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Engineers and Mothers of Color: The Struggle of Juggling Work and Children with a Specific Learning Difficulty

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Abstract

      This full Women in Engineering Division paper will present the stories of two academics of color in engineering departments, self-identified as a Black woman and a Latiné woman, who for the past couple of years have been navigating the diagnosis, treatment, and management of their children's specific learning disabilities (SLD). This qualitative story is a journaling exchange between two colleagues and friends who have struggled with navigating the diagnosis and interventions of SLDs for their children. The conversation discusses the additional challenges of navigating their promotion and tenure process, and the layers of systemic oppression and inequalities they have experienced while advocating for their children. The paper will conclude with a call to action for engineering education to consider the unique challenges academic women engineering faculty and other gender identities who have parental responsibilities face at the intersection of race, ethnicity, mental health, and SLDs.

Motivation

      This full paper was written as a journaling exercise to unpack what two academics, engineers, and mothers of color have experienced over the past few years as they have navigated their promotion and/or tenure processes while carrying the primary responsibilities for the care and education of children who have been diagnosed with a specific learning disability (SLD). The accounts presented below is represented in the form of collaborative autoethnography highlighting the balancing act of working in their engineering departments and the inequities these women faculty of color have faced in still meeting the demands of their careers while juggling motherhood. Since the authors are already underrepresented in engineering, they opted to remove their names and identifying information from the quotes used in the manuscript to minimize any work-related retaliation.

      The readers are cautioned that these events are deeply embedded in the intersectional identities of the authors and these accounts may not necessarily translate to other individuals undergoing similar situations. Also, because these challenges are layered, complex, and situated in the authors' intersectional identities, the findings may include multiple systemic barriers that are intertwined in the interpretation of the findings. The authors opted to maintain the complexity of the narration as it was deemed more authentic to their lived working and personal realities. Further, the multilayered complexity in the narrative demonstrates the levels of cognitive load and role strain associated with each presented challenge, subsequent reflection/decision, and perceived outcome. The authors hope that by sharing this work/life story, more considerations are made to acknowledge the multiple hats and caretaking roles of faculty parents working under the expectations and rigor of academic universities and institutions of higher education.

Introduction

      Motherhood in academia has in the literature and over the decades pointed to the multiple obstacles that women face in their professional paths e.g., [1-7]. Its impact has become even more pronounced since the COVID-19 pandemic [8-12]. The normative regimes of academia and their metrics of performance push individuals to be their most productive at the cost of high levels of anxiety, stress, and exhaustion [13]. The gendered nature of academia [14] also creates systems that dissociates work from family and creates professional and personal consequences for those individuals with caretaking responsibilities [15] and that they do not match the system's idealized views of a productive and valuable worker and puts into question their abilities and talents [16].

The many demands of the academic profession can challenge the time management and time allotment women faculty and mothers of color can dedicate to childcare [17]. The same has been found for academic fathers who are active in their child-raising role [16, 18]. Some scholars have argued that the hetero-patriarchal infrastructural norms of institutes of higher education have indoctrinated individuals into a culture and practices that systematically disenfranchise and marginalize women of color [19] due to *"...disembodied individualism, unbound work demands, assumed infinite availability, and institutional profit over collective gain intensifies the career vulnerability of women of color academics and risks straining members..."* [20, pg. 19].

One area that seldom has been explored in the academic literature surrounding women of color faculty are the responsibilities of motherhood when a child is diagnosed with a specific learning disability [21]. Specific learning disabilities (SLD) are described as learning barriers that cannot *"easily be explained by a lack of intellectual ability or deficit schooling"* [22, pg. 3]. During a child's SLD diagnosis, their mothers begin to acquire new and unexpected roles such as being an advocate, disability expert, and long-term caregiver [23-25]. When motherhood of an SLD child also includes race, ethnicity, gender, and other social identities, the power dynamics and abilities for mothers to enact these new identities become convoluted or disadvantaged to the primary systems of education, workplace, and medical fields that advantage the wealthy majority [26-29].

For academic faculty who are women of color, work-life integration already comes challenging as they already deal with their (and others') cultural expectations, discrimination, bias, micro-aggressive behaviors and language, limited support systems, lack of flexibility in expectations and work-life norms, erosion and weathering of one's health and well-being [30, 31], career advancement, and equitable pay challenges [32, 33]. For academic faculty women of color, the constant struggles with educational and healthcare disparities and discriminations towards themselves, their community, and treatments that are rooted in majority 'numerical power' rather than ancestral backgrounds [34]. The constant advocacy creates an overexertion of their already stretched cognitive and emotional loads as they navigate their institutions of higher education. These women experience battle fatigue that at times can reach dangerous and exceedingly high levels [31, 35, 36].

The purpose of this collaborative autoethnography [37] was to capture the layered struggles that two faculty, academic women of color, and mothers in engineering have experienced during their promotion and tenure in their hiring at institutions of higher education, while also fulfilling their caregiving responsibilities for their SLD children. The aim of this paper was to expose, raise awareness, and question the working structures we (the authors) navigate every day. To attend to this aim, the study's objective was to use collaborative autoethnography to authentically, co-construct meanings of our experiences while uncovering damaging and often hidden assumptions of the tenure and promotion process within academia.

Theoretical Frameworks
Disability Theory

Rooted in Black scholarship, activism, and educational theories (e.g., [38-42]); Disability Theory poses that special education labeling and practices appear to maintain and expand racial segregation among students (e.g., [43-50]). Unfortunately, outside of these publications, special education generally rejects the racialized nature of disability education, diagnosis, and treatment.

This theory centers on several tenets: (1) racism and ableism occur independent of each other and often in invisible ways to uphold conceptions of normalcy; (2) identities are

multidimensional and usually include race, dis/ability, class, gender, or sexuality, etc.; (3) social constructions of race and ability include material and psychological impacts of being labeled by race and/or disabled; (4) prioritizes the voices of the marginalized, which are normally not acknowledged in research; (5) considers legal and historic aspects of disability and race and how they are not intersected to deny the rights of these citizens; (6) recognizes Whiteness and ability as property that have primarily advantaged White, middle-class citizens; and (7) activism is needed as well as all forms of resistance.

In the domain of special education, a lack of consciousness among teachers and other educators requires a process of unlearning and relearning over time, particularly in the "*impaired or distorted way of thinking about (dis)ability. . .one that tacitly accepts dominant ableist norms and privileges*" [51, pg. 895]. In STEM education, literature around disability is very limited [52, 53] with only a handful of scholars studying non-apparent disabilities [54-57]. To our knowledge, neither race, ethnicity nor other social constructions have been explored for the women caretakers of children with special learning disabilities who also work within STEM working environments, let alone engineering.

Role Strain Theory

The Theory of Role Strain [58] posits that all organizations possess a metaphorical quilted social culture held in place by threaded role strains. These role strains include cognitive, emotional, physical, and mental disabilities experienced by individuals as they attempt to fulfill their assigned roles within an organization [58, 59]. Inherent in this theoretical framework is the normalization of the struggles associated with fulfilling one's role demands and sequence of *role bargains* (individual choices) people make that are shaped by their inherent desire to reduce personal role strain [60]. Within a specific organization, third parties called *alters* assert limitations on one's ability to *role bargain* to reinforce institutionalized limits and the social cultural infrastructure *norms*.

Goode (1960) [58] identifies two mechanisms that people use to reduce *role strain:* (1) selecting roles which are less onerous, mutually beneficial, minimally conflicting; and (2) obtaining gratification or a value-productive bargain including alters in one's total role pattern. Within the context of this theory, the *institutional infrastructure* dictates the contextual role pattern and ways in which individuals and alters interact, resulting in diminishing or increasing one's role strain. These structural limitations are often social evaluations based on external factors (e.g., age, class, caste), importance of role within the society (e.g., nurse versus housekeeper), third-party alters' access and interaction, norms of adequacy, linkage or dissociation of role obligations in different institutional orders, ascriptive status (status within or outside of a marginalized group), and lack of a profit in mutual role deviations [61-64].

Role Strain Theory has been used to explain the nature and multiplicity of and genderized roles of work and family responsibilities, where women are often more constrained by time and resources, making them more vulnerable to role strains than men counterparts [65]. Role Strain Theory has been studied to elucidate the complexities of the roles of faculty with invisible disabilities [66] and the roles of parents of children diagnosed with SLD [67].

Like other organizations, institutions of higher learning reflect and normalize disconnects between the presumed role expectations of faculty members depending on their social cultural identity [68, 69]. The presumed role expectations and measures of adequacy are often inequitable and oppositional to challenging or transforming the paradigms that exacerbate the role strains of

women and in particular intersectional women [31, 68, 69] who are in disciplines within science, technology, engineering, and mathematics (STEM).

Research Questions

For this paper, the main research question is:

What experiences shape these academic mothers, faculty, women of color, in engineering have as they navigate their workplace and juggle caretaking for their SLD children?

Methodology

Philosophy and Paradigm

This collaborative autoethnography philosophically centers on the ontological and epistemological beliefs of the authors who retroactively and selectively wrote about past experiences, analyzed and co-constructed these stories to uncover sociocultural epiphanies, their meanings, and who they are becoming [70]. The centering of our voices and experiences to co-construct meanings deepened our thinking and mutual respect and our stories. The constructivist paradigm [71] allowed the authors to mutually and analytically understand the assumptions behind systems of self within the culture of academia [72] while dually becoming more aware of the historical and cultural relativity [73] and strengs each author carries [74]. Each story carries epistemic powers that allowed us to reflexively connect with each other, our stories, and text [74].

Positionality

For this work, our positionality situated both our insider perspectives as neurodivergent individuals, academic faculty, engineers, and mothers of color, as well as our epistemological changes as we navigated the process of SLD accommodations (which we posit is deficit-labeled) for our children while navigating the rigors and expectations of institutions of higher education. Due to the intersections of our race, ethnicity, and gender identities, we acknowledge the frustrations of constantly being placed in situations where we are confronted with the inequalities of both the language and actions used in much research, clinical, and educational environments.

Research Data Collection and Analysis

Data Collection

The qualitative data for this study included two written stories provided by the authors who responded to eight open-ended questions (Table 1 shows only six of them; the other two will be presented in a future publication). The authors provided self-reflective, written accounts of their lived experiences [75, 76]. The questions posed are intentional, where questions pertained to their roles as women of color faculty members within engineering at institutions of higher learning and as mothers of children with SLDs.

Each author independently answered these open-ended questions. The authors read each other's narratives and identified common and different elements of their stories to discuss critically the multi-layered working and living realities of their situations.

Table 1. Questions answered by the authors/researchers.

1.	When and how did you first find out about your child's diagnosis?
2.	What stage of your academic profession were you in during the child's diagnosis and

3.	How did this impact your promotion and/or tenure?
4.	Briefly explain what a day to day at work looks like when you are also advocating for and navigating educational/medical services for your special needs child?
5.	How do you navigate the rigor of academia and your department as you are also a mother of color faculty?
6.	How does your personal experience with neurodivergence in the academe and at home evolve with time and exposure to the neurodivergent world and new age and embrace (repel) of diversity, access and inclusive spaces in education?

Collaborative Self-reflection focused on Emotion and Inductive Coding

Adapted from the six ideologies of collaborative autoethnography [73], the authors positioned their self-reflections as involving the active participation and collaboration between the researchers and the communities, both of which are the same individuals. This intimacy in the insider's experience and knowledge allowed us to critically analyze the assumptions that underpin the meaning systems while contextualizing the layered complexities of our intersectional identities and realities. These self-reflections allowed us to critically interrogate and critique existing educational *norms, knowledge, cultural worldviews* that are at the core the re-imaged, collaborative relationship between the participant and researcher [77].

As an approach to analyze their self-reflections, the authors opted to use emotion coding as their primary mechanism to conduct their first cycle of coding complemented with a second cycle of inductive coding based on the tenets presented in the literature review. With emotion coding, the authors relied on their cognitive centers (feelings) as they read their own and the other authors' stories. Memoing and inductive coding was used as a second cycle of coding to discuss categories and account for critical instances where complex intersections of the authors' working, and personal realties were evident. Their aim was to elevate these complexities and not to dissociate the themes and sub-themes identified as they understand that their motherhood at the intersection of their race, ethnicity, gender, neurodivergence, and other identities are complex and cannot be dissociated from the realities of their work and life.

Results and Discussion
Theme 1: **Multiplicities of Role Strain**

Both authors lamented on how the normative expectations of their academic environments do not recognize, value, or support women of color faculty at the intersection of their motherhood and neurodivergence. The added layers of their genderized and racialized roles in work and family compounded to the deficit ways that colleagues and superiors view their professional fit within engineering. In addition, the complexity of their professional and familial constraints due to time, resources, and money creates a liminal space where their vulnerabilities due to their role strain becomes magnified compared to their majority and male counterparts [78, 79]. An example of one's reflections is provided below.

> *I'm sitting at a living room table trying to work while also trying to do*
> *breakfast, clean, coordinate medical appointments, mentor, and train my*
> *students to do research, write grants, and prepare for classes. Plus,*
> *because I'm home, there's this expectation that I need to have stuff cooked*
> *and cleaned, and it's overwhelming at times. I feel exhausted. Even*
> *though my spouse and my other child do help, I still carry the biggest*

*burden of them all. It's hard for me to keep it together. There are days that
I just don't want to meet with anyone and go to bed but I must keep on
because that's what you do. Right?*

Theme 2: Multidimensional, Gendered Racism in the Workplace

The authors agreed the multidimensional layers of racism and genderism that they have experienced in the workplace has created traumas that extend to their other identities and roles such as motherhood, talents, ideas, leadership potential, etc. They reflected on how the cumulative traumas that have been imposed by society since birth are still occurring for them and for their children, causing pains that they cannot nor dare not share in the workplace.

*I spend a great deal of cognitive load managing my non-relationships with
my colleagues. This often means being patient when they ignore my emails,
cleaning up messes they create because they failed to listen to me the first,
second, and third time. Being a mother who loves her child was used
against me when I went up for tenure...I fear saying anything – whether it
is the need to get home to take my child to a doctor's appointment or leave
a bit early to go to my child's school event. My male colleagues leave for
these things all the time, and majority women colleagues from other
departments and schools tell me they cannot accommodate meetings when
they have sick children all the time. But, for me and other Black and Brown
academic women who I talk to, they work up until they give labor in the
hospital, they sleep with a laptop next to their bed and regularly answer
texts regardless of the hour for fear of being accused that they are not
prepared, not available or agreeable as a colleague. It is for this reason, I
am presently behind on my own dental, medical, and dermatologist
appointments because I use these times during the day for my child's visits
and work… endless work.….*

The authors have communicated how workplaces operate to create epistemicides, where their systems of knowledge are killed, silenced, annihilated, and devalued. Thus, the multidimensional harm created in the workplace and society results in stressors sustained, prolonged, and magnified in their lifespan [59, 79].

*I think every day is a constant question of survival. And what survival
looks like when you are being put in what I call the 'whack-a-mole' of
academia. You have so many things to juggle, so many expectations to
fulfill that I say are expectations rooted in race and ethnicity. You are
expected to work 2, 3 or 4 times more than others. You are expected to be
complacent, nice, and play along. People make choices for you or put
you in the middle of projects that you don't even want to be a part of nor
that you are consulted about. You are placed in the middle of difficult
situations and are expected to handle them. You have a bigger
understanding of the problems of the department and because of that you
end up doing more things like mentoring and supporting other students
that are not even yours. You must also navigate this promotion and/or*

tenure process, and still be a mother. Now add to that being a mother of a
SLD child and there is this skewed judgment about you. For some, you
stop being serious enough to do academic work. It's double standard. It's
a catch 22. You're constantly put in the middle and it is very hard...

Theme 3: Disparities within and outside the Workplace

As the authors alluded to their multidimensional, multiplicity, and complexity of the gendered racism they experience in their workplaces compounded with their motherhood identity has resulted in psychological and physiological impacts to their health and overall well-being. These disparities manifest across multiple dimensions of their lived realities. For example, both authors expressed the excessive stress they experience by being a provider in their families, the need for health insurance for their neurodivergent children, and the daily survival modes they are placed within their workplaces. These increased professional and personal life interferences result in bouts of depression, anxiety, sense of frustration, lack of fulfillment, isolation, and dissatisfaction with their positions in life and work. They also acknowledged the need to seek inner healing by being intentional with the limited time they have in the day to focus on faith, prayer, physical fitness, and recentering of their priorities in life. However, they understand that sometimes health and well-being are not always continuous and that when (and if) they find the time to engage in these practices, the accumulated stressors over time may make recoveries (psychological and physiological) even harder than before. Excerpts from discussions are provided below to contextualize this theme further.

My child was diagnosed after I had received tenure during COVID
times....for me it is a blur. The circumstances surrounding my child's
diagnosis culminated with life threatening experiences.... During this
time, I continued to work, and did so in silence of what was going on
in my family life. I told no one because so often my colleagues dismiss
the seriousness of my life.... I was afraid of the judgment of my child
and judgment of me as a parent. Imperfection in higher academy is
not acceptable for women of color. We are often put into positions of
being more responsible and advocating for others' children but are
discouraged and transgressed against when speaking out for our own
children's rights...

Even while sitting in an emergency room – I took work calls, answered
emails, and rescheduled zoom meetings. In between therapy sessions, I
was begging for emergency treatment for my child in the middle of the
pandemic where little to no room existed in pediatric hospitals – I
worked, I mothered, I did not tell anyone because deep down I knew
that they simply did not care and did not want me there.

Collectively, the themes shed light into the complexities, roles strains, critical periods involving the diagnosis, treatment, and caretaking of their SLD, all the while fulfilling the requirements of their promotion and tenure process. The authors lament the multiple hats they wear and the invisible challenges that they do not feel they can fully share in their workplaces.

While there are additional sub-themes identified in this work, additional implications are to be discussed in a future publication.

Limitations

The authors recognize that there are a couple of limitations present in this paper. First, the authors are intentionally not extending the implications or findings of the work with the intent for transferability to other parents or scholars with similar situations. It was intentional on the authors' part to focus on their stories so that readers can begin to understand how race, motherhood, neurodivergence, work, society, and other social constructions overlap rather than separate from the realities of academic mothers of color in academia. Second, as the stories are between the two authors, there is risk for biased interpretations of the findings. To mitigate these biases, the authors individually wrote their stories and shared them with the other author. Interpretation and coding were then conducted via continual conversations between the two authors to ensure that their biases were accounted for in the coding process. Third, the stories are a snapshot in time and primarily focused on the role of the working academic mother of color as they navigated a time when their child(ren) were diagnosed for a specific learning disability. A lot has occurred since the sharing of these stories and the authors opted to not share more than what was needed to allow them to be the owners of their experiences. The authors were intentional in not identifying the quotes as they recognized they are one of a handful of women of color in engineering departments nationwide and even including their names in the authorship of this paper may come with implications to their work life. Finally, the authors opted not to include a list of strategies in the Implications section of this paper (see below) as they recognized the need to simply start opening up more spaces for these types of conversations to happen. Given that this topic is not being discussed in literature and most engineering (or STEM) education research circles, opening our stories was deemed as a powerful first step.

Implications

This work initiates a conversation to acknowledge and give voice to academic mothers of color, faculty, and engineers who experience the academy's traditional struggles while navigating the SLD process for their child(ren) and still meeting the requirements of a promotion and tenure process at their institutions. In shedding light on the experiences of these groups, administrators and colleagues can begin to empathize and reflect on how institutional *norms* may normalize ways of doing that limit and/or sabotage advancement and contributions of individuals and groups with invisible challenges within the academy. Given the nascent state of this or other related topics, specific strategies were not provided but early suggestions to call to action for next steps:

- Call to Action (Opening brave spaces for critical conversations): Create a space to have a conversation about academic mothers of color and the struggles they face as they serve in multiple caregiving roles. Extend the conversations to other parents as well.

- Center Conversations and Solutions from the Impacted Parties: Allow the academic mothers of color or other parents in similar situations to be at the helm of decision-making that minimizes anti-deficit procedures and protocols that may serve to exploit or devalue academic mothers of color as they navigate their promotion and tenure processes in engineering while being unacknowledged about the invisible and undue stress and emotional/physical fatigue they experience in their workplaces.

Concluding Thoughts

  Academic mothers of color in engineering face numerous barriers, in their personal and working life. For academic mothers of color, the challenges are further compounded by their intersectional identities and any caregiving responsibilities they may carry. This paper focused on the story of two academic mothers of color, a Black woman, and a Latiné woman, who have been sharing their lived experiences with each other as they both navigated the process of evaluation and diagnoses for their child(ren) with a specific learning disability. Their laughs, their tears, and their struggles have brought them together and empowered them to share a small portion of their stories to raise consciousness of the numerous, invisible challenges they face during promotion and tenure at their respective colleges of engineering. This paper is more than just information-sharing, it is a raw, complex look into the stifling that happens to academic mothers of color who are devalued and exploited for their motherhood, their service, empathy, and productivity outputs in systems of higher education that was never made for them.

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