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5 WOMEN MAKING CULTURE: PROFILES OF PERSISTENCE IN COMPUTING

Kelly knew at the age of six that she wanted to be an engineer. She loved math and science, and this passion, along with the popular television show *Star Trek*, inspired her occupational aspirations. One day she told her neighbor that when she grew up, she wanted to be chief engineer on the starship *Enterprise*. The boy laughed at her. Twenty years later, their paths crossed again. Kelly recalled: "At 26, I had my doctorate in engineering, so when I met him again, it was my turn to laugh." Even at a young age, Kelly knew her mind and her emotions and remained undeterred by sexist derision of her career goals in technoscience.

Leith Mullings (1997) coined the term "transformative work" to refer to everyday work that women do to resist and transform constraints in their lives. Mullings developed this concept while doing fieldwork on Black women's reproductive strategies in the context of the politics of Central Harlem. This experience laid the groundwork for generating and sustaining broader social movements dedicated to justice. While often time-consuming, stressful, and exhausting, transformative work can be a source of satisfaction that comes from caring for community (Mullings 2005). Mullings's concept is a useful frame with which to valorize the labor (enacted both individually and collectively) required to negotiate and mediate social inequalities in computing organizations—labor that cares for and sustains marginalized communities under siege by interpersonal and institutional violence.

In this chapter, I blend Mullings's analytic frame of transformative work with Dorothy Smith's (1987, 1990) feminist approach to institutional

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ethnography to make sense of how women in computing persist and what their experiences can tell us about institutions ruled by the Bro Code. Smith pioneered "a method of inquiry that problematizes social relations at the local site of lived experience" (Walby and Anais 2015, 211). Women who navigate organizations ruled by managerial, organizational, and controlling processes that produce ideologies to legitimize domination become alienated from their own experiences (Smith 1987). These processes, as they are manifested in this study, are what I call the Bro Code. This chapter presents excerpts of stories from participants in this study who resist this alienation and persist in computing education and workforce. Three themes structure this chapter—emotions, sponsors, and strategies to persist—and each helps us to understand, respectively, the personal, interpersonal, and communal dimensions of the lives of technoscientists' who persist in computing despite intersectional constraints. I highlight participants' personal characteristics, aspirations, emotions, and support systems (both kin and professional) and the labor required to overcome cultural and interpersonal barriers to contribute to the computing profession and, by extension, US culture. The women in the present study dare to compete as equals of men in arenas where—as demonstrated in previous chapters—the Bro Code dominates. Their lived experiences can help inform the public on the inner workings of a highly secretive, powerful field and offer opportunities for collective organizing to contest the outsized power Big Tech wields in our world.

Of particular interest to me is to document what Smith (1990) calls "rupture," moments in women's lives where they feel the tension between their own consciousness and the reigning ideology and cultural norms of the Bro Code. As Hyejin Iris Chu (2011, 57) observes, "Women in engineering live on the boundary between two different worlds. One is the world of engineering ruled by men—invented by fathers and built along patriarchal rule, [while] the other is womanhood." Women transgressing this boundary must negotiate the dictates of two very different worlds. Stories gleaned from my research on these transgressors offer an interpretative framework through which we gain a broader understanding of how gender, race, class, and technology are constituted and how these factors interact to produce the Bro Code. Viewing the work that women do in computing as potentially transformative means more than just striving to desegregate computing and advance individuals' careers. It also requires unpacking critical elements in a technical career that limit or impede efforts to use one's talent

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in computing to advance social justice. Throughout this chapter, I want to celebrate the efforts and emotions of women who persist, despite formidable odds, and emphasize my participants' efforts to not only transform their own lives and workplaces but also to use their technical skills to transform our culture through social change.

In the chapter ahead, when I first introduce a research participant, I will provide their pseudonym, gender identity, race, career stage, subfield, and the type of institution they were navigating at the time they spoke with me. In subsequent references to these participants, I will note their pseudonyms, with their race and institution type in parentheses.

EMOTIONS AND CREATIVE COSTS

A significant majority of this study's participants expressed proficiency in math and science, and credited this talent for their participation in computing. For example, Julie, a cisgender, white early-career software developer in industry, said: "I got into engineering because I had strong math and science scores. I mean, consistently." Additionally, computer scientists and engineers can feel intense pleasure and exhilaration for their work (Hacker, Smith, and Turner 1990). When I asked Julie what she enjoyed most about programming, she became brightly animated: "I loved learning how to test and fix and try and find which switch is the one that's off—aha! It's cool." Participants particularly enjoyed analytical challenges. Alisha, a cisgender African American doctoral student, told me: "I enjoy the intricate nature of computers, the speed that you can do [work] with the computer, and now they're getting smaller and smaller, and you can do much more [than] you could do maybe five or ten years ago." Brandy, a cisgender Asian American doctoral student, said she liked combining logical and creative thinking in programming, and the problem-solving part especially motivated her career in computing research. Sylvia, a cisgender African American doctoral student, also discovered programming in college and described the experience in terms of love:

> When I went to university, I took a computer science class just to see how it would be. It was Intro to Visual Basic, and I was just in love with it, I loved programming, and we had to create our own program. I loved it, so then I just switched to computer science. . . . I just found it was so fun, and I fell in love with this creative thing that I did.

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Diane, cisgender and white and a senior leader in academia, also fell in love with programming in college: "When I got to college and learned how to program, I loved it. I knew I was in the right field, right away. Yeah, so that was nice. I love to program. I really enjoy it." Carol, a cisgender white senior software engineer in industry, called herself "a tools gal. . . . I got really lucky. I found this process that pays obscene amounts of money, one I find deeply satisfying." These narratives reflect participants' passion for what they do and challenge the Larry Summers Hypothesis (discussed in chapters 2 and 3), which denigrates women as incapable of excelling in mathematically oriented fields. The present research debunks this pernicious myth to show that mathematical acumen and passion for programming can motivate women's career aspirations and support their persistence in computing. Beyond protest of this cretinous dimension of the Bro Code, my attention to participants' emotions about their work highlights the parts of their job in which they feel engaged rather than estranged.

Though the Bro Code dictates that logic is superior to emotions, male technical workers also displayed passion in their work. During participant observation at a small civic-minded start-up, I observed a six-person team launch a new product. An authentication password was crashing the server. The team was in a flurry of activity. The team leader, an expressive, jovial fellow, opined: "[It's] Murphy's Law; right before a launch, something will go wrong!" As he returned furrow-browed to his computer, his colleague, Joe (cisgender white male), lit up and a satisfied grin crept across his face. I knew even before he announced it that he had fixed the problem. He was keenly emotive but shared his success casually, in an offhand manner. I learned later in an informal chat with his colleague, outside their workplace setting, that Joe is introverted and very stoic. I was lucky to witness Joe's emotions, the pleasure he derived from his programming skills, since he adheres to a Bro Code norm to hide emotions.

Tony, a cisgender white senior leader in industry, shared further insights into the emotions and pleasure derived from computing work, saying "some programmers are in love with the creativity of a creation. They think of themselves as makers, like, a maker of culture." It is understandable why computing professionals perceive themselves as makers of culture. People in the US live in a world mediated by their creations. High-tech laborers are culturally significant in the twenty-first century as bearers of technical knowledge and, as Tony stated, "makers of culture" (Oldenziel 1999). Tony

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then juxtaposed this love and pleasure with another dimension of the Bro Code: "There's a culture of workaholism. Culture of abrasiveness. Culture of, like, hierarchy, where people treat you like shit if they can—if they're higher than you. And I don't see why the work has to be that way." Combativeness and a culture of overwork are the price that workers in computing pay to do what they love and to reap financial reward. This conflict between one's intrinsic passion and talents and the culture of the Bro Code needs attention. It is these moments of contradiction that may signal rupture (Smith 1990) in a computing worker's consciousness, sparking recognition that the Bro Code denigrates creativity and the contributions of people with less power in a society stratified by race, class, gender, and sexuality. Perhaps then, this rupture might motivate women in computing to resist marginalization in this field, not (just) to assert their rights as women but to assert their right to pursue a career motivated by love and passion and to contribute to society as a maker of culture.

My data suggest that women who persist in computing are extremely driven to succeed. For example, Joe, a cisgender white undergraduate student, had this observation:

> Girls within the department tend to be at the top of the department. Like, if they're in there, they tend to be at the level of awesomeness. Yeah, and they're more involved with getting internships. They tend to take heavier class loads. They tend to focus more on their schoolwork. They're much more driven than men.

On the one hand, women's grit to succeed could be a way of finding a sense of belonging. On the other hand, within the context of the workaholic culture, the drive to exceed expectations in an already intense field could have negative consequences (e.g., poor health outcomes). Further, it could be a consequence of the internalization of what a number of senior women in this study, observed: "Women have to be twice as talented to be considered half as good."

BRAGGING

In previous chapters, we have explored some behaviors attendant to the Bro Code—namely, competitiveness, combativeness, hazing, and bullying. Janice, a cisgender white senior leader in academia, added another dimension to the Bro Code, which she calls "macho behavior":

> Macho behavior is the experience you have when you go into a class—it particularly happens in early computer science courses—[and] there are one or two

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> people in the class, almost always male, who have been working with computers since an early age. And they are just so excited to meet a computer scientist—a real one—that they can't stop talking about their skills. "Oh, I did this when I was 12."

Janice considers this macho behavior a form of bragging and one of the most significant barriers to women's persistence in computer science undergraduate education because it intimidates those who did not have the social resources to tinker with computers during childhood. It is one way that men from dominant groups in computing enact the *geek mystique* (a concept I explored in chapter 4), a performance of power and confidence predicated on cultural codes governing masculinity and computing technology. Becca, a cisgender, white PhD student, described how this type of behavior turned her off from computing. Of her undergraduate experience, she said:

> I love math. Computer science was to me, like, the most evil thing, and I never wanted to do it. What happened was there were a lot of people that were more technically inclined than me, I guess. I had the math background, but a lot of them had the computing background, and it was really daunting that other people were just kinda, like, whipping through these assignments. These guys would tell me: "You just do this . . ." and I'm like, "Huh? I've never heard the terms before." I just felt really left behind.

Becca's experience in introductory computing was intimidating. Her male peers, early adopters of computing, did not explain terms but, instead, acted as if the next steps for assignments were obvious. This lack of support signaled that she did not belong, which affected her emotionally and colored her perception of the computing field as "evil."

IMPOSTOR SYNDROME

Tara, a cisgender white academic, described her experience with this particular form of macho behavior, which was similar to Becca's:

> I took computer science [in high school] because I thought it might be interesting, and I hated it. And the reason that I hated it is because I thought that I wasn't any good at it. And the reason that I thought that I wasn't any good at it was because there was sort of a guy who was across the way from me, and I mean, he knew exactly what he was doing with the coding. You know, he could code it all instantly. And it took me a really long time, and I really felt bad at it. But, in fact, I was not [bad at it] because we took these exams—the class was affiliated with a local university, and we took their exams—and I was the only person in the class to get any sort of "A" on the exams, but I didn't feel like I knew what I was doing.

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Janice (white academic leader) had a name for the feelings Tara expressed—the impostor syndrome—which she described as "the feeling you have that everyone else but you thinks you're really successful. I suffer from this big time. And yet deep in your heart, you just don't think you're that successful, and you just feel like you're going through the motions . . . you feel like a failure." Janice stressed that the impostor syndrome can persist even when one is getting external validation of success, like Tara was when she found out she was the best in her high school class at college-level computer science exams.

In contrast, Theresa, a cisgender, white mid-career academic who identified as feminist, expressed a strong dislike of the impostor syndrome concept. Theresa felt the concept kept the focus on individual women's struggles and dangerously framed the Bro Code as an internal barrier to overcome rather than as a symptom of a cultural problem in computing. In other words, the impostor syndrome reflects a personal cost of navigating a hostile culture, an internalization of a culture that signals that women are less talented and less competent than male peers. Internalizing these Bro Code values means one can begin to feel as if they are true. "One day," Theresa remarked, "I will have the balls to do an anti-impostor syndrome workshop at Grace Hopper [Celebration of Women in Computing conference]." She felt the conference needed to foster more structural critiques of sexism rather than further burden women with the charge to fix themselves to assimilate into their technical classrooms and workplaces.

Theresa's critique of the impostor syndrome prompted me to examine who among my participants discussed this topic. In this study, only white women said they feared they were merely simulating the role of a competent computer scientist. Though several women of color were candid with me about the pain that white supremacist patriarchy caused for them, none mentioned or displayed the self-doubt characteristic of the impostor syndrome. White women who identified as feminists, like Theresa, also appeared to have robust skills for coping with hostility and the ability to analyze individual experiences within the context of structural constraints.

For example, Sylvia, a cisgender African American doctoral student, shared how she overcame her self-doubt as an undergraduate: "I had this one class that was really difficult, which made me think, 'Why did I commit to computer science?' But then I found that everyone was having the

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same problem with the class—then I didn't feel too crazy." Realizing she was not the only one struggling was a moment of consciousness-raising for Sylvia that inoculated her from discouragement. Diane, a white senior leader in academia, experienced a similar consciousness-raising moment. When she was unhappy in her first tenure-track job, her friend helped her to examine the situation and shift her criticism away from herself and onto her institutional environment. "It took me a while to figure out that it was the hostile environment, and it wasn't me or the job itself," Diane reflected. The danger of the braggart form of the Bro Code is it can isolate minoritized group members and foster self-doubt and isolation, which threatens women's persistence in the field.

Shawna, a transgender, white early-career academic, adds another layer to this aspect of the Bro Code. She described how some male professors in computing exacerbate feelings of isolation and incompetency in their women students:

SHAWNA: I had some official mentees; we had set up a first-year mentoring program, and my mentee was really having difficulties working with her adviser . . . and she was having some difficulties in some classes. There was one day, in particular, where I had five female grad students come by my office [to] talk about how they were the only one who had done really, really poorly in this class.

COLEEN: Oh, they all thought they were the only one, too.

SHAWNA: The instructor had pretty much taken care to suggest that it was only their problem; [he] did not mention that it was common. [By] the third one, I'm like going, "Wait a minute, you do know that there are other people in class who didn't do as well as you." They had no idea!

Note how Shawna framed the male instructor's role in this experience. He did not assure women that they were not the only ones struggling with the complexity of course material. Further, he went out of his way, Shawna believed, to make them feel alone in their struggle. I was not surprised when Shawna told me that this instructor was an adherent of the Larry Summers Hypothesis. Shawna thus designed her mentoring strategies around counteracting this pattern in the Bro Code to help her students build self-efficacy, which means having positive feelings toward the tasks you do, their value, and your ability to successfully complete them. It plays a significant role in women's persistence in engineering (Marra et al. 2009).

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Women of color in the present study often expressed high self-efficacy. For example, Olivia, a cisgender African American doctoral student who left her Big Tech job mid-career to pursue social computing, took great pride in her accomplishments and found overcoming barriers rewarding. When I asked her what other women can learn from her example, she declared: "Hey—I can do anything—kids should see that!" Regina, a cisgender Taiwanese doctoral student, stated: "I do want the image of computer geeks to be overthrown. This is why I like being [an athletic] performer. I'm like, 'Hey, I can kick your ass physically, and I can also sit in front of a Mac.'" White women expressed more self-doubt and lower self-efficacy as compared to women with other racial and ethnic group experiences. This could be due to my whiteness affecting what participants were willing to trust me with. It could also mean that white women, as compared to, say, Regina or Olivia, are more susceptible to stereotypes about proper gender roles because of particular enactments of patriarchal relations within white communities in the US. In contrast, participants of color in this study were highly adept at showcasing their ability to act as agents of their own destiny (Browner 2001; Maternowska 2006).

I was especially impressed with the self-assuredness expressed by Alisha (African American doctoral student) and her ability to self-advocate:

> Coming from my background . . . even to get into this program, [I knew] it wasn't easy. I knew I wanted to get into this program but I had to, you know, talk to the adviser [and] let him know, "Hey, I'm a hard worker. I can get in there and do the work." But my background is so much different from a lot of students that come here. Some of the classes they've taken I may have not taken. But, I got in and worked hard, and I did a very good job.

Alisha had to bridge gaps in academic preparedness and move from a predominantly African American community to a computer science and engineering program with only one other African American student. Then, she gave herself credit for navigating these circumstances with aplomb. When I pressed Alisha on what motivated her to overcome challenges such as successfully networking with her predominately white and Asian American peers, even when she felt out of place, she stated firmly: "You just have to." Later in our conversation, she recalled a period when her motivation to finish her dissertation research lagged; ultimately, what spurred her to continue on was "the accountability factor, because I have people counting on me." She persisted because she wanted to make her family proud and be

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a role model for younger folks in her community. This finding supports my prior research in which students who have overcome structural obstacles in the pursuit of educational achievements are motivated not only by individual personal gains but also by commitments to family and community members (Carrigan et al. 2019). This "accountability factor" signals that for those who have faced social disadvantage, persistence in computing is an investment in a collective identity and community.

SPONSORS: TALK BACK AND PASS IT ON

Women in this study relied on more than their internal resources to persist in computing. My data revealed a consistent pattern whereby the positive influence of others' support and encouragement was crucial to participants' success. All participants were sure to tell me about the people who have inspired them, supported their careers, and helped them navigate hidden rules, avoid pitfalls, improve skills (both technical and social), minimize stress, and advocate for advancement. These "sponsors" had a significant impact on my participants' aspirations, networks of access, and strategies for persistence. A sponsor differs from a mentor in that their support is highly visible, as they use their authority to actively advocate for those they sponsor. Sponsors take mentorship to another level: they not only give advice to their mentees, but they actively support them, go out of their way to help them avoid pitfalls, and invest in their mentees in a holistic sense. "Where a mentor might help you envision your next position, a sponsor will lever that position for you . . . a sponsor believes in you more than you believe in yourself" (Hewlett 2010, 5).

SAME-GENDER SPONSORS

Evidence suggests that women faculty in computer science and engineering have a positive impact on women's persistence in the training stages of computing careers (Diekman et al. 2010). My research supports these findings. For example, Whitney, a cisgender Latina graduate student, told me how she is inspired by women faculty in computing: "It feels really great to take classes with female professors. It makes me feel proud and I want to be as accomplished as them." Becca (white PhD student) spoke highly and frequently of her sponsor: "Both she and I label her as my academic mom. . . . She just basically opened all these doors for me. . . . She's

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a blessing, seriously." Alisha (African American doctoral student) described how her sponsor outlined a long-term career path for her:

> There is a very influential person from my career environment. She is the deputy director of the laboratory that I work in. My research center has seven labs. The lab that I worked in is the Information Technology Lab, and she was the one that kind of got me along this path, [saying] "Hey, you need to get your master's; you need to get your PhD," [and] putting me in different leadership development courses, leadership development programs. So, I give her a lot of credit for the place that I'm in right now.

Sylvia (African American PhD student) also described the importance of her sponsor in her career choices:

> Dr. Keller [name changed] was amazing because she is the one who got me into Minority Access in Research Careers. She would tell me I should apply to this program and I didn't—I just didn't—and so she called my dad and told him I would be amazing for the program. So, oh my gosh, I applied, I got in, and even now she still encourages me.

Carol (white senior leader in industry) described how her sponsor's support inspired her to do the same for other women:

> [My sponsor] was just completely awesome, and I was this young woman in her purview, and she scooped me up. Now, whenever there's a young woman in my field of vision, I scoop her up. It is just that culture matters, and if you care about culture, then it behooves you to pass it on. . . . I have my ideas of what culture should look like . . . probably more now that I'm more senior and definitely old enough, as the saying goes, to wear purple. I really don't give a rat's ass what you think. . . . I know what culture should feel like. I know how we could treat each other.

Carol invoked culture here and how women passing on the mentoring they received early in their career can help to transform computing culture currently ruled by the Bro Code. Carol's sponsor, a legend in the history of US computer technology, gave Carol concrete, practical advice about her male peers that not only released Carol from an ongoing burden but also gives us further insight into another aspect of the Bro Code:

> It's like, these guys, they're always talking about [how] they're working on this really important thing and this other guy's working on this seriously important thing. I asked my mentor, How do they know that this stuff is so important? She said, "*They're making it up*" [author's emphasis]. And it was so helpful; it's like this huge load off my shoulders. . . . It was such a boost of confidence [for] me . . . to know the stuff that you think is bullshit, you might be right.

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In chapters 1 and 4, I discussed at length this kind of mythification—an entrenched, speculative belief system that reproduces the chasm between what Big Tech leaders say they are contributing and their actual impact on society. Myth-making plays out both globally and locally. Examining it locally, in computing organizations and from the perspective of people who work from their margins, some men in tech cultivate a geek mystique by bragging about their prior experience with computers and speculating about how their technical outputs are of monumental import. In graduate school in the 1980s, Carol's male peers convinced her that their aspirations were true facts. Their triumphalism may have sprung from material, ideological, and cultural forces that undergird the power of Big Tech on a global scale. This aspirational, cocky form of the Bro Code mirrors the global PR campaigns of their billionaire bosses—men who look like them and whose divine mystique trickles down to these bros by virtue of their birthright. Carol's sponsor helped break the spell of the geek mystique early in her career, a critique that encouraged Carol's persistence and her transformative work in computing to help other women succeed, too.

Same-gender sponsors can also make crucial interventions that increase persistence in computing. Shawna (white early-career academic) described how a female full professor kept her from dropping out of her graduate program:

> [The toxic relationship] with my adviser just kept getting worse and worse . . . and eventually it led to a point where I was on the verge of a mental breakdown. . . . I had given up. Rebecca [name changed] came into my office one day and said, "I'll help you find a new adviser." Honestly, I am saying that moment was the whole reason why I stuck it out in grad school. I actually called her out with a special acknowledgment at the end of my defense, because I can honestly say I would not be here without her.

Shawna's sponsor, Rebecca, gave her options other than sticking it out with a male adviser who was causing her serious harm. Beyond providing individual support to Shawna, Rebecca also worked communally to spearhead organizational networks of support for graduate students in computer science and engineering:

SHAWNA: I will say that [my school has] improved the safety nets quite a bit, and that's all Rebecca's work.

COLEEN: Can you be more specific? What safety nets?

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SHAWNA: So, basically what Rebecca does is, you have a review of progress every year. Before no one really paid attention to it. Now, both our graduate adviser and Rebecca go through each of those reviews of progress and identify potential at-risk students.

COLEEN: Oh, wow!

SHAWNA: So then they reach out to those students; in particular, Rebecca reaches out.

Rebecca was performing care work in a solo capacity, a role not formalized as a department policy or procedure and yet one Shawna credits with her persistence in getting a doctorate in computing. Shawna valorized this labor performed outside the Bro Code, and we would be wise to consider at what cost to Rebecca this labor came. Same-gender sponsors are indeed critical to desegregating computing, but senior women should not shoulder this responsibility individually. They deserve institutional support, including resources, recognition, and recompense.

CROSS-GENDER SPONSORS

Given the low numbers of women in computing and especially in senior leadership positions, women graduate students often rely on men to advise their thesis and doctoral projects. Unlike Shawna's hostile adviser described above, some men excel at cross-gender sponsorship. For example, Wendy, a cisgender white leader in industry, spoke fondly of her male mentor:

> In my case, I had a male Engineering Fellow who was very supportive of women engineers and worked hard to make sure we had opportunities. He understood the importance of the technologies I worked on and asked challenging questions. I also had a woman VP who was quite skilled at working the system and sometimes felt pressured to give up her own technical career. She knew where the roadblocks were. Both listened well [and] offered great advice and a shoulder to lean on when things were not going too well.

Diane (white academic leader) also stressed the supportiveness of her male graduate adviser and connected his support to her persistence in computing, despite the high rate of attrition among her female peers:

> Well, I was lucky. I had a great adviser. He was incredibly supportive—I mean, there were women dropping out around me, and I don't think I had the awareness to really understand, as well as I do now, the dynamics of why. So it wasn't

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> good for everyone, is what I'm trying to say, and maybe I didn't appreciate how good I had it at the time.

After Olivia (African American PhD student) finished her master's in computing, she decided she "was done with school." After seven years of working in industry, however, she grew tired of working only to expand the corporation's bottom line. She returned to school to get her PhD in part because of the impact of one of her professors:

> Dr. Dave had great classes. He brought industry to classes; most of the other professors were dull. Dr. Dave made computing part of the real world and made me want to teach. He inspired me to become a professor.

Though men dominate the senior ranks of computing, glowing reports of their sponsorship of women were few in the present study. The stories I have shared tell us how impactful this essential skill of mentoring is to broadening participation in this influential field. Skill in mentoring and sponsoring early-career practitioners is not innate to people of certain genders and race/ethnicities; rather, it is a skill that should be encouraged and rewarded in senior practitioners. Unfortunately, it is not. This transformative care work is still, at present, valued and enacted outside the Bro Code.

ALLIES

Men in computing need to join efforts to desegregate the field and destabilize the imposed dominance of the Bro Code. The best way to foster support for diversity in STEM from dominant group members is to create, recognize, encourage, and recruit allies. An ally is someone who advocates for minoritized group members but does not share their social identity. Male allies are needed at all stages of computing careers—from peers in the educational stages through senior levels of leadership.

Men can be effective allies to women in computer science and engineering, especially men who are underrepresented in other identity aspects, have a female partner who works in computing, share equally in domestic responsibilities, or have a daughter (NCWIT 2013). Julie (white early-career software developer) gave me examples of this kind of support:

> With my current coworkers, they are a lot more socially adept [than past colleagues]—they're not hard-core academics; they've studied more, like, art and design, but they're kind of still dudes' dudes . . . they played sports, and they like to party a lot, but they're all married and have daughters, which is something

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> that's really cute. It is cute. And I think it makes men a little bit cooler to work with when they have a daughter and they're close to their wife. It makes a huge difference—or if they have sisters that they really like.

Joy and Kara, two cisgender Asian American undergraduate students, explained in a group interview what it is like to have male allies who "are cool to work with."

JOY: Just because I also have guys who are in my group, I feel like they're just—they're just gentlemen.

COLEEN: Okay. So, then, you feel respected?

JOY: I do. I mean, a couple of people, they're definitely a little more self-absorbed, and they don't like to interact as much with me. But, I mean, I want to say, like, maybe five out of the seven people in my group, they've treated me pretty well. Maybe I've just been lucky and I've been sort of just working with . . . stand-up guys, but I don't know. They're always just kind of, you know, like, "Oh, it's a woman. Let's be nice to her." It probably does help that I'm usually the one who knows what I'm doing, too.

And, for a similar perspective, there is this comment:

KARA: The only professor who I think kind of noticed females for a second was an ally, 'cause he sent out emails to a few of us [women] saying, "Hey, I just want to let you know, congratulations on doing really well in my class." And he's just sort of a sweet guy.

During my participant observation at a small civic-minded start-up, I observed Agnes, a cisgender, white early-career professional, interact with three male coworkers who displayed ally behavior:

AGNES: Thanks for holding my hand, Ken. I feel safe here with all you smart people. I learned two new shortcuts.

AARON: Now you are around other tech people all day. You'll learn lots of shortcuts instead of languishing in isolation!

TONY: Yea—and thanks for fixing my mistake, Agnes—you get an eagle-eye badge!

Rather than showing off, Aaron made a point of making Agnes feel a part of the team, and Tony credited her with helping him. These are two examples of ways that men can practice welcoming disenfranchised practitioners in high-tech.

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These narratives share a common theme: women in computing appreciate being welcomed, respected, and valued by their male peers. Males in computing leadership positions have the opportunity to make institutional contributions to inclusivity. For example, Jason, a male senior leader in industry who is cisgender and white, described his hiring policy at his start-up. With the goal of hiring more women, he requires hiring managers to interview women for engineering jobs even if "on paper" they do not appear as strong. He noted that evaluation of candidates privileges a small slice of technical skills to the devaluation of other skills needed for the job. In the interviews, the women often impressed the search committee and were hired. Jason's analysis of gender politics was nuanced and astute, especially his anecdotes about how some male computing professionals not only self-promote but also manufacture drama for attention and accolades. In my eyes, Jason cemented his status as an ally when he implicated his own behavior in his critique, demonstrating the self-reflection and humility required for men to become part of the solution to cracking the Bro Code.

KIN

Kin—in the sense of both one's first family and one's chosen family—also played a role in this study in women's interest and persistence in the computing field. Alisha (African American doctoral student) remarked: "My father has been a great influence in my life, and he told me a long time ago, if I could understand science and math that I could basically do or be whatever I wanted to do—whatever I wanted to be in life. So, I took that to heart." Olivia (African American doctoral student) was also inspired to become a computer engineer by a family member:

> My uncle is an electrical engineer, a genius, and he introduced me to a new side of things. He would explain things in two or three different ways [and] tell me another way to approach the problem until I got it. I admired that he could teach me all these different ways, and in school there was only one way explained and I felt lost. My uncle opened these doors for me . . . that was the engineer in him. I wanted to be like my uncle. I have friends that get stuck all the time, and I can teach them what my uncle taught me. He said: "Don't let anyone call you stupid." He often said: "We can do it."

Parents and close family members are not the only people who inspire women to invest in a computing career. In the course of this study, I found that male partners also encourage women to take up computing as a career

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and persist. In fact, every woman in this study who was in the mid-career or senior stage of her career and partnered with a man had an agreement in which her career took priority over his. Helen, a cisgender Asian American graduate adviser in academia, first clued me into the influence of partners on women in computing. She keeps in touch with women long after they leave the program. She talked about her students, both present and former, in terms of genealogy and likened them to her "grandchildren . . . a family tree." From her position in this lineage, she observed that the majority of straight women who persist in computing have steady male partners who support their careers.

Tara (white early-career academic) told me that her male partner suggested she take computing classes. She said: "He definitely helped me a lot, especially in the early classes." Carol (white senior software engineer in industry) also described the role a male partner played in her becoming interested in technology:

> It was the very early eighties, and there was a very big recession. I got laid off, and I tried so hard to find another job in that field and there was just nothing, nothing. And one day I was home doing nothing, and my boyfriend at the time who worked at Data Inc. [company changed] . . . he had a book, a manual that he had brought home on microcode. . . . I picked up his manual because I was bored and read it, and when I was done I tossed it over the side of the chair and said, "Well, that's trivial." And my boyfriend at the time said, "Are you serious?" And I said, "Well, yes." And he said, "Well, if that looks really easy to you, then you should consider doing this" because there were not a lot of people who had degrees in computer science at that time.

Thirty years later, Carol still credits her ex-partner with helping her find a lucrative job that she loves. When I asked Jessica, a cisgender Asian Canadian undergraduate student, if she had a mentor, she thought it about for a minute and said: "My partner is in tech also and helps me regularly . . . perhaps he would come closest as a mentor."

Janice (white senior leader) told me about being recruited for an executive position in academia and how her daughter Fiona and husband Phil supported not only her autonomy in decision-making but also her nonrational approach to this life-changing choice:

JANICE: I kept on trying to drop out of the search 'cause I really was not interested in moving. And [the search committee] kept on saying, "Just come to meet [us] 'cause we want to calibrate other candidates against you." And

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then, "Just come and do the on-campus interviews," et cetera. So, they make me the offer and I say, "I'm not coming if I have to make the decision quickly. . . ." And by this time, Phil, my husband, was probably more in favor of going than staying because he found the school we were at really quite arrogant. It really is quite arrogant. . . . So, we're having lunch in the airport. And my daughter Fiona says, "Mom, I know what you're going to decide." And I said, "So, tell me." She says, "No, I'm not willing to take that kind of responsibility for your life." I said, "Fine. Tell Dad I'm going to go off and find a ladies' room. But as soon as I make the decision, I want to be able to check with you [to find out] if you knew or not." So, anyway, she told him. And then the next day at 3:00 p.m. is the phone call when I have to make a decision. And I'm sitting looking out, you know, [at] a gray, drizzly day. I'm looking out at the water, and I'm painting. And, all of the sudden, literally, the clouds part, and a shaft of light hits the water, and it's a quarter to three. And I went over to Phil and I said, "Phil, could I choose to go to [the new university] just 'cause it's this magical thing that we're going to miss if we don't go . . . even if I don't have any rational reason to choose to go?" And he said, "Sure."

COLEEN: For magical reasons, he supported you?

JANICE: Yeah, . . . then I ask Phil what Fiona said I was gonna do. And he says, "Oh, she knew you were going to move. She's watched you for the last three weeks, and you were trying really hard to find a reason to go. But she knew you'd figure out some reason or other to go."

COLEEN: She knows you well.

JANICE: Yeah, she does.

Janice's "kinscript" is a testament to how women's intimate relationships influence their computing career trajectories. It is a positive example of the concept of "rupture" (Smith 1990), a moment in the technical woman's life when the tension between her own consciousness and the reigning ideology of rationality in computing are in conflict. Janice had reached an ascendant position of leadership in a field that values formal hyperrationality. With the support of her family, she made decisions using a more creative, nonrational process. Janice's story of her career path and decision-making process speaks to a yearning to follow one's heart that loved ones can best empathize with and support.

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LEAVING HOME

In order to advance their careers, other participants had to make difficult choices related to place. An important element of pursuing a computing career trajectory is the willingness to move away from home for a degree program or job opportunity. The theme of transitioning from one place to another frequently came up in my interviews. Race also emerged as an important factor in this theme. Participants from historically underrepresented racial/ethnic backgrounds described their transitions away from their homes and away from their kin with varying degrees of pain and discomfort. Alisha (African American doctoral student) described her experience moving away from home to attend an out-of-state school:

ALISHA: So, coming from the environment that I come from, I guess it's home, because I'm from Louisiana [state changed], so I already knew a lot of people in my work environment before I even got there, just on a personal level, just knowing them because I'm from Louisiana. And coming [to Pennsylvania and] not really knowing anyone, um, really, I'm the minority either way you look at it. The first time I came here, I . . . felt like an outsider. . . . As the semester progressed, and even in that second semester, I got more comfortable. I met more students, and the second time around, since I'm back this semester, it's like I've made a few friends and I feel more comfortable in this environment.

COLEEN: So why did you return to Louisiana?

ALISHA: I just really love home. . . . I like to travel, but I really love the South. So, when that opportunity came to return home, I jumped on it.

Sylvia (African American doctoral student) also noted the shock of homogeneity that greeted her at a predominately white institution:

SYLVIA: I went to Wisconsin [state changed] for school, and I'm African American. There's not [many] African Americans there. So, I went from seeing, you know, everyone like me, to like, aw! I'm just seeing everyone of [a] different culture!

COLEEN: That must have been a big shock, too!

SYLVIA: It was! At first you start feeling self-conscious about yourself, wondering "Huh? Everyone else looks the same way." Everyone started looking the same way, and I was just self-conscious, like, there's something wrong with me. I think time helped me work through that.

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Olivia (African American doctoral student) also took some time to acclimate to her new community:

> After graduation, I decided to go into industry. I was a little burned out on academia. [My company] was awesome. I moved to Seattle from the South. [Seattle is] a predominately white area—at first, it was tough to socialize outside work. But I started to get close to people.

These stories of transitioning from one's community to a solo member of one's race and ethnicity in predominately white communities testify to the price of pursuing a computing career as a woman of color (Malcom 1976). When considering the social impact of computer technology, the disciplinary norm requiring practitioners to move does not allow women, and particularly women of color, to practice their skills in their chosen communities. Furthermore, there is additional evidence of rites of passage operating within computing. Rites of passage, a phenomenon discussed at length in chapter 4, are formal practices that codify core values in a high-tech culture to ensure the reproduction of the underlying belief system foundational to the Bro Code. In the case of leaving home as a rite of passage in the field of computing, it divorces workers from their communities and social fabrics more generally while privileging the global, the virtual, and the ideals of the hypermobile ruling class.

STRATEGIES FOR PERSISTENCE

In the sections above, I reported the personal characteristics and interpersonal relationships that are crucial to women participants' successes and advancements in computing. In this section, I share persistence strategies that women learned "on the job," not because they are foolproof or even desirable courses of action, but because they can shed light on the social dynamics in computing cultures that marginalized workers must navigate to persist.

THICK SKIN AND DARK HAIR

Once, at conference in Silicon Valley hosted by a Big Tech corporation, Kate, a cisgender, white early-career academic, told me over lunch that she had a student who asked how to handle sexism in labs. Because I am a social scientist who studies this form of injustice, she asked for my advice.

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The following field note demonstrates the conflict that I felt about my exchange with Kate:

> Kate asked me, "What do I tell her? It doesn't get better and to complain is dangerous." I told her to legally document every incident of sexism, no matter how subtle, by sending an email to yourself. I said, "Don't be afraid to get litigious; documentation over time is the best offense." However, later that night at dinner with Linda, a senior academic woman, I asked what her advice to this assistant professor would have been. She said the only way to persist in academic computer science and engineering is to toughen your skin and learn productive ways to vent.

In considering my field note, it is important to reiterate that I did not persist in Big Tech, whereas Linda has persisted in the field for over 30 years. Getting litigious on one's own, like I did, may not be the best strategy for someone who wants to remain in the field for the long term, because it will likely make one a target of retaliation, which affects one's ability to remain in the high-tech labor force. Kate's observation—"to complain is dangerous"—is chilling. Those who are targets of violence are then ostracized. For example, in my experience, protesting sexism hurt my career, and I gained a reputation for being "oversensitive," an agitator and not a team player. Timnit Gebru, an Black woman senior leader in industry, was fired from Google for several reasons, one being her critique of Google's diversity and inclusion practices. Gebru said: "Your life starts getting worse when you start advocating for underrepresented people" (Metz 2021). Emi Nietfeld, a former Google employee who is white, reported the sexual harassment she experienced at the company and was then targeted by exclusionary practices, even by coworkers she cared for and trusted (Nietfeld 2021).

After our dinner conversation, I wondered what Linda meant by "vent." I thought of group interviews where women discussed sexual and gender harassment and bias with levity and even humor. I remembered Diane's smile when she discussed her female colleagues who helped her get through graduate school. I thought about the impressive extracurricular activities in which many of my participants engaged—poetry, race car driving, acrobatics, marathon running, sculpture, and volunteering with underserved children. These could be framed as creative ways to "vent" and thereby relieve the strains of working in an intense field dominated by the Bro Code. These are all examples of both collective and individual forms of venting that women practice to persist as disenfranchised members of computing.

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Elena, a cisgender, white senior academic, agreed that there is a certain amount of tolerance required in persisting. She said:

> In addition to the knowledge and skills required by their profession, I think that women in technical fields should have a bit of thick skin, to not be impacted by how different they may look in meetings, to ignore comments, sometimes intentional and sometimes accidental, about their not belonging, and to gently interrupt to take their turn in discussions.

Elena's "turn the other cheek" advice worried me at first because it encourages passivity in the face of violence. However, I concede that women on the front lines of desegregating computing must employ a range of strategies to order to persist. Many women in the educational phase of a computing career have taken this advice to heart. Corrine, a cisgender, white early-career professional, identifies as "a social person" and was one of three women in her undergraduate computing classes of 60 students. Early in her undergraduate career, she dyed her blonde hair black and continues to do so five years later: "Being known as both talkative *and* blonde isn't what I need." Joy (Asian American undergraduate) also drove home the importance of having a "tough skin," and she connected to the concept to hair color:

JOY: I guess if you're going into any of the STEM majors, you kind of have to have a tough skin.

COLEEN: Yeah. And how do you develop tough skin?

JOY: Kind of have to be manly, if you will. I don't want to say "manly." I feel like we're just adopting—male characteristics.

COLEEN: Which are?

JOY: Not like the—not stereotypical, like, girly-girl stuff. Limit the blonde moments.

By dyeing her blonde hair black, Corrine appears to be hewing closely to this Bro Code dictate. Blonde hair within the cultural domain of US society can denote sexual availability and a lack of intelligence (Urla and Swedlund 1995), both of which can be dangerous to marginalized community members struggling to prove their competence. Persistence may require, at times, acquiescing to the Bro Code, tolerating the hostility of peers and bosses, and navigating stereotypes about women.

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BREAKING THE RULES

Conforming is not always the best strategy of persistence, though. Sometimes breaking the rules worked too. Sylvia (African American doctoral student) explains:

SYLVIA: You can do other things besides what they teach you. Like, for me, even though as an undergrad we would go in the classroom and [the professors would] be like, "Okay, create this project," and then they would give you this really boring thing, but what you can do [is] go to the professor and be like, "Can I do something else?"

COLEEN: Oh, good for you! And what did they say? What was their reaction?

SYLVIA: They used to always be like, "Sure, you can do whatever project you want."

Janice (white senior leader in academia) described how she and her colleagues were able to significantly increase the number of women in her department:

JANICE: We changed the intro course to [computer science], both in terms [of] the way it was taught and how the material was framed. The contents of the material provided more choice. So, for instance, we knew that women liked to have a sense of control over what they were doing. Actually, men do, too. And so instead of getting only one homework assignment, you can pick either of two problems to work on. Of course, they have exactly the same content in them. But one of them is a biology problem and one of them is a robot [problem], for example.

COLEEN: Oh, I see. So, they can choose the context, and the content remains the same?

JANICE: Exactly.

COLEEN: And it's the same problem-solving.

JANICE: Yes.

Like Sylvia, Janice demonstrates that when women are given more choice and agency in regard to the problems they solve, they are more likely to persist in computing. This suggests that the content of the problem being solved matters to women in computing.

Independence of mind also benefited Tara (white early-career academic) in persisting in computing:

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TARA: The reason that I did not drop out is because I realized early on that one of the really important things in my graduate career was that you can't expect your supervisor to be everything. . . . You need to figure out where you are going to get various [networks of support] from. . . . I spent a lot of time figuring out what I wanted to do and where that diverged from what my adviser wanted me to do—what I should do anyway.

COLEEN: So, sometimes you pursued your own path against the advice of your adviser?

TARA: Yeah. . . . My adviser at one point literally said that he thought that getting a PhD should be one student sitting alone in a cubicle doing their work, and I firmly rejected that notion.

COLEEN: Oh, geez, that is the stereotype of the lone geek.

TARA: Right. So, you know, I said no, and I went out and I found support there. I rallied the other students, and we went out and had breakfast every other week at IHOP because that's how it worked out for us.

Tara rejected not only her adviser's advice but also a dimension of the Bro Code—the "lone genius" myth of scientific knowledge production—which, I suspect, is her adviser's idea of the best way to earn a PhD in computing and a relic from the Enlightenment era, long left behind in post–World War II scientific industry in the US. Tara broke this lone genius stereotype haunting the Bro Code by taking a collective, cooperative approach to her education, which proved critical to her persistence.

PUTTING OUR MINDS TOGETHER: COLLECTIVE ORGANIZING

The power of women's collective organizing was evident in my data. For example, there was great levity in my group interviews with women computer science and engineering undergraduates; struggle was shared and received with humor and, in these interviews, women expressed a confidence born of belonging. Diane (white senior academic) moved to the US from Europe for a graduate program in computing with four other women from her undergraduate program. They all lived together, studied together, persisted together, and graduated together in five years. Diane's self-efficacy was especially high when she talked about her and her cohorts' skills and successes: "We just felt like we were in charge of the rest of the class!" Much like the transformative work performed by the women in Mullings's (1997)

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study of reproductive labor in Harlem, women in the training, early, and mid stages of a computing career depend on their female cohorts to survive the Bro Code. Beatriz, a cisgender and Latina early-career academic, suggested that computing organizations provide funding to bring women together:

> There should be more money for mentoring—women mentoring other women. I'll tell you, [it can be] something simple. One thing that made a difference, even at Carnegie Mellon [university name changed], . . . was funding for lunch for female graduate students once a week. That made the difference, because we had to eat. And if there's a place where it's just women . . . where there's no men, you know, and you can just gripe and support each other, it turns out we all had the same problems.

These lunches not only provided "productive ways to vent," to use the words of Linda, the senior academic quoted above, but also facilitated moments of consciousness-raising that Sylvia, the graduate student quoted above, had when she realized others were struggling in her classes, too. Breaking with the loner expectations of the Bro Code and communing with other disenfranchised members of computing inoculated people in this study from resignation and attrition. Beatriz deftly framed these opportunities as institutional responsibilities that require monetary investment.

Until computing leaders institutionalize structures of support for historically disenfranchised members, women continue to find and create ad hoc solutions. For example, Anita Borg, a pioneer in computing, started a women's group in the women's bathroom at a conference on operating systems in 1987 in order to gather scattered, isolated women into a community with a collective identity (Abbate 2012). Cynthia, a cisgender white undergraduate, joined a sorority for women in engineering majors because she was the only one of her existing friends who was "science-minded" and felt welcomed by other science-minded women:

> What's great about the engineering sorority is you have that camaraderie where you meet once a week, and you just need to, like, bitch about some teacher or some class. . . . Everyone else knows what you went through; they all were, like, "Yeah, I totally understand. You know, it sucks now, but just wait a little bit, you're going to be fine." They'll give you hints, teachers to avoid, or hints on homework—they'll give you homework help. If you're struggling, we have what we call a scholarship chair—you go to her and [say], "Hey, I'm in this class. I am sucking at it right now. Is there anyone who can help me?" And then she goes and talks to people who took that class, or who are in the class right now. They're like, "Hey, so-and-so's struggling. Do you think you can like help her out?" And

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> we set up study sessions. And we have an old scholarship binder where whenever we feel like donating, we just donate our old homework or practice exams for future generations to go through and be able to benefit.

I asked Cynthia whether her woman-centered network of support functioned much like the "old boys' club" in terms of succession planning:

COLEEN: There's a legacy that you're putting in place for succession, for more women engineers to come behind you.

CYNTHIA: Yeah.

COLEEN: So, do you think that helps other women persist as well in engineering?

CYNTHIA: I think it really does. Kind of just knowing that you have a group of girls that you'll go have fun with. We try to take classes together. A lot of our newer pledge classes have been . . . bigger groups. . . . I was with a group of three. [Now] we've had up to, like, 11 girls in one pledge class recently. They become really, really close with each other, and really good friends, and so they all plan their schedules around each other. . . . They just all *put their minds together*. And it just fosters this more *collaborative* thinking, where everyone gets to the right answer faster, rather than all of them separately struggling.. [author's emphasis]

I stress the last part of Cynthia's comment to bring attention to the cognitive effects of women cooperating in computing, which augment the social support these women-centered collaborations provide. These values were also the impetus for the formation of the Latinas in Computing group, formed in 2006 at the Grace Hopper Celebration hosted by the Anita Borg Institute. African American women in computing also see the benefit of organizing together in the fight against the Bro Code. A program aimed at understanding the intersectional experiences of Black women in computing, sponsored by the National Science Foundation, found that "collectively creating an action plan for and by black women in computing . . . was beneficial for organizing a movement around black women in computing to fight against not being seen or heard" (Burge, Thomas, and Yamaguchi 2017). Women of color in computing have to contend not only with the misogynistic dimensions of the Bro Code but also the white supremacy and white privilege encoded into the field's culture. Fostering ways to collectively organize around race and racism—both in the computing discipline as a whole and in individual worksites—is critical to subverting the

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Bro Code and the hegemony of white masculinity in the practice, production, and application of computer technology. These forms of organizing not only allow opportunities to vent and compare notes on the experiences of being marginalized in the tech workplace and foment consciousness-raising, they also help facilitate moments of respite from the imposition of the Bro Code. For example, early in her career, Carol (white senior leader in industry) took part in a group for women in systems, hardware, and design engineering fields. She credits this group mentorship with her career persistence because she had "a place where I was me—where I didn't have to be anyone else. I was with my homies, and this had a profound effect on my life."

CONCLUSION

In this chapter, we have examined—at individual, interpersonal, and institutional levels—women's lived experiences persisting as computer scientists and engineers. Despite facing barriers to inclusion, like their male colleagues' cocky assurance about their technical prowess and lack of institutionalized support to combat racialized sexism in the field, participants in this study persisted in their careers through the strength of their own passion and grit and through networks of mutual aid from other women, male kin and allies, and importantly, their sponsors. Their experiences can help elucidate what changes might transform the practices, demographics, and applications of computer technology. In chapter 6, I reflect on these experiences to suggest further actions that may nurture such transformative changes.

The majority of participants in the present study expressed aspirations to contribute to society—they want to leave the world a better place. I found a strong correlation between participants' social justice aspirations, their persistence in computing, and their personal commitments to supporting other women. However, technical fields have historically devalued and even denigrated social and humanistic knowledge and continue to do so today (Riley 2014). Further, they also thwart the social aspirations of practitioners in the field (Cech 2014; Litchfield and Javernochf-Will 2015), all while waging a relentless public relations campaign extolling the social revolutionary effects of computers (Carrigan, Green, and Rahman-Davies 2021; Dean 2002). This contrast between the exaltation of computing's social contributions and its actual outcomes is why there is a clash between my

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participants' yearning to use their computing skills for social good and the prevailing cultural values within the field. The resulting rupture that some technical women experienced offers the opportunity to amplify existing efforts to organize against the threats Big Tech pose to the world. Not only do the participants in the present study have insider knowledge about the cybernetic infrastructure that undergirds the global economy, they know all too intimately the harms and injustice perpetuated by the Bro Code.

To make sense of my participants' persistence and ruptures, I framed them in terms of transformative work—Leith Mullings's concept of the everyday work done to resist oppression that can be the impetus for larger social movements. The transformative work that some cisgender and transgender women and nonbinary people do every day in order to persist in computing can serve as a blueprint for cracking the Bro Code. When people who are far outnumbered in their organizations find ways to connect with one another, this communion can interrupt not only the process of internalizing one's toxic environment but also the myth-making power of technocracy. Computing workers who navigate their marginalized positions in their field by pursuing their aspiration for social justice "open up the possibility of common ground where differences [of class, race, and gender] might meet and engage one another" (hooks 1990, 13). Capitalizing on the shared yearning of some computing workers to contribute to the communal good may be a way to bridge computing's much-touted benevolentness and its actual outputs and impacts.

To do so will require further efforts at organizing and building coalitions. The informal and formal networks of support documented in this chapter occurred in academic sites and professional societies. Tech workers are also organizing. For example, in 2018, more than 20,000 Google employees across the globe staged a walkout against sexual harassment and systemic racism in the company (Wakabayashi et al. 2018; D'Ignazio and Klein 2020). Organizing against militarization, racism, and sexism in academic and professional societies has been increasing, and, as I discuss in chapter 6, further coalition-building with labor activism in Big Tech may prove beneficial.

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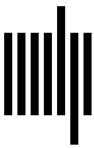

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