

Vulnerability and Transformation: The Impact of Student Experiences of Vulnerability on the Development of Capabilities in Higher Education

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Abstract: In higher education, our students experience a wide range of vulnerabilities, which we define as a lack of physical, social, and emotional security. Vulnerabilities are unevenly distributed and stratified by race, gender, and socioeconomic status. What is the role of vulnerability in facilitating the development and expansion of capabilities, a core mission of higher education in many Western nations? On the one hand, a lack of resources can substantially undermine students' abilities to learn and integrate new knowledge. On the other hand, vulnerability has been theorized as a catalyst for transformation, a condition of suffering and fragility that engenders change. Operational definitions of vulnerability in higher education need to acknowledge its dual-sided nature and potential to help and harm student growth. In this paper we ask what kinds of vulnerability facilitate and inhibit students' development of capabilities?

To guide our thinking, we analyze the life history interviews of three engineering students attending a liberal arts college in the Northeastern United States: one American student of above-average academic performance (representing the normative case), one immigrant student of color of above-average academic performance, and one immigrant student of color of below-average academic performance. Utilizing qualitative structured coding methods, we coded each interview using Walker's (2006) capabilities list for higher education contexts. We also inductively coded instances of vulnerability that arose during the interviews, which often overlapped with one or more of Walker's capabilities, and noted their proximity to other capabilities at that time in their lives. Coding was performed by three members of the research team using consensus coding techniques to reduce individual biases.

We suggest that vulnerability acts as a conversion factor, which both enables and inhibits capability development. Vulnerability is often the product of structural factors, which distribute vulnerability unequally by gender, race, social class, and country of origin. However, the valence of vulnerability is mediated by individual agency, through which individuals may experience transformation through reframing vulnerability as personal triumph over adversity. We argue that the capabilities approach offers a better balance between structure and agency than two competing models, shame resilience theory and psychological safety. This study contributes to new ways of conceptualizing and measuring vulnerability and human development at the micro-level in universities. Higher education systems are central to citizens' capability development, and understanding student vulnerabilities helps such systems respond to rapid societal changes.

Introduction

"How far is human good living, *eudaimonia*, vulnerable? What external events can disrupt or distract it, and how (and how far) should it attempt to make itself safe?" (Nussbaum 2001, 318).

The capabilities approach, as a social justice framework, takes as its central aim the achievement of equitable opportunities for all persons globally. The work of social justice, broadly speaking, often entails the removal of structural barriers and improving security for marginalized populations. Put another way, social justice seeks to reduce vulnerabilities, or alternatively, to more equitably distribute vulnerabilities across a society. While, practically, the removal of vulnerability may not be possible, in some cases it may not even be desirable. The transformative power of vulnerability has been noted in many academic fields, from philosophy (Nussbaum 2001) to social work (B. Brown 2006) to organizational behavior (Edmondson 1999). Vulnerability may be particularly important in higher education, wherein students are asked to challenge what they have been taught and think creatively about the world they will remake in the future.

In this paper, we interrogate the role of vulnerability in the development of capabilities in higher education. We analyze the life history interviews of three students enrolled in an engineering department in the United States to better understand what kinds of vulnerability students experience in college and how it changes their trajectories. We theorize vulnerability as a conversion factor in the development of

capabilities with dual impacts - either constraining or facilitating student growth. Is it possible to determine when vulnerability will result in positive or negative outcomes? Although vulnerability is often created through structural factors, individual agency also plays a role in one's response to adversity. We argue that the capabilities approach better articulates the relationship between structure and agency, enabling us to simultaneously acknowledge the unjust causes of vulnerability, while also accounting for individual human resilience.

Literature Review

The work of social justice is, broadly conceived, a project to improve the quality of life for all persons, and to more equitably distribute securities (rights) and privileges amongst the global population. However, the removal of precarity entirely may not be possible, or even desirable. Philosopher Judith Butler (2004) has argued that precarity is an inescapable condition of life, forged by virtue of our interdependencies upon one another, for security, shelter, and sustenance. Following Hannah Arendt's critique of liberal individualism and rational choice arguments, Butler insists that these ethical obligations are often *not* deliberately chosen, but are pre-given dependencies upon strangers, political and economic institutions, and even geopolitical adversaries. She writes, "Since we do not choose with whom to cohabit the earth, we have to honor those obligations to preserve the lives of those we may not love, those we may never love, do not know, and did not choose" (Butler 2004, 150). These co-dependencies produce vulnerabilities, which are unavoidable, but negative consequences tend to be particularly concentrated amongst marginalized populations - immigrants, refugees, and religious or racial minorities.

Although our instinct may be to reduce or eliminate these dependencies, a life without vulnerability may not be a "good life", after all. Martha Nussbaum (2001) has argued that a "good life" must include some degree of vulnerability. She writes, "[Human excellence is] something whose very nature is to be in need, a growing thing in the world that could not be made invulnerable and keep its own peculiar fineness" (Nussbaum 2001, 2). Indeed, the risk generated under conditions of precarity increases the value of resources and relationships that are limited. Vulnerability, she argues, determines what we find valuable - it is valuable *because* there is risk.

One of the most vocal champions of vulnerability as a technique for transformation is Brene Brown (B. Brown 2006; 2012a), who defined the field of "shame resilience theory" (SRT). SRT theorizes shame as a psycho-socio-cultural phenomenon that results from an individual's internalization of their failure to meet rigid socio-cultural expectations (B. Brown 2006, 46). Shame resilience requires high levels of facility with four capabilities: a) acknowledging personal vulnerability, b) critical awareness of the conditions that create vulnerability, c) reaching out to others for support, and d) speaking shame (B. Brown 2006, 47). SRT is typically used by psychologists and counselors treating survivors of extreme vulnerability: domestic abuse, homelessness, addiction, and eating disorders (Burke and Brown 2021; Sanderson 2015; Dayal, Weaver, and Domene 2015; Ryan-DeDominicis 2020). It has been applied in a limited way in education (Juzwik and Antonucci 2020; Culp and Jones 2020; Bynum et al. 2020). In her more recent work, Brown has broadened the target audience, acknowledging that vulnerability is a human experience shared by everyone (B. Brown 2012a). In popular interpretations of Brown's work, the acknowledgement of personal vulnerability has taken center stage, playing down the socio-cultural elements in favor of individual actions. In her TED Talks (B. Brown 2010; 2012b) she highlights the importance of an

intrinsic sense of worthiness: “There was only one variable that separated the people who have a strong sense of love and belonging and those that struggle for it...The one thing that keeps us out of connection is our fear that we’re not worthy of connection.” (B. Brown 2010, 06:40-07:30) She goes on to explain how leaning into the experience of vulnerability is the avenue to personal growth. In this popularized version of SRT, individual agency is granted full explanatory power, while less attention is paid to altering, or even acknowledging, the social structures that destabilize and undermine conditions of safety and security.

While it may be true that everyone experiences vulnerability in some form, we must certainly grapple with the *uneven distribution* of vulnerabilities in the world. Scholars of global inequalities often seek to identify structural barriers, which produce inequalities in the concentration and duration of vulnerability. These themes appear in numerous social theories, but I will point here to scholarship on precarity, popularized by Guy Standing (2011), which is principally concerned with shoring up security for marginalized groups such as immigrants, refugees, and the underemployed. Standing argues that neoliberal flexibilization has resulted in the collapse of protections once afforded to citizens and workers, leaving them vulnerable to the state and to capitalist exploitation. Lack of citizenship, job security, adequate wages, and political representation are themes that also resonate with Amartya Sen’s (1999) original conception of the capabilities approach, each of which contributes to a lack of freedom and inadequate “real opportunities” to live a meaningful life. Despite precarity scholars’ emphasis on improving security, many do acknowledge the positive affordances of precarious vulnerability, including the potential for a unified multi-racial, multi-class, international platform for political mobilization (Standing 2011; Armano, Bove, and Murgia 2017; Diminescu 2008).

Understanding the dual-sided nature of vulnerability is of particular importance in educational contexts for two reasons. First, education has been noted as a capability that positively influences other capabilities and contributes to an individual’s ability to live a life of value (Sen 1999, 294). A better educated populace is more able to engage in meaningful political participation, increasing their influence over the institutions that shape their lives. Furthermore, education is a well-established tool for economic mobility, opening pathways out of poverty and exploitative labor conditions. Higher education, furthermore, prepares students to occupy privileged positions in which they are directly involved in the creation and management of societal institutions, potentially reshaping them into more just forms. If vulnerability is indeed a conversion factor, its impact during the critical years of higher education may have tremendous implications for more equitable human development.

Secondly, the process of learning demands some degree of vulnerability amongst students. Learning a new subject is a humbling process, one that asks learners to admit their own limited knowledge, seek help from professors and peers, and understand their own learning process. Educational concepts such as Vygotsky’s Zone of Proximal Development (1978) hypothesize there are areas along the vulnerability (challenge) spectrum that are more conducive to learning. By asking students to study socially with more advanced learners, they learn faster. In higher education, students are pushed beyond memorization and recitation to think critically for themselves, a process that requires them to engage in the difficult task of challenging their own prior beliefs. For this reason, Melanie Walker (2006) included “Educational Resilience” as a capability that is critical in higher education contexts. Educational resilience is defined as: “The ability to navigate study, work and life. Able to negotiate risk, to persevere academically, to be

responsive to educational opportunities and adaptive to constraints. Self-reliant. Having aspirations and hopes for a good future” (Walker 2006, 128). Implicit in this capability is the understanding that learning involves pushing beyond the boundaries of comfort and will inevitably include setbacks and failures along the way. Indeed, learning from failure is an important pedagogical technique which some scholars fear is falling out of favor amidst popular trends that promote more scaffolded experiences (Darabi, Arrington, and Sayilir 2018; Lamnina and Chase 2021). Resilience also aligns with Dweck’s “growth mindset” (Dweck 2006) and the notion of “grit” popularized in education (Christopoulou et al. 2018).

Perhaps for this reason, there is an emerging push for “psychological safety” in learning environments (Higgins et al. 2012; Cauwelier, Ribière, and Bennet 2016; Martin 2020; Sidani and Reese 2020; You 2021; Spomer 2022). The term was originally coined by psychologist Amy Edmondson after extensive fieldwork examining team-based learning in manufacturing industries (Edmondson 1999). Edmondson observed that learning behaviors such as admitting errors, asking for help, or seeking feedback were risky in corporate environments since they may lead to looking foolish, social ostracization, or negative performance reviews. Recognizing the value of overcoming these vulnerabilities, she argued that it was necessary to ensure that teams were “safe for interpersonal risk taking” (Edmondson 1999, 354). The concept of psychological safety is particularly valuable in creative occupations, in which brainstorming and out-of-the-box thinking has explicit value (Mills and Watson 2021; Gallo 2023).

Psychological safety has also been used to improve the inclusion of marginalized team members, emphasizing the importance of creating an atmosphere wherein members of the social minority feel comfortable contributing their skills and ideas (Ostapenko, Ostapenko, and Shcherbakova 2021; Woodson 2020). This is of particular importance in engineering education in the United States, which is predominantly white and male, and has struggled (unsuccessfully) for decades to achieve parity for women and racial minorities. Engineering studies scholars have noted the persistence of heteronormative masculine identities and cultures (Faulkner 2009; Tonso 1998), which may include bluntness, confrontation, competitiveness, and “ritualistic displays of hands-on technical expertise” (McIlwee and Robinson 1992, 139). In disciplines wherein work is the site of “masculinity contests” (Berdahl et al. 2018), acknowledgment of vulnerability becomes exceptionally risky.

In contrast to shame resilience theory, the concept of psychological safety places greater emphasis on structural and cultural factors. Edmondson insists that psychological safety is established by groups, not individuals. It is incumbent upon teams to reduce the risks associated with interpersonal vulnerabilities. However, Edmondson admits this is “more magic than science” (Gallo 2023), since what works for some teams may not work for others. Some have argued that the concept of psychological safety is culturally malleable; definitions and norms must be adapted in cross-cultural contexts (Cauwelier, Ribière, and Bennet 2016). In addition, the theory of psychological safety is not as responsive to individual agency. Individuals experience feelings of vulnerability and safety differently; two individuals may experience the same conditions of vulnerability and respond in different ways, resulting in different outcomes.

The study of vulnerability across several academic fields indeed points to a “Goldilocks problem”, wherein it is necessary to achieve the “just right” balance of vulnerability and security to ensure student success. Too much vulnerability may result in dropping out or dissociation. Too little, and students may not experience the transformative change that education promises. It is also clear from this literature

review that vulnerability encompasses a wide range of conditions, from structural barriers, to social relationships, to individual emotions. It is, therefore, important to clarify what kinds of vulnerability are experienced by students in order to understand their impacts. We suggest that the capabilities approach - with its holistic lens and its simultaneous emphasis on both structure and agency - may provide insights into how to strike an optimum balance.

In this paper, we consider three case studies taken from life history interviews with college seniors. We draw upon Walker's capability list for higher education (Walker 2006), which defines eight capabilities necessary for success in higher education.¹ These capabilities are as follows:

- *Practical Reason*: Being able to make well-reasoned, informed, critical, independent, intellectually acute, socially responsible, and reflective choices. Being able to construct a personal life project in an uncertain world. Having good judgment.
- *Educational Resilience*: Able to navigate study, work and life. Able to negotiate risk, to persevere academically, to be responsive to educational opportunities and adaptive to constraints. Self-reliant. Having aspirations and hopes for a good future.
- *Knowledge & Imagination*: Being able to gain knowledge of a chosen subject—disciplinary and/or professional—its form of academic inquiry and standards. Being able to use critical thinking and imagination to comprehend the perspectives of multiple others and to form impartial judgements. Being able to debate complex issues. Being able to acquire knowledge for pleasure and personal development, for career and economic opportunities, for political, cultural and social action and participation in the world. Awareness of ethical debates and moral issues. Open-mindedness. Knowledge to understand science and technology in public policy.
- *Learning Disposition*: Being able to have curiosity and a desire for learning. Having confidence in one's ability to learn. Being an active inquirer.
- *Social Networks & Relationships*: Being able to participate in a group for learning, working with others to solve problems and tasks. Being able to work with others to form effective or good groups for collaborative and participatory learning. Being able to form networks of friendship and belonging for learning support and leisure. Mutual trust.
- *Respect, Dignity & Recognition*: Being able to have respect for oneself and for and from others, being treated with dignity, not being diminished or devalued because of one's gender, social class, religion or race, valuing other languages, other religions and spiritual practices and human diversity. Being able to show empathy, compassion, fairness and generosity, listening to and considering other person's points of view in dialogue and debate. Being able to act inclusively and being able to respond to human need. Having competence in intercultural communication. Having a voice to participate effectively in learning; a voice to speak out, to debate and persuade; to be able to listen.
- *Emotions & Emotional Integrity*: Not being subject to anxiety or fear which diminishes learning. Being able to develop emotions for imagination, understanding, empathy, awareness and discernment.
- *Bodily Integrity*: Safety and freedom from all forms of physical and verbal harassment in the higher education environment.

¹ Although Walker's list was developed in a South African context (and we agree that context matters), we are still in the process of developing a list for higher education in engineering, and this list is general enough to be applicable in our context.

By investigating how vulnerability intersects with our students' real opportunities to pursue these capabilities, we hope to better understand the impacts of vulnerability in the lives of undergraduate engineering students. Does vulnerability aid or inhibit the development of capabilities? What types of vulnerabilities do students experience in higher education? What is the role of individual agency in determining the positive or negative impacts of vulnerability? We find that the capabilities approach enables us to ascertain underlying imbalances in capabilities, which may help predict when students have reached a vulnerability threshold that will result in negative outcomes. Although this qualitative study is exploratory, we hope future systematic research may help to confirm these findings.

Institutional Context

This study took place in an Electrical and Computer Engineering (ECE) department at a small, liberal arts college (SLAC) in the Mid-Atlantic region of the United States. In contrast to rigid, technically-focused degree programs in research universities, engineering in a liberal arts context offers more breadth, including opportunities to study across disciplines, and this is encouraged by many (but not all) professors in the department. Furthermore, liberal arts colleges offer smaller class sizes and the ability for professors to engage with students on an individual basis. Student cohorts (i.e. freshmen, sophomores, etc.) in the ECE department range in size from 15-35 students, resulting in tight-knit peer groups. Course schedules are not identical, but students likely share multiple classes with their cohort peers in any given semester.

This university is a prestigious, highly-ranked institution. Its culture is defined by its exclusiveness and privilege, since these help keep it on a sound financial footing. It is an attractive option for elite students from prestigious preparatory high schools. In order to attract a more diverse student body, the college creates scholarships and outreach programs to make itself accessible to students from less privileged backgrounds, including racial minorities and international students. However, many of these students initially feel out of place amongst the students-of-means, who decorate their dorms with luxury items and speak fluently on academic and political topics. It is common for international students, like the ones described in this paper, to spend their freshman year adjusting to the culture of privilege and finding peer groups they feel comfortable in. In addition, there is an associated desire amongst students to project the appearance of success. As one former Dean of Students at our university succinctly put it, "the culture at [this institution] is that you have to succeed at everything and make it look easy at the same time." Students conform to Gee's "shape shifting portfolio people" (Gee 2004, 105), collecting dual degrees, minors, certifications, and other accolades to legitimate their achievements. In this culture, it can be risky to appear vulnerable and some students may play down their weaknesses in order to persuasively perform "success".

Methods

In order to examine students' experiences of vulnerability, we analyzed life history interviews with seniors who graduated in the Class of 2022. We interviewed eight students total, using targeted sampling to capture a diverse range of student experiences. Of the eight students, there were five men and three women, three white students, three black students, one Hispanic student, one Asian student, and three international students. For this paper, we selected three case studies for comparison: one white American

student and two black international students from African countries. Case 1 represents the normative case: a white male student from the U.S. Mid-Atlantic region who experiences few institutional barriers or social isolation due to race, gender or nationality in the predominantly white male discipline of engineering. He also represents the ideal student at this liberal arts university: an engineering student who has a deep interest in technology combined with broad, creative talents and engages in exploration of other disciplines. Cases 2 and 3 were selected for their similarities to each other - their African country of origin and international student experience - and for their differences. Case 2, a black woman, excelled at the university collecting numerous prestigious experiences and accolades. Case 3, a black man, struggled academically and ultimately chose to leave the university and finish his degree elsewhere. We felt these three cases offered fruitful opportunities to explore the affordances, both positive and negative, of vulnerability in higher education: one student who experiences little structural vulnerability, one student who experiences structural vulnerability and excels, and one student who experiences similar structural vulnerability and fails to thrive.

We used a combination of structured and unstructured coding to analyze these three cases. In order to compare each student's "real opportunities" to be successful at the university, we used concepts from the capabilities approach as structured codes, including Resources, Conversion Factors, and Structural Barriers. We adopted Walker's capabilities list for higher education (Walker 2006) as structured codes.² The full codebook is included in Appendix A.

Since vulnerability is a broad term that means different things in different contexts, we chose to use unstructured coding to capture experiences of vulnerability that appeared in these interviews. Following an initial round of unstructured coding, we grouped these codes into common categories. Finally, we mapped these groupings back on to Nussbaum's four classifications of vulnerability (Nussbaum 2001, 340). The first two classifications involve deprivation of the *means* or *resources* to complete an activity, which either a) totally blocks, or b) constrains one's performance. The remaining two classifications are *relational* deprivations, in which the recipient of the activity is either c) completely blocked (in the case of death), or d) impeded / temporary (an absence). Our resulting vulnerability typology is shown in Table 1. This is not intended to be an exhaustive list of all potential vulnerabilities in higher education, but merely the types we found evidence of amongst our students.

To decrease coding biases, we used consensus coding techniques, a type of intercoder reliability (Richards and Hemphill 2018). Three members of our research team independently coded all three interviews using the codebook. We then met to discuss our codes, adjusted our collective interpretation of code definitions, and produced three final coded interviews which represented our consensus views. We generated memos for each participant to explore the relationships between capabilities and vulnerability. In these memos, we explored three questions: 1) If vulnerability acts as a conversion factor, does it have positive or negative affordances? 2) Are some types of vulnerability more challenging to overcome than others? and 3) To what extent is individual agency an important component of growth following the experience of vulnerability?

² We also found that Social Cognitive Career Theory (Lent, Brown, and Hackett 2002) helps us understand student decision-making, so we included several codes related to SCCT in our codebook.

There are a number of limitations to this methodological approach. First, since this is a small-N, qualitative study, we cannot hope to yield generalizable results. Rather, we hope to generate new insights that others can build upon in future systematic studies. Second, the nature of the life history interview means that the interview protocol was not uniform across students, resulting in higher focus on some capabilities than others for each student. Furthermore, students were not asked specifically to tell stories of when they felt vulnerable, these moments were simply allowed to arise among stories about their experiences in the engineering department. Despite its lack of uniformity, the life history interview is well-suited to the capabilities approach, because it allows students to highlight the things they have cause to value. Students' accounts indicate where their attention is at the moment of the interview, capturing the capabilities and vulnerabilities that were most important to them at that particular moment in time.

Table 1. A Vulnerability Typology in a Higher Education Context.

	HIGHER EDUCATION EXAMPLES	CONSTRAINING	ABSOLUTE
DEPRIVATION OF A RESOURCE	Intellectual or Task-Related Vulnerability	Difficulty understanding concepts or completing tasks, often temporary	Physical or mental disability or permanent inability to complete the task
	Time Vulnerability	Difficulty scheduling classes, finding time for academic and/or leisure activities	Prolonged, frenetic pace of life that cuts into time spent on basic needs, such as sleep.
	Financial Vulnerability	Difficulty affording cost of tuition, expenses, and/or leisure activities	Dropping out due to high financial burden
DEPRIVATION OF A RELATIONSHIP	Social Vulnerability	Temporary social isolation (from peers, professors, mentors, etc.) or isolation along one axis but not others	Prolonged social isolation along multiple axes
	Emotional Vulnerability	Temporary emotional distress, including stress, homesickness, etc.	Prolonged or extreme emotional distress

One Campus, Three Experiences

Case 1: Christopher (M, White, United States)

Christopher³ is a tall, lanky young man with an inquisitive mind and an artistic flair. He grew up on the East Coast of the United States where he attended a vocational high school dedicated to technological innovation. “I was always a very creative kid,” he reflects. “I always liked building things. For Christmas I would get boxes of paperclips and tape and stuff instead of toys. And I loved it. I would just make stuff.” When he was young, he told his father he wanted to be an inventor, so his dad steered him toward engineering. Christopher’s interest was not purely technical though. “I am definitely a big art person,” he says. “I got into drawing, where I could kind of create worlds.” The fusion of artistic and technological interests drew him into hobbies like science fiction and world-building video games, and steered him toward engineering design.

In college, Christopher received a prestigious scholarship that helped him obtain access to research experiences in programming and robotics. He excelled in his engineering coursework and took full advantage of the opportunity to explore classes outside of engineering, including digital sculpture, printmaking, and materials science. One such course, Digital Chinese History, used GIS technology to analyze the documents and movements of Chinese people over time. “I just thought that was so cool,” he said, “It was just the perfect combination of history, which is not something I’m usually super into, and technology.”

In Christopher’s narrative, he reflects upon four capabilities most frequently, indicating that these are the capabilities he most values at this point in his life: Knowledge & Imagination, Social Networks & Relationships, Educational Resilience, and Learning Disposition. He clearly places a high value on creativity and curiosity, a flame that drives most of his decisions at school. He is bolstered by strong social networks amongst both his peers and his professors. His relationship with his research advisor forged important connections to a summer internship experience and to his future path in graduate school.

When Christopher experiences vulnerability, it is generally related to his learning experiences, intersecting with Knowledge & Imagination, Educational Resilience and Learning Disposition capabilities. In one case of Time Vulnerability, he found it difficult to schedule classes due to his broad interests and the rigid engineering course schedule. “I overloaded for one semester to take an art class and that was horrible,” he reflects. “It was too much for me.” However, he feels satisfied with the courses he took, saying, “I took advantage of the time I had where I could and I feel pretty good about it.” Christopher recognizes that his future career may impinge upon the time he has available to pursue his broad interests, but he feels confident in his ability to manage his time. “I love doing all these things so much,” he says, “I know I’m going to continue to do them, whatever it takes.” In this case, the experience of vulnerability constrains his choices, but does not limit his capabilities.

In another example of Intellectual / Task Vulnerability, he reflected on a difficult class, which he describes as a “trial by fire”. “They basically teach you to build a computer from scratch,” he says. “Most of the class were computer engineers who had taken more advanced programming classes, which I hadn’t...so that was a little bit stressful.” Fortunately, he did not get discouraged. He kept up with the assignments and asked the professor for help and ultimately concluded, “I feel like if you were really on top of things, you could get everything figured out.” Like the previous example, this experience of

³ Pseudonyms have been used to replace all student names in this study.

vulnerability was constraining, but did not impede his ability to develop the capabilities he cared most about.

Case 2: Adanna (F, Black, Nigeria)

Adanna is an accomplished young woman. Friendly, yet reserved, she always appears professional, collected, and competent. Growing up in Nigeria, she had never questioned the power outages that constantly disrupted their lives. It was not until she studied abroad in the Netherlands in high school that she learned how unusual that was in the Global North. “Studying in a different country, I realized that people have electricity all day, even at night. And before you know it, I started reading in the news, how lack of constant power is affecting the economy of the country and affecting many other things, even medical procedures...A lot of people risk their lives in those situations. So I definitely wanted to find a way to eliminate those issues, or at least reduce them.” She chose to come to the United States for an electrical engineering education, hoping to one day contribute to fixing the power grid issues she experienced in her youth.

This mission carried Adanna through her college education, influencing many of her decisions along the way. She developed an interest in sustainable energy through a research experience with one of the professors on campus. She studied abroad with the same professor, learning about energy distribution in Costa Rica. She joined the Engineering Grand Challenges program (NAE 2008), which seeks to channel technological change toward societal problems. Many of her elective courses were chosen to supplement her knowledge about infrastructure, including a Water and Power class in the Environmental Studies department, which taught her more about political and critical perspectives on energy infrastructure. In a unit on hydropower, she learned about some of the negative impacts on the surrounding community. “Major dams that people praise and elevate, there’s issues that I did not know existed,” she reflects. As a result of her experiences studying abroad and in the humanities, she came away with a new perspective on what makes a “good engineer”. “Being a good engineer also requires attention to the community that you’re working with. In addition to being knowledgeable, you should be able to empathize with them, and really, like, understand what they want, and how you could potentially help.”

Adanna’s narrative emphasizes the same four capabilities as Christopher - Knowledge & Imagination, Social Networks & Relationships, Educational Resilience, and Learning Disposition - plus one additional capability, Practical Reason. In particular, Adanna has learned to value critical thinking more highly than many of her peers, perhaps as a result of her study abroad and humanities courses.

Like Christopher, Adanna experiences vulnerabilities related to education and learning, intersecting with Knowledge & Imagination, Educational Resilience, and Learning Disposition. She is resilient in the face of these challenges, treating them as opportunities to learn and reframing them as successes. For example, although the COVID-19 pandemic and rapid transition to Zoom learning was tumultuous, it gave her more free time to explore other interests. “I feel like I had a really different COVID experience from many people,” she says. “I tried to focus on the academic side of things, and also discover other things that I liked. I think that time was well used in that respect.”

In contrast with Christopher's narrative, Adanna also has experiences of vulnerability that intersect with Structural Factors and Social Networks & Relationships. We classified her early experiences of power outages as Infrastructure Vulnerability. These were the result of political decisions outside of her control, yet deprived her of critical resources in her everyday life. This vulnerability was constraining, not absolute, as it was typically only temporary and not a total absence of electrical power. While these experiences may impede many Nigerians' real opportunities to obtain a quality education, for Adanna, this experience became a motivator. It drove her forward, impacting many of her decisions about her future.

Adanna also experiences Social Vulnerability, particularly early in her degree program in the United States. It was not the classes or the professors, she says, but she felt it was hard to develop relationships with her peers. "I think in the beginning, it was really hard," she admits. "Because like, people just feel more comfortable with people that they've always been around...because they don't know how to interact with you, they don't try to interact with you." Perhaps drawing upon her previous experiences studying abroad in high school, she understood that she would have to make the effort herself, rather than waiting for them to reach out. "I found myself putting myself out there, which I think not everybody feels comfortable doing," she says. She joined as many clubs as she could, including the Engineering Grand Challenges program and international student organizations. By her second year, she had found a peer group she felt she belonged with and was on firmer footing socially in her classes.

In this example, Adanna's Social Vulnerability is constraining, rather than absolute. Adanna had to expend more energy creating her communities than Christopher did. But we can see a cyclical pattern in Adanna's story - she has learned that working through social discomfort is a valuable investment of her time and even seeks it out. After her first vulnerable experience studying abroad in high school, she chooses to do it again as an international student, and again in her study abroad experience. She has learned to embrace this form of vulnerability because it affords her greater capacity for Practical Reason. "I learned from an early age that studying in a different country opens your perspective. And one thing that I want to bring into the engineering field is a different perspective...I realized that when you're in a different country, you learn different things, you understand something from their own point of view, that helps you in your everyday life in your classes, and I just wanted to continue that."

Case 3: Daniel (M, Black, Ghana)

Daniel is an easygoing young man with an affable, goofy demeanor. On the first day of his senior year, he burst into the classroom and ran down the aisle giving all of his classmates celebratory high-fives. His engineering origin story is similar to Adanna's, inspired by the experience of electrical power outages in Ghana. "The Akosombo Dam was struggling," he explained, "and there was rolling lights out each day for, like, twelve hours. And as a kid, I didn't really know what was happening, but it was a struggle...I didn't understand why power infrastructure in Ghana was so bad." He chose electrical engineering because he wanted to improve the power grid. "I personally want it to be better for my countrymen back in Ghana," he said, "so I'll take it upon myself to learn this stuff."

Daniel's experience in college began with many similarities to Adanna's. He faced initial social isolation amongst his peers, but after the first year, he found his voice. "My first year, I was a bit quiet, you know,"

he says. "I was reserved. Don't say anything that's wrong [or else] everyone thinks I'm an idiot. By sophomore year, I was comfortable around everyone. Everyone knew who I was, I was cool with everyone. I was finally getting into my stride and really being comfortable."

Unfortunately, the COVID-19 pandemic derailed his academic success. Without the formal structure of the classroom, he zoned out during Zoom classes and fell behind in his homework. Sinking into depression, he started skipping class altogether and avoiding his friends. "I just withdrew completely," he tells me. "Like, people thought I *died*. I just couldn't handle it. So I would just, like, retreat into my fetal position and just hope that when I sleep and wake up, everything [will be] back to normal."

Daniel discovered that the consequences of falling behind were particularly severe at this university, in which class cohorts are so small and close-knit and which imposes a strict four year graduation policy. He was ashamed to have to retake courses that he failed during COVID. "It's kind of hard to be that expressive among sophomores, because I am a senior and I don't want the awkwardness. I think everyone knows that I'm a senior, but no one really points it out. Which I'm glad about because I don't want that awkward conversation." Daniel also damaged his reputation amongst his peers and professors, who were less patient with him as a result of his poor academic performance. "I have tried to get classmates to be on my side, but it's kind of weird because a bunch of them are going to graduate this year," he says with some sadness. The two friends he was closest to will be moving on to their new jobs. "If we were all graduating this year, it'd be like the crowning moment for, like, the fact that [they] were able to help me through it." It is the death of a dream, one in which he emerges victorious from this terrible ordeal. Instead, the struggle to redeem himself continues. "I don't want it to sound dire. But like, I have really one shot to make sure that I get everything right. So next year, I have to be on top of everything."

Daniel's narrative is markedly different from both Christopher's and Adanna's. He does desire to develop his capabilities in the Knowledge & Imagination category, particularly as it relates to his core goal, which is to help people in Ghana. He appreciated an economics course he took for this reason, because it helped him understand the inequalities in the Ghanaian financial markets. However, his desire to learn was undercut by gaps in other educational capabilities, specifically, Educational Resilience, Social Networks & Relationships, Emotional Integrity, and Respect, Dignity & Recognition, which prevented him from fully capitalizing on his education.

Daniel has struggled to develop Educational Resilience, which refers to self-reliance and the habits and systems that make it possible to learn. Essentially, this capability encompasses the ability to productively transform vulnerability, risk, and adversity into learning. Daniel recognizes that he needs to find a better balance between relying on his peers for help - an essential learning strategy - while remaining self-reliant. "I have to be diligent enough that I don't depend on them to get stuff done. You know, I need someone to help me out with some work. [But I can] actually start with it, get ahead on it. And then if they somehow don't have the time to meet, I'll at least have something done. I can at least submit something I'm working on."

However, a big part of why Daniel has fallen so far behind is due to his Social and Emotional Vulnerabilities. In his narrative, Daniel focuses much more heavily than his peers on two capabilities: Social Networks & Relationships and Respect, Dignity & Recognition. The emphasis indicates that they

are at once very important to him, and also things that he perceives to be missing or deficient in some way. We have previously noted the way his experience during COVID negatively impacted his social relationships with peers and professors, but it is also notable how important these relationships are to his enjoyment of learning. In almost every class that Daniel describes as a “favorite”, his enjoyment of the class is due to his personal connection with the professor. Referring to one of his ECE professors, Daniel recalls, “[He was] encouraging me to really dig deep. And when I dig deep, I get the answer without him. And he just lets out a “Very good! Brilliant!” I felt like, at that point, I was really in the class, because he was looking at me, hearing what I was saying. He really was really resonating with each word I said.” Daniel, perhaps more than his peers, thrives on this personal attention. When it was abruptly withdrawn during COVID, it was a significant contributor to his inability to cope.

On a related note, the theme of Respect, Dignity & Recognition emerges repeatedly in Daniel’s narrative. It is something that he deeply desires and something he feels the absence of at the university. Respect informs his drive to improve the power grid as a point of national pride - “I personally want it to be better for my countrymen.” It informs his desire to avoid looking “like an idiot” in class and in front of underclassmen. And it is also a motivator for why he wants to do well in his classes. Referring to the same professor from the previous example, Daniel says, “He’s one of the professors that clearly takes joy and pride in his work. It’s so infectious that it will make you want to also like, take some pride and joy in the class.” Pride and respect from his professors and peers play a significant role in Daniel’s definition of success.

The deficits in Daniel’s social networks and sense of respect created extreme Emotional Vulnerability during COVID, which further impinged upon his capabilities of Emotional and Bodily Integrity. “Those were some dark times,” he reflects. “I was just letting my stress eat me. I was staying in my room, really wouldn’t go anywhere. And when you stay in your room all day, you don’t do any exercise...It just makes things worse.”

While Daniel’s experiences of Social and Emotional Vulnerability were not absolute - after all, they are temporary and surmountable - they were more intense and prolonged than his peers. They resulted in long-term damage to his ability to form Social Networks & Relationships and earn Respect & Recognition from his peers and professors - two capabilities that are high on his priority list. The deprivation of these capabilities undermined his real opportunities to take advantage of other fundamental capabilities in college, including Knowledge & Imagination, Educational Resilience, and Practical Reason. Facing such severe disturbances in his social and emotional well-being, Daniel was only able to acquire new knowledge in fits and starts, rather than in the comprehensive, cumulative way that Christopher and Adanna explored and built upon their interests.

Discussion

So what are we to make of these cases, as they pertain to vulnerability? Does vulnerability aid or inhibit the development of capabilities? From these cases, we conclude that vulnerability acts as a conversion factor that has the potential for both positive and negative transformation. All three students showed evidence of positive, neutral, and negative outcomes following vulnerable experiences. However, by more closely interrogating what *kind* of vulnerability was experienced, we may be able to distinguish some

types of vulnerabilities that are more easily overcome. Amongst our students, positive outcomes were more likely when students were able to emotionally distance themselves from failure. This happened most frequently in cases of Resource Deprivation (i.e. Intellectual / Task Vulnerability or Time Vulnerability). This was the case for Christopher, in the management of his schedule. It was also true for both Adanna and Daniel, who were able to channel their Infrastructure Vulnerabilities into a mission to improve the power grid in their countries of origin. This may not always be the case. Resource Deprivation may be absolute, cutting off all access to positive outcomes. For example, many students in Ghana will not have the opportunity to pursue higher education, let alone travel to the United States, due to Financial Vulnerabilities. Nonetheless, in these three cases, the lack of resources was merely constraining and students experienced positive transformation in overcoming these challenges.

In contrast, Relational (Social and Emotional) Vulnerability appears more difficult to transcend - though not impossible. Both Adanna and Daniel experienced challenges in finding peer groups when they arrived at the university. In Adanna's case, she has learned to value social vulnerability for the different perspectives that she gained from cross-cultural experiences. She continues to seek out these challenges as she expands her horizons. However, for Daniel, his experiences of social and emotional vulnerability were intense and prolonged, leaving him unable to recover (at least within the timeframe of the degree program).

What is the role of agency in determining the positive or negative impacts of vulnerability? This is a central argument of shame resilience theory, that our attitude during and after an experience of adversity is crucial to our ability to transcend it. Our investigation of this question had two components: 1) does it make a difference if one has made a deliberate choice to enter this experience? And 2) does reframing vulnerability in a positive light improve the outcome?

On the first point, it is important to note that no one really *chooses* to be vulnerable. The challenges we face are largely dependent upon others (i.e. the institutional policies, the professor's classroom management, etc.). However, in these cases, it does seem to make a difference if students have some element of choice in the process and value the outcomes. Christopher's difficulty managing his schedule is the product of department policies that mandate required courses and a fairly rigid order of events. He did not specifically choose this organizational structure, it was chosen for him. However, he chose the degree program and valued the education he was receiving in engineering, which made the sacrifices he made in his elective courses more acceptable. Similarly, Adanna had some experience with social vulnerability previously when she studied abroad in high school. While she did not know exactly what she would find in the United States, her previous experience likely prepared her for the culture shock and social exclusion she might face. She chose to have this experience again because she valued that outcome.

In contrast, Daniel had not previously studied abroad and was less prepared than Adanna. While she had acquired the wisdom to "put herself out there" in response to her social isolation, Daniel did not yet have coping mechanisms in place. The subsequent COVID-19 pandemic took everyone by surprise and those without solid social networks were most adversely affected. While Daniel did actively choose to study abroad, he appears to have had less control over his circumstances than his peers. His strong desire to give back to society continues to fuel him along his journey, but that flame is burning low in the face of these unanticipated and unwanted challenges.

On the second point, the ability to positively reframe challenging experiences does appear to lead to more positive outcomes. This is a somewhat circular logic - when students tell their stories in a positive light, they tend to frame the story as having a positive outcome. The theory of story reframing is fairly well established in psychology (Wilson 2011; Pennebaker 2004), and has been shown to significantly and positively alter educational outcomes. For this reason, we have chosen to focus on concrete outcomes - graduation, earning degrees, earning certifications, getting a job, getting into grad school. Following the capabilities approach, we have tried to ensure that these outcomes were self-defined by the students: Christopher wanted to go to grad school and was able to achieve that goal. Adanna wanted to find a job in a non-profit organization and she achieved that goal. Daniel was focused on graduating. He fell short of that goal, but he is currently finishing his degree at another university.

Both Christopher and Adanna were able to reflect upon their experiences of adversity in a positive way. For example, while Christopher struggled in several classes during the pandemic, he downplayed that experience, saying “it was just a tough time”. In this way, he distances and depersonalizes the experience, making it easier to move forward: it was not a personal failing and it was unlikely to repeat itself in the future. Adanna is particularly adept at reframing her negative experiences, to the point that the struggle is often omitted entirely. Her interview includes a laundry list of accomplishments - studying abroad, internships, working at the career center and at one of the centers for racial inclusion on campus. These learning experiences must have had their challenging moments, but she does not talk about them. This may be a healthy sense of ethnographic refusal⁴, declining to discuss uncomfortable aspects of her life with a stranger. Alternatively, it may reveal cultural pressures to present a sanitized, uncomplicated success story. We have previously mentioned the university culture in which students feel compelled to collect accolades and present a positive and successful image. In such an environment, revealing vulnerabilities might seem risky, opening oneself to judgment. Nonetheless, for both Christopher and Adanna, their ability to positively reframe their personal narratives coincides with positive outcomes.

Daniel was still in the midst of his struggle at the time of the interview, and therefore his narratives tended to end on a negative note. Even positive stories about the good times he had at the university would transition into further meditation upon his current misfortunes. Referring to shame resilience theory, we might surmise that Daniel was trapped in a shame cycle. In this sense, his strong desire for Respect, Dignity & Recognition were likely hindering his ability to extract himself. By holding so tightly to the need for external validation and recognition, and then not receiving it, his shame continued to compound itself. His negative narrative continued to produce negative outcomes.

However, viewed solely through the light of shame resilience theory, this interpretation of Daniel’s story feels like blaming the victim. It feeds into individualistic rhetoric that anyone should be able to “pull themselves up by their bootstraps” regardless of their circumstances. Likewise, if someone hasn’t been able to transcend their obstacles, it must be because they haven’t fully embraced their vulnerability. While there does seem to be some psychological benefit to letting go of shame and developing a more positive

⁴ The term “ethnographic refusal” refers to instances when research subjects decline to share particular kinds of information with researchers. Taken from Audre Simpson’s work amongst the Mohawks of the Northeastern United States, ethnographic refusal is an assessment - by both the interviewee and the ethnographer - of what information is truly necessary to reveal, what the consequences might be, and who benefits (Simpson 2007).

relationship with failure, this individual-centric viewpoint distracts from the structural factors that create vulnerabilities. In this higher education context, organizational and cultural factors such as the scheduling system, the strong cohort models, and the institutional culture of excellence and exclusivity generated experiences of vulnerability for our students. Rather than focusing on these structural contributors to inequality, we may focus too narrowly on individuals' ability to overcome them, usually with a few extraordinary exemplars, such as Adanna, that we can point to as proof that it works.

One advantage of the capabilities approach is that it allows us to simultaneously address individual agency *and* structural factors. If we consider these cases through the lens of capabilities, we can see that students have differing *real opportunities* to pursue their educational goals. Christopher had a real opportunity to enjoy and develop all of the eight capabilities necessary for success in higher education. He chose to embrace Knowledge & Imagination in pursuit of his creative goals. When he experienced vulnerability, it was not insurmountable. Adanna experienced some disadvantages in developing the capability for Social Networks & Opportunities, but she was able to rely upon her previous knowledge and considerable Educational Resilience to help her improve her Social Networks "functionings vector". She ultimately experienced growth as a result of her vulnerabilities, even learning to value social vulnerability and choose it again and again, integrating it tightly into her identity.

In Daniel's case, he arrived with similar disadvantages in Social Networks & Relationships that Adanna did. However, his "functionings vectors" in Educational Resilience and Learning Disposition seemed less developed than his peers at the start of his undergraduate studies. When he experienced extreme forms of vulnerability, these opportunity gaps were revealed. In the face of this vulnerability, he latched onto what he lacked - Social Relationships and Respect - valuing these capabilities higher than others. Brown's shame cycle has explanatory power in this case since it shows how Daniel became trapped in his experience. But the cycle is as much a product of structural factors such as racial/cultural biases and university policies and culture as it is about Daniel's reaction to failure. He began with a different set of capabilities and functionings than his peers, which explains why COVID so dramatically disrupted his more tenuous social support system. The capabilities approach more holistically captures the experience of vulnerability, and why some students thrive amidst adversity while others flounder. It also lends support to promoters of "psychological safety" in learning environments, since in our small sample we can see clearly that learning is nearly impossible without the capabilities related to social and emotional well-being (including Social Networks & Relationships and Respect, Dignity & Recognition and Educational Resilience).

Conclusion

Vulnerability, as we have argued, is a conversion factor with both positive and negative potential. It is a "Goldilocks" problem - too much may lead to failure, while not enough leads to stagnation. While it is not possible or desirable to eliminate vulnerability entirely, as advocates for social justice, it behooves us to consider how to ensure that disadvantaged groups do not experience greater vulnerability than others.

In this example from higher education, the capabilities approach helps us understand how vulnerabilities become compounded and how to better assess when an individual's vulnerability tips from growth into liability. Understanding vulnerability in higher education is particularly important since we know that

education provides affordances for future capability development. Students from less privileged backgrounds will experience dual positive outcomes as a result of a college education: upward social mobility for themselves, and the ability to influence and transform the institutions to which they belong into more equitable forms. However, to learn is to make oneself vulnerable. It requires challenging currently held beliefs, acknowledging one's limitations, and submitting to knowledge and processes of inquiry defined by others. Given that learning is a vulnerable process in itself, it is important to ensure that students do not cross a vulnerability threshold into an overloaded state that will be unproductive and lead to negative outcomes.

In contrast to existing frameworks, the capabilities approach allows us to address structure and agency in equal measure. Shame resilience theory tends to overemphasize individual agency, underplaying the role of structural factors. Psychological safety does address structural factors, however its collective focus on teams fails to capture the very individual and often private circumstances of individual students. The same vulnerabilities experienced by two different students may yield different results. Because the capability approach is a normative rather than explanatory framework (Robeyns 2017) the insights generated by shame resilience and psychological safety inform understanding of student capabilities. Through the capabilities approach, involving comparisons in relative real opportunities between students, we can gain insights into why some students thrive and others falter under similar circumstances. The framework enables us to simultaneously acknowledge the unjust causes of vulnerability, while also accounting for individual human resilience. Although this small, qualitative study cannot claim to be conclusive or universal, we hope that future research will verify and validate these preliminary findings.

Appendix A: Qualitative Codebook

- **Resources:** Elements from a person's environment (social, natural, etc.) that can be used or 'converted' to create or develop capabilities. Examples include time, money, and prior knowledge.
- **Conversion Factors:** The factors that make it easy or hard to convert resources to capabilities. Where we find conflicts with other codes, such as Structural Factors, conversion factors are value-free, whereas structural factors result in positive or negative impacts. For example, the social class one belongs to is a social conversion factor, but the value that society places on that group in relation to other social classes is a structural factor.
 - **Personal:** Conversion factors related to individual abilities, talents and aptitudes
 - **Social:** Conversion factors related to social relationships, such as family and community networks
 - **Environmental:** Conversion factors related to the physical environment, such as geographic location, local availability of resources, etc.
- **Structural Factors:** Something in the person's environment or organization that affects their behavior or accomplishments. Structural factors place weight on the scale, either in favor of, or in opposition to, the achievement of capabilities. These tend to be policies, laws, rules, or cultural norms that govern human behavior.
- **SCCT Categories:**
 - **Interests and Choice Goals:** The extent to which a person's interest in a topic endures and they make choices to pursue activities related to that topic.
 - **Outcome Expectation:** The probability a person believes they will be rewarded for a given behavior.
 - **Self-Efficacy:** The belief a person is able to accomplish something in a given domain, self confidence.
 - **Choice Actions:** The actions individuals take that show they are following up on goals.
- **Capability:** an element of a person's real opportunities to achieve desired outcomes - things that can be or do in the world in which they live. Capabilities are latent.
 - **Practical reason:** Being able to make well-reasoned, informed, critical, independent, intellectually acute, socially responsible, and reflective choices. Being able to construct a personal life project in an uncertain world. Having good judgement.
 - **Educational Resilience:** Able to navigate study, work and life. Able to negotiate risk, to persevere academically, to be responsive to educational opportunities and adaptive to constraints. Self-reliant. Having aspirations and hopes for a good future.
 - **Knowledge and imagination:** Being able to gain knowledge of a chosen subject – disciplinary and/or professional – its form of academic inquiry and standards. Being able to use critical thinking and imagination to comprehend the perspectives of multiple others and to form impartial judgements. Being able to debate complex issues. Being able to acquire knowledge for pleasure and personal development, for career and economic opportunities, for political, cultural and social action and participation in the world. Awareness of ethical debates and moral issues. Open-mindedness. Knowledge to understand science and technology in public policy.
 - **Learning disposition:** Being able to have curiosity and a desire for learning. Having confidence in one's ability to learn. Being an active inquirer.

- **Social relations and social networks:** Being able to participate in a group for learning, working with others to solve problems and tasks. Being able to work with others to form effective or good groups for collaborative and participatory learning. Being able to form networks of friendship and belonging for learning support and leisure. Mutual trust.
- **Respect, dignity and recognition:** Being able to have respect for oneself and for and from others, being treated with dignity, not being diminished or devalued because of one's gender, social class, religion or race, valuing other languages, other religions and spiritual practices and human diversity. Being able to show empathy, compassion, fairness and generosity, listening to and considering other person's points of view in dialogue and debate. Being able to act inclusively and being able to respond to human need. Having competence in inter-cultural communication. Having a voice to participate effectively in learning; a voice to speak out, to debate and persuade; to be able to listen.
- **Emotional integrity, emotions:** Not being subject to anxiety or fear which diminishes learning. Being able to develop emotions for imagination, understanding, empathy, awareness and discernment.
- **Bodily integrity:** Safety and freedom from all forms of physical and verbal harassment in the higher education environment.
- **Functioning:** what a person accomplishes in being or doing based on applying some set of their capabilities. Functionings are to some extent active and therefore measurable.
- **Vulnerability:** any discussion of a person's sense of mental or physical self being at risk.

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