained through "understanding in practice" (Lave 1990, 310).

Navigation skills are also bound with value systems about self and disability. Without total self-acceptance, taking the leap of faith to learn such a "dangerous" skill would be considered both unnecessary and impossible. And accepting oneself would be out of reach without accepting one's disability. The acquisition of skills, as anthropologist Greg Downey points out, "necessarily entails physiological, neurological, and psychological transformation"(Downey 2016, 77). Once obtained, these skills will in turn enable different ways of being.

For these reasons, ENABLE's blind activists see orientation and mobility training as "the best vehicle for advocacy" in the context of China today. On one hand, they consider navigation the ultimately "hardest level" skill for a blind person. In their folk statistics, only 10% of blind Chinese have full mobility. This skill thus translates to a significant boost in quality of life and confidence as a blind person. On the other hand, the process of learning mobility skills necessitates transformations that would ultimately change how blind people view themselves and their relationship with the society. In other words, behavioral change in the blind person, it is believed, would inevitably lead to attitudinal change in not just themselves but people around them — a critical goal of ENABLE's advocacy.

Moving, or as Ingold terms it, "wayfaring," is living being's "most fundamental mode of being in the world" (Ingold 2011, 152). We know, learn, and inhabit the world through movement. The autonomy to move confidently and freely through places constitutes the autonomy of life itself. Navigation skills are therefore foundational to the livelihood, as well as lives, of blind people.

Movement also entails not just mobility but mobilization. Training the blind community how to move is a component of the social movement that ENABLE takes part in. The practice of the physical motion of moving as a blind people entails transformations in their relations with self, community, and the environment, which in turn, create new pathways in the social nerves of their surroundings. This political goal of blind navigation was spelled out to me by Huang Junjie, ENABLE's co-founder and mastermind of strategy. He compared their navigation training camps to the "independent living movement" during the US civil rights movement of the 1970s, which promoted visions to support disabled

people to live with dignity in their chosen community, participate equally in society, and make decisions about their own lives (C. Barnes 2003), heralding the global disability rights movement.

Designing for movement towards autonomy therefore takes a different valence for the disabled activists than mainstream technologists. Would some blind people like to be driven around by a fully autonomous vehicle in the future? Probably. But would they also want to gain skills and relations that matter to their identity and community? Probably yes too. By necessitating basic blind epistemic capabilities, the Homecomer augments the existing social and technical infrastructure of the blind community without dismissing it as cumbersome or displacing it. Autonomous design for ENABLE is about learning, walking, and living the blind way.

CONCLUSION

The Ghost of Automation

Months after I had left the field, Li Feng would occasionally call me to update on how they were doing. Sometimes we talked for hours. He was constantly trouble shooting, trying new approaches, and weighing on new opportunities. But one call in March 2024 was different. When I picked up the phone, this was the first thing he asked: “Are you done with your dissertation?” Before I could figure out what he was getting at, he added: “If not, you better hurry.”

“We may be out of business soon.”

ENABLE, it turns out, is facing the threat of Large Language Models (LLMs) up close. AITech instituted LLMs to their data annotation tasks, and 96% of its annotation results are the same as ENABLE’s human workers. AITech has fired four of ENABLE’s lower performing workers. In the near future, they are warned, data in need of human annotation will significantly reduce.

Li Feng has always been on top of technological developments. He was the first person who told me about LLMs right after the launch of ChatGPT in 2022. When asked about it, he was optimistic that China’s ambition to compete in the LLMs space will translate into more demand for data annotation. Even the few months before this call, he was telling me how many ENABLE’s workers have shifted to labeling for LLMs, which entails not only making meaning judgements but often moral judgments of the data,

making human workers more indispensable. In any case, LLMs were good news for ENABLE not so long ago.

The change seemed both abrupt and anticipated. The ghost of automation has been haunting ENABLE since day 1. When I interviewed the workers in 2020, nearly all of them considered data annotation as a short-term gig. Having circulated between other precarious jobs before, they are surprised this one was stable for a while. For disabled people in China, full-time, waged labor was never the norm. Precarity for them is what Lauren Berlant calls “crisis ordinaries,” where crisis is not a shock or exception but a component blended into everyday life (Berlant 2011).

Configuring Autonomy

Why, then, do ENABLE and its workers knowingly embed themselves into such an exploitative and risky system? In this dissertation, I have strived to demonstrate that AI data annotation is but a means towards an end for my interlocutors. To be commercially successful in the AI industry is beside the point for ENABLE. Nor do the workers lack any other options and are in data annotation purely for survival. In anthropologist Kathleen Millar’s words: “work is fundamentally entangled with moral and existential questions of what it means to live well” (Millar 2018, 13). To my interlocutors, to live well cannot be reduced to mere economic needs. To have a good life is about dignity and autonomy. They found more autonomy in data annotation, not because of the promises of “flexibility” often implied in precarious digital labor (Gray and Suri 2019), but because the disabled

workers and activists have actively transformed the work and life conditions in and through data annotation towards more expanded, multiple scales of autonomy for the community.

What appears to be a familiar story of capitalist exploitation of disabled people is rather a story about the struggles of disabled Chinese over “different forms of inhabiting the world” (Millar 2018, 29). They deploy what I call “autonomy work” to make AI appear autonomous technically (Chapter 1) and institutionally (Chapter 2), build spaces for “autonomous lives” for the workers (Chapter 3), and design tools for “independent navigation” tailored to the epistemology of blind travelers (Chapter 4). Their visions of autonomy, though tied to technology, differs drastically from notions of freedom and liberation heralded by technologists (Turner 2008), hackers (Coleman 2013; Beltrán 2023), or AI evangelists that chase machine autonomy at the expense of human autonomation.

Technology becomes part of the affordance towards these visions of autonomy as a result of power and contingencies. Rather than capitalism inevitably enrolling every corner on the planet for its deterministic self-expansion, it is disabled activists who sought to “reverse co-opt” institutions like AI companies to advance their political agenda, however risky or constrained this strategy may be. In this sense, disability activism and AI systems in this temporary assemblage are “co-produced” (Jasanoff 2004).

I do not intend to discount critiques of techno-capitalism for its displacing effects of social justice, or as Silvia Lindtner puts it, the “displacements of technological promise” (Lindtner 2020, 4). Seminal works on technological interventions for development have

focused on the visions for social change of makers (Lindtner 2020), hackers (Dunbar-Hester 2020), designers (Irani 2019), and engineers (Ames 2019), and importantly unraveled their violence and limitations. My approach differs in lens. Looking from the vantage point of disabled activists, engaging the technology sector is a thoughtful, skilled, and risk-taking tactic that has made a meaningful impact on many lives. Disabled people in this case are neither victims of algorithmic cruelty nor beneficiaries of technological salvation. In getting their hands dirty in messy business, half promises, and hard compromises, disabled activists and workers in China demonstrated immense agency and expertise.

ENABLE interfaces technologies like AI with a completely different genealogy than actors coming from the technology sector working to "empower" disabled people. Instead of displacing the slow work of social change with techno-solutionism, I argue that ENABLE's use of technology constitutes that very slow work. In this case, it is the slow work towards dignity and autonomy. As a grassroots NGO laboring on disability rights for a decade, ENABLE entered AI data annotation at the conjuncture of political repression and China's own "Silicon Valley" moment. While civil society in China began to undergo crackdown (Lei 2018; Pils 2018a) in the early 2010s, the tech industry still enjoyed strong state support and societal hype (Lindtner 2020). The private sector in general, and technology companies in particular, became a new-found space for small-scale social change still possible in Xi's China. In a way, to the disabled activists, making claims to technology companies bears no fundamental difference to conventional advocacy's claim-making to the government they are trained in — both govern social and technical systems that shape disabled people's lives. This is what Langdon Winner meant by

“technology in a true sense is legislation" (Winner 1983, 323). By intervening in technology, my interlocutors are effectively intervening in a form of governing system, which at times seems more responsive and less repressive than the government in the current environment.

More importantly, with deep knowledge and lived experience of the social issues they advocate for, disabled activists in China approached technology as a puzzle piece, not a magic bullet. To make AI data annotation a meaningful alternative to limited job options such as massage, ENABLE reconstructed the work and living conditions for their blind, low vision, and physically impaired workers (Chapter 1 & 3). To ensure tech companies have multiple and sustained interests in hiring disabled workers, they built a new infrastructure of allies and incentives within tech corporations (Chapter 2). To design a useful mobility assistance device, they embed the objects in blind walkers’ existing sensory networks in a modular way so individual blind users can customize their own paths (Chapter 4). Autonomy here is not only treated as already relational; it is seen as malleable.

I argue that disabled activists in China managed to make some technologies useful for their movement precisely by reorganizing the social and material relations around and through technology. In other words, they return the technical to the social. This differs from neoliberal interventions that use technology as a permission to look away from deeper structural issues or singles out technology as external to the social problems at hand (Dunbar-Hester 2020; Lindtner 2020; Irani 2019; Ames 2019). The disabled actors have, in Eden Medina’s words, “decentered” the computer (Medina 2018) and returned it to the historical and social processes that the technology is embedded in. Technology is

not “a primary axis of intervention” (Dunbar-Hester 2020, 23), but a node in a network of interventions in ENABLE’s practice. A relational category, disability necessarily demands coordination. Technical proposals must be backed with social and institutional passages across different domains. As material experience, changes around disability also always entail logistical rearrangements. These knowledges allow ENABLE to build an infrastructure for their advocacy and community building goals, in which technological objects and systems play a seemingly outstanding but far from deterministic role.

These technical, social, and bureaucratic labors to rework relations between humans, objects, and their environment constitute a form of “disability expertise,” a term anthropologist Cassandra Hartblay coined to capture disability-informed knowledge to thrive in uninhabitable worlds (Hartblay 2020). I offer the concept “rerouting” as a shorthand for a specific mechanism of disability expertise that reconfigures sociotechnical, institutional, human, and spatial arrangements towards better flourishing. Rerouting is, in a way, disabled people’s well-known life hacking expertise (Jackson 2018) applied to physical and social movements.

Take Back the Mic!

Two events in May 2023 crystallize the current state of the disability movement in China. Early that month, ENABLE and I helped UNESCO China organize a conference. The initial design was to bring disabled activists, policy makers, and other stakeholders to discuss major policy issues, and inform the UN’s next phase program on disability in

China. The agenda eventually morphed into an 80-people forum, where each thematic area — social service, gender, accessibility, and collaboration — was opened by remarks from a policy maker or policy expert. Although we knew the group would be too big for meaningful discussion, I personally had not anticipated what would happen that day.

An official from the CDPF opened the first session. This arrangement was not unusual in the past, where NGOs would invite the government and perform gratitude for government blessing, regardless of their actual relationship. Having government presence is sometimes even seen as a sign of successful engagement of the most important stakeholders. Yet on this day, the CDPF official's remarks triggered a whole day long chain reaction of rage among the disability activists.

Expectedly, the CDPF official gave a celebratory account of China's disability policies. He especially praised the policy to give family the primary responsibility of care for disabled persons, citing traditional values and what he saw as personal preferences. This immediately received a direct critique from a UN Women officer. As the facilitator of the session, I totally misread the situation and tried to direct the discussion towards employment and education policies as designed. Before I realized what a mistake that was, an activist who runs a parent organization and is mother of a child with intellectual disabilities, took a microphone from the back end of the room and cut the conversation in fury:

> Have you all asked me about the policy? Did you think we [families] had a choice? … I love my child, and I want to care for him. But is it my choice? Or am I forced to? I have no other [services] to resort to!

One session after another, disabled activists from various communities — deaf, blind, wheelchair users — all began to challenge the so-called “experts” and the policies they propose on behalf of disabled people. Rather than a consultation, the event became a series of confrontations where activists expressed their decades of frustrations about all forms of paternalism from the state (Ma 2020), from families, and from able-bodied “experts” by interrogating whose expertise, and ultimately whose voice, matters.

One expert involved in the legislative process of the 2023 Law on Barrier-Free Environment, noted that under China’s current conditions, it is impossible for disabled students to live independently in schools, and therefore they must be accompanied by parents. To this comment, a disabled activist using a wheelchair questioned in tears:

> But we want freedom. And freedom has a cost… How can a [lawmaker] scholar today say that disabled students cannot go to school without the company of their parents? I thought the ultimate goals of our legislations should be better than this.

Many disabled participants cried that day. So did Qin Fei, my co-facilitator of the event. As he concluded the event, he compared the collective rage of disabled people to feminist rage. Emotions of the marginalized, he acknowledged, must be allowed to be expressed and be seen.

In *Crip Negativity*, disability studies scholar J. Logan Smilges writes about feeling suffocated by ableism as “all at once confronted by an inaccessible world, disappointed by what access has to offer, and still left feeling inadequate of the half portion of a life we’re allowed to live” (Smilges 2023, 37). For decades, Chinese policy makers, families, and non-disabled experts on disability issues have decided for their disabled constituencies what’s best for them, and expected them to be grateful for whatever is

offered, however meager or demeaning it may be. At that conference, it is made crystal clear how much pain this power dynamic has caused. And how urgently disabled people want things to change, on their terms, now.

A few weeks later, I was at another conference on technology and accessibility. Failing to RSVP for this popular event, I registered as a volunteer. This role surprisingly brought me up close to another dramatic moment. The event, it turned out, was predominantly organized for tech companies to showcase their philanthropy. Among the disabled participants invited, only a former CDPF Chairman, who uses a wheelchair, was invited to the stage to speak. Because of this, the organizer believed it was not necessary to have a permanent ramp to the stage. Two other volunteers and I were asked to install a temporary ramp and remove it after the Chairman's speech. Many of my friends from the disability community sat quietly in the audience, watching the tech companies and government leaders talk about them at them. The venue is shaped as a literal theater, forcing wheelchair users including the Chairman to sit outside the range of the fixed seats. Theater seats are often humiliating nightmares for wheelchair users, since "bodies stick out when they are out of place" (Ahmed 2012, 41). Among them was Meilin, a young disabled woman and experienced activist. In the afternoon, when most of the disabled participants have left in anger and disappointment, she and I were texting. "I posted something on my feed. I can't bear with it anymore." She wrote. I went on to check her Wechat feed, and saw her post:

There is an elephant in the room. We can choose to:

1. Ignore it

2. Let it be

3. Dismiss it

4. ?

……

I knew exactly what she meant. Just when I was about to comment on her post, my attention was grabbed by the three microphones laying on the table in front of me at the back stage. Those are the microphones that the two other volunteers and I are supposedly in charge of. My heart started racing before I even noticed.

I half-jokingly texted her: “Should I give you a microphone? [Chuckle][Chuckle]”

Within seconds, Meilin texted back: “Hahahahahahaha. Please do.”

Next thing I knew, Meilin had interrupted the host, holding the microphone I sneakily passed from the backstage, and started making a passionate speech to the audience, while sitting in her wheelchair in the jarringly awkward space between the audience and the ramp-less stage:

> Today we had an elephant in the room. I saw many speakers went on stage, including the Chairman, using the ramp. But the ramp is no longer there. This means, wheelchair users, disabled people like us, do not have the opportunity to join the conversation or go on the stage. […] I hope everyone can see real concrete people, and truly see, us.

This frustration, fury, and feeling of being gaslighted, persists throughout disabled people’s interactions with able-bodied professionals in China. Tired of waiting to be invited to the stage, disabled activists now must literally take back the microphone and the space that belongs to them.

The autonomy work by ENABLE and the disabled workers, is part of this emerging paradigm of disability advocacy in China — the rise of disabled experts, who are ready to

take matters to their own hands, to regain self-determination from non-disabled decision-makers, and to build freedom for the community. No longer willing to tolerate the deeply entrenched paternalism that denies their personhood, agency, and expertise, disabled people are now turning every opportunity into a small demonstration for autonomy.

Breaking Paths

ENABLE's data annotation program may have to end, one way or another. Even working with or as business is not a risk-free strategy. A few weeks before the International Women's Day in 2023, ENABLE was planning for a disabled women's leadership camp in Shanghai. One of the program items of the camp was to bring 20 women with disabilities to visit Shanghai Disney Resort on March 8 to experience its world-class accessibility features and to celebrate the Women's Day. Knowing that they had some funding shortage, I connected ENABLE with a contact at Disney, who happily agreed to offer them free tickets and front row spots for the evening fireworks show. It is a feel-good arrangement for everyone involved. A few days later, however, ENABLE was told by the authority in Shanghai to cancel the entire camp, including the visit to Disney. Worse yet, the cancelation scared away the camp's donor, who decided to pull out their funding. No one knows exactly what triggered the security apparatus. Is it the timing which coincides with the annual national Congress sessions? Is it the camp's perceived link with foreign funding? Is it the word "women," hence its association with feminism, an increasing political taboo? Or the idea that 20 disabled women having a good time in public may look like a protest? I remember holding a female staff member of ENABLE in my arms, who

was crying her heart out in total disbelief: “Our folks were so looking forward to Disney! Why??? What’s so sensitive about our disabled folks!”

In China, sudden closures of advocacy programs or even entire organizations are common. Often, people who have been involved in these programs find other ways to continue their work, sometimes in forms that seem unrecognizable from conventional advocacy. As Anna Tsing reminds us, “changing with circumstances is the stuff of survival” (Tsing 2021, 27). Precarity necessitates flexibility. Adaptability — for both the state and the society — is a feature of contemporary Chinese politics, not a bug (Heilmann and Perry 2011; S. Hsu, Tsai, and Chang 2021; O’Brien 2023).

What is important is to not confuse the form of advocacy — be it law, therapy, business, or technology — with its substance. Because the form is bound to change again. What matters is the alternative paths developed, the new relationships built, the different mindsets and skills cultivated, and the physical terrains traveled, in these processes of constant rerouting. These efforts may seem inconsequential at the surface, compared to mass protests or feverous revolutions, but they are the mundane, small-scale groundwork of everyday politics that are necessary for any changes to sustain.

Disability justice in particular has an undeniably material dimension. The failure to address the political economy of disability and class issues, as critiqued by many disability scholars studying the Global South (Erevelles 2016; Grech 2015; Meyers 2019; S. Huang 2020), has been a flaw of ENABLE’s earlier advocacy that they sought to correct. Building a quality life of the now for the community, is recognized as the cornerstone of dreaming transformative changes of the future. Decent work, independent living, and expanded

mobility are part of the “autonomous” good life they envisioned. They cannot begin to imagine a radical future without a livable now. They also cannot wait for a future reimagined but must build it now.

Once a new life is lived, alternatives are no longer imaginaries but realities. And reality changes mindset, powerfully. These material, behavioral changes have no doubt led to cognitive changes in the disabled community and others like me who are affected by ENABLE’s work. I have a hard time believing that we will all pretend that nothing has changed and go back to where we were just because AI companies have decided to automate their labor. My roommate Miaomiao will keep wanting to live by herself, Huifang will keep travelling to all the touristy sites, and Luna will keep listening to Podcasts and reading Foucault. They will make new demands for the society that draws its strengths not from abstract slogans but concrete experiences of living otherwise. They will continue to try to live a different life, in this life, in this society that has the lowest expectations possible for them. And when many people pass one way, a road will be made.

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