Engineering Educators Bringing the World Together
2025 ASEE Annual Conference & Exposition
Palais des congrès de Montréal, Montréal, QC • June 22–25, 2025 ASEE
Paper ID #48101

A Few Good Connections: Exploring the Social Networks of Underrepresented Racially Minoritized (URM) Entrepreneurs in Tech Fields

Dr. Ebony Omotola McGee, The Johns Hopkins University

Dr. Ebony McGee, Bloomberg Distinguished Professor of Innovation and Inclusion in the STEM Ecosystem, is a 13-time NSF investigator awardee, is a Bloomberg Distinguished Professor of Innovation and Inclusion in the STEM Ecosystem at Johns Hopkins University. An electrical engineer by training, she is renowned for her work addressing race and structural racism within the STEM ecosystem, and their impact on the mental and physical health of Black and other minoritized students and professionals. Dr. McGee has spearheaded multiple initiatives, such as R-RIGHTS, EDEFI, and ICQCM, to foster diversity, equity, and inclusion in STEM and has received grants to unlock the entrepreneurial potential of underrepresented groups in STEM. Her research incorporates Afrofuturism to reimagine a STEM future where Black individuals thrive and has resulted in her highly acclaimed book, "Black, Brown, Bruised: How Racialized STEM Education Stifles Innovation." She founded Racial Revolutionary and Inclusive Guidance for Health Throughout STEM (R-RIGHTS) and co-founded the Explorations in Diversifying Engineering Faculty Initiative (EDEFI), as well as the Institute in https://www.icqcm.org/ support from the National Science Foundation, the Spencer Foundation, and the WT Grant Foundation.

Dr. Shelly Engelman, Johns Hopkins University

Shelly Engelman, Ph.D., is the Director of Research and Evaluation at Custom EduEval LLC in Austin, TX, and also a Research Manager at Johns Hopkins University. She earned her PhD in Social Psychology and has over 20 years of research and evaluation experience. Dr. Engelman has been a lead evaluator, data analyst and social science methodologist on over 40 federal and state funded grants and programs.

Dr. Thema Monroe-White, George Mason University

Thema Monroe-White is an Associate Professor of Artificial Intelligence, and Innovation Policy at the Schar School of Policy and Government and the Department of Computer Science at George Mason University. Her interests include bias mitigation in artificial intelligence (AI), critical quantitative and computational methods, and racial equity in innovation and entrepreneurship (I&E). She is particularly concerned with understanding the pathways to achieving social and economic empowerment for minoritized groups via I&E, AI education, and emancipatory data science. She has received multiple NSF awards to investigate issues of racial equity in the STEM ecosystem, including serving as a lead member of the research team for the Inclusion in Innovation Initiative (i4), a $3.5 million cooperative partnership to develop a national infrastructure for diversity and inclusion within the NSF Innovation Corps (I-Corps™) Program. Inspired by her work on intersectional inequalities in science, she has also received funding to investigate the harms of structural racism on the scientific enterprise, and the benefits derived by the inclusion of historically marginalized groups in the scientific workforce. Thema holds a Ph.D. in Science, Technology, and Innovation Policy from the Georgia Institute of Technology, as well as Master's and Bachelor's degrees in Psychology from Howard University.

Dr. Binh Chi Bui, The Johns Hopkins University

Binh Chi Bui is a STEM entrepreneurship postdoctoral fellow at Johns Hopkins University's School of Education. He earned his Ph.D. in Higher Education Leadership and Policy Studies from the University of Houston, M.A. in Educational Studies from KU Leuven, and B.Sc. in Teacher Education from Can Tho University. Before starting the current position, Dr. Bui held research positions at the University of Houston's College of Education and the University of Michigan's Marsal Family School of Education. His research interests include college access, academic success, and employment/career success, focusing on racially minoritized students.

A Few Good Connections: Exploring the Social Networks of Underrepresented Racially Minoritized (URM) Entrepreneurs in Tech Fields

ABSTRACT:

An entrepreneur is an individual who identifies, develops, and manages a business venture, taking on financial and operational risks with the goal of generating profit and/or creating social impact. Entrepreneurs drive innovation by introducing new products, services, or business models to meet market demands or address societal challenges. Entrepreneurship in STEM and technology fields is often perceived as a meritocratic landscape, yet systemic barriers persist, particularly for underrepresented racially minoritized (URM) entrepreneurs. These barriers include limited access to capital, industry networks, and mentorship, which impact their ability to scale businesses successfully (Fairlie & Robb, 2007; Kerr & Mandorff, 2023). While previous research underscores the importance of social networks in entrepreneurial success, limited attention has been given to how URM founders' networks function differently from their non-URM counterparts. Our study investigates how URM entrepreneurs define and leverage their networks, the types of relationships they build, and the specific support they receive, distinguishing between formal (industry experts, investors) and informal (family, friends) ties. Using Social Network Analysis (SNA), we surveyed 358 entrepreneurs, finding that URM founders rely more on friends and family for emotional and spiritual support, while non-URM founders tend to access industry experts and problem-solving support. This discrepancy affects access to venture capital and technical expertise, reinforcing structural inequalities in entrepreneurship. Our study also explores the implications of these findings for engineering and entrepreneurship education. We propose integrating equity-centered networking strategies into engineering curricula, equipping students—particularly those from minoritized backgrounds—with the tools to build effective, diverse entrepreneurial networks. By reimagining entrepreneurship education through a race-conscious lens, we contribute to fostering inclusive and sustainable pathways for URM entrepreneurs in STEM and technology sectors.

INTRODUCTION

A report by McKinsey & Company (2019) estimated that advancing racial equity could add 1 trillion to 1.5 trillion to the U.S. economy by 2028, partly through the growth of minority-owned businesses. Yet, the Annual Business Survey (ABS) by the U.S. Census Bureau (2022) reported that minority-owned businesses accounted for only 19.9% of all U.S. businesses in 2020. While these businesses hold significant economic potential, underrepresented racially minoritized[1] (URM) entrepreneurs often face significant barriers, including limited access to funding, mentorship, and industry expertise essential for scaling their businesses. These challenges are deeply rooted in systemic inequities tied to race and ethnicity (Akella & Eid, 2023; Fairlie & Robb, 2007). For example, access to critical resources often hinges on social networks which provide avenues for funding, problem-solving, and professional opportunities. However, compared to their non-URM counterparts (e.g., White, Asian), URMs (e.g., Black/African American; Latinx/Hispanic, Indigenous) tend to have less access to robust, industry-focused networks, particularly in STEM and tech fields (Fairlie & Robb, 2007; Sorenson, 2018; Milli et al., 2016). While prior research has established the importance of social networks for entrepreneurial success, few studies have examined how network composition and support structures differ between URM and non-URM entrepreneurs, and how these differences shape psychosocial and business outcomes. This study addresses this gap and sheds light on the unique ways that URM founders leverage social capital to navigate an entrepreneurial ecosystem shaped by historical injustices that continue to influence the landscape of technology-based growth industries (Cook, 2014; Fechner & Shapanka, 2018).

Social Networks and Key Challenges for URM Entrepreneurs

Social networks are a vital component of entrepreneurial success, particularly for early-stage entrepreneurs. These networks provide access to mentorship, funding opportunities, technical expertise, and critical growth connections (Burt, 2004; Light & Dana, 2013). Research highlights that entrepreneurs with diverse, broad networks are more likely to succeed, as they can access novel information and opportunities unavailable within homogenous networks (Burt, 2004). For URM entrepreneurs, social networks play an even more critical role in addressing systemic barriers by providing not only resources but also legitimacy in spaces where their presence is often underrepresented (Granovetter, 1973; Vongswasdi et al., 2024). However, qualitative and anecdotal evidence suggests that URMs tend to rely on networks of family and friends, which, while rich in trust and emotional support, may lack the technical expertise and industry-specific connections needed to scale a business (Akella & Eid, 2023; Light & Dana, 2013). These "strong ties," characterized by close, intimate, and frequent interactions with family members, close friends, or long-term collaborators, are critical for fostering emotional support, resilience, and trust (Granovetter, 1973). However, these ties may limit access to novel or diverse information and opportunities that exist outside the immediate circle. Likewise, reliance on informal networks (i.e., friends, family) is thought to compound systemic barriers by limiting URMs' access to broader

[1] Underrepresented Minority (URM) refers to racial and ethnic groups that are disproportionately underrepresented in specific fields, particularly in STEM and entrepreneurship, relative to their overall presence in the U.S. population. Thus, our definition of URM includes: Black or African American; Hispanic or Latino/a/x; Native American, Alaska Native, or Indigenous Peoples of North America; Native Hawaiian or Other Pacific Islander.

professional networks, such as venture capitalists and industry experts (Ruef, 2002; Sorenson, 2018). This exclusion from critical industry networks suggests that URM founders may lack access to "weak ties"—professional connections that bridge different social groups (Granovetter, 1973). Weak ties have been shown to be critical in securing loans, venture capital, or technical support, even when controlling for education and business potential (Fairlie & Robb, 2010). Limited access to such networks not only hinders business scalability for URM entrepreneurs, but also perpetuates broader racial and financial disparities (Acheamponmaa, 2024).

Research Purposes and Questions

While existing qualitative research and theoretical papers highlight some differences in how URMs and non-URMs access networks, significant gaps remain in understanding these dynamics from a quantitative and social network analysis perspective, particularly in tech fields. Most studies have focused on broad conceptualizations of networks without delving into the specific types of relationships and support structures that constitute entrepreneurial networks. This lack of empirical data limits our ability to identify actionable differences in network composition and support systems across racial and ethnic groups.

This study addresses these gaps through three key objectives. First, it explores the **types of relationships** URM tech founders rely on, comparing them with the networks of non-URM entrepreneurs (e.g., family, friends, mentors, technical experts). Second, it examines the **types of support** entrepreneurs receive from individuals within their networks (e.g., emotional support, career advice, networking). Third, it investigates how these relationships and support types are linked to outcomes, including psychosocial factors (e.g., entrepreneurial self-efficacy) and business performance (e.g., future viability). By employing a quantitative approach and social network analysis, this research aims to offer a more nuanced understanding of how network composition and support structures are differentially related to entrepreneurial outcomes for both URM and non-URM entrepreneurs in tech fields.

Our research is guided by the following questions:

1. **Types of relationships:** What types of individuals (e.g., industry experts, family) do URM entrepreneurs rely on compared to non-URM entrepreneurs?
2. **Type of support:** What types of support do URMs derive from their networks compared to non-URMs?
3. **Correlation and Outcomes:** How do the relationships and support types correlate with psychosocial and venture outcomes for URM and non-URM entrepreneurs, and how do these correlations differ between groups?

Research Significance

This study examines the differences in social networks and support systems that URM and non-URM entrepreneurs leverage to scale their businesses successfully. Using Social Network Analysis (SNA), we aim to deepen our understanding of the structural and contextual factors influencing URM founders, particularly in tech fields, where systemic inequities often limit access to critical resources. SNA is a unique methodological approach that maps and quantifies relationships within networks (Chung et al., 2005; Yap et al., 2024). A key component of SNA is the analysis of an individual's "ego network," which consists of the central individual (the ego) and their direct

connections (alters). This approach enables researchers to visualize the structure of an entrepreneur's immediate network, measure the diversity and strength of ties, and identify patterns of support, such as mentorship, technical expertise, or emotional assistance. By examining these networks, we can gain critical insights into how different types of relationships and support systems influence entrepreneurial success (Chung et al., 2005).

Previous research shows that while URMs are more likely to start businesses than their non-URM counterparts, they often encounter unique barriers that limit their ability to sustain and grow their ventures (Akella & Eid, 2023). By analyzing the types of relationships and supports within entrepreneurial networks, this study seeks to inform policies and programs that foster equitable access to resources with the ultimate goal of creating a more inclusive and supportive entrepreneurial ecosystem in tech fields.

Theoretical Framework

This study is grounded in the concept of *social capital*, originating from the sociological works of Bourdieu (1986). According to Bourdieu (1986), social capital is a key form of capital that social agents can leverage to enhance their position within a social field. It refers to the bonds and relationships that define the networks of social agents, such as entrepreneurs. Within these networks, agents mutually recognize and accept each other, creating a foundation for sharing knowledge and materials (Bourdieu, 1986; Bui & Tran, 2022). In business, those outside a given circle must prove their legitimacy (Vongswasdi et al., 2024). For URM entrepreneurs, entering the predominantly White and male-dominated business world presents challenges, as their racial differences may hinder their integration into these established networks. This disparity creates differences in the types of support available to URM entrepreneurs compared to their non-URM counterparts.

In this study, we approach social networks through the understanding of two social capital types—informal and formal (Bui & Tran, 2022; Fugate et al., 2004). This distinction helps highlight the racial differences in social network availability between URM and non-URM entrepreneurs. Informal social capital involves personal connections, such as friends and family, while formal social capital includes professional contacts and experts. Informal networks arise from bonding, which refers to relationships among individuals within identical social spheres (Coleman, 1988; Yap et al., 2024), whereas formal networks serve a bridging function, connecting individuals from different social spheres (Coleman, 1988; Yap et al., 2024). Entrepreneurs' social networks define their social circles and establish boundaries to protect members, offering resources to those within the network. As such, gaining membership in these networks requires time and effort, with networks prioritizing their members (Bourdieu, 2020).

Previous works on social capital (e.g., Bui & Tran, 2022; Fugate et al., 2004; Yap et al., 2024) and social networks in entrepreneurship (e.g., Acheamponmaa, 2024; Kerr & Mandorff, 2023; Light & Dana, 2013; Renzulli et al., 2000) emphasize the importance of social networks in entrepreneurial life although the benefits of these networks depend on their strength or size (Higgins & Kram, 2001; Seibert et al., 2001). It is well-documented that entrepreneurs face various stressors when making decisions under resource constraints (White & Gupta, 2020). For URM entrepreneurs, the additional pressures they face due to race, ethnicity, and sometimes gender make them particularly vulnerable within the predominantly White and male-dominated business culture

(Kerr & Mandorff, 2023; Vongswasdi et al., 2024). Drawing from the theoretical framework, we equally emphasize the significance of the networks and supports available to URM entrepreneurs. By examining these networks and their associated forms of support, we highlight the potential avenues URM entrepreneurs can leverage to scale their businesses successfully.

METHODS

Data Sources

To address our research questions, we designed and administered the *Supporting Innovation and Diversity among Entrepreneurs* (SIDE) 2, a national online survey distributed between 2020 and 2023. The instrument incorporated constructs derived from empirically validated scales widely used in entrepreneurship research. Scales for the SIDE 2 survey aligned with our research objectives to assess network differences between URM and nonURM tech founders. In addition to examining network differences, the survey investigated key psychosocial factors such as founders' attitudes, perceptions, and business intentions, providing a deeper understanding of how different network types influence entrepreneurial outcomes.

Network Items

The SIDE 2 survey included items to capture detailed insights into participants' professional and personal networks using a SNA approach. Participants were asked to identify up to five individuals who are critical to their ventures, and then classify each by **relationship type** (mentor/advisor/coach, industry expert, technical expert, peer/colleague, or friend/family member) and **type of support** (problem-solving, financial opportunities, career advice, networking, personal/emotional support, or spiritual support). Participants were instructed to select only one relationship type and one support type that best described each individual that they listed.

To ensure clarity, detailed descriptions were provided for each relationship type and support through dropdown menus. For example, the following descriptors were used for support type:

- **Problem-solving**: Provides information or advice to help me solve problems in my business
- **Spiritual**: Provides spiritual guidance; helps me connect to a higher meaning or calling
- **Career Advice**: Helps me think about long-term career plans
- **Financial Opportunities**: Helps me capitalize on financial opportunities or other opportunities
- **Personal/Emotional**: Allows me to vent and discuss tough problems to get me back on track
- **Networking**: Connects me with other people

Psychosocial Items

Psychosocial constructs included entrepreneurial identity, entrepreneurial self-efficacy, equity ethics, and racial activism. To ensure reliability, Cronbach's alphas were calculated for all multi-item constructs. **Entrepreneurial (ENT) identity** (Liguori, 2012) demonstrated strong reliability (3 items; $\alpha = 0.93$), and captures how integral participants perceived their entrepreneurial work to their identity (e.g., "My work as a founder is an important part of who I am"). **ENT self-efficacy** (McGee et al., 2009) included sub-constructs such as marshalling (3 items; $\alpha = 0.70$), which assessed confidence in gaining support for one's vision (e.g., "How confident are you in getting

others to believe in your vision?"), and planning (4 items; α = 0.80), which measured confidence in estimating customer demand. **Equity ethics** (McGee et al., 2022) included 17 items (α = 0.96), focusing on participants' efforts to create inclusive spaces for marginalized groups (e.g., "I apply my expertise to make spaces more inclusive of marginalized groups"). **Racial activism** (adapted from Szymanski, 2012) included 12 items (α = 0.95) and was modified to encompass all racial groups by replacing terms like "African-American" with "People of Color" (e.g., "I attend conferences on issues pertaining to People of Color"). Racial activism was rated on a 7-point scale (1, very untrue of me to 7, very true of me), while all the other measures were rated on a 5-point Likert scale (1, strongly disagree to 5, strongly agree).

The survey also included additional variables such as founder experience and background (e.g., education level and professional history), demographic information (e.g., race/ethnicity and gender identity), and business characteristics (e.g., legal status). Participants were also asked whether their business provides products or services designed to benefit **marginalized communities** (e.g., "Does this business offer any products or services specifically designed to meet the needs of marginalized groups?"). Using measures from Hechavarría et al. (2017) and Hörisch et al. (2017), participants were also asked to allocate 100 points between **economic value** (financial performance of the venture) and **societal value** (benefit to society or community). Business outcomes were assessed with items measuring **financial outlook** (e.g., "How do you feel about the financial future of your business?" Scale: 1, not at all confident to 5, very confident) and considerations for **stopping the business** (e.g., "How often do you think about stopping your business?" Scale: 1, never to 5, almost always).

Recruitment and Inclusion Criteria

Our recruitment strategy targeted both non-URM and URM founders, with an intentional focus on oversampling URM participants. To reach potential participants, we utilized a multi-channel approach, including entrepreneurship-focused groups and networking platforms via LinkedIn, direct outreach to collaborators and professional contacts, and engagement with online networks specifically catering to URM entrepreneurs. Additionally, we implemented a snowball sampling technique, where initial participants were invited to refer other eligible individuals within their networks; this technique allowed us to broaden our reach to a wider audience of URM founders. All recruitment and communication materials clearly outlined the study's purpose, emphasizing the importance of participants' experiences in contributing to a deeper understanding of entrepreneurship. Participants were also informed about the time commitment required to complete the survey and assured of the confidentiality of their responses.

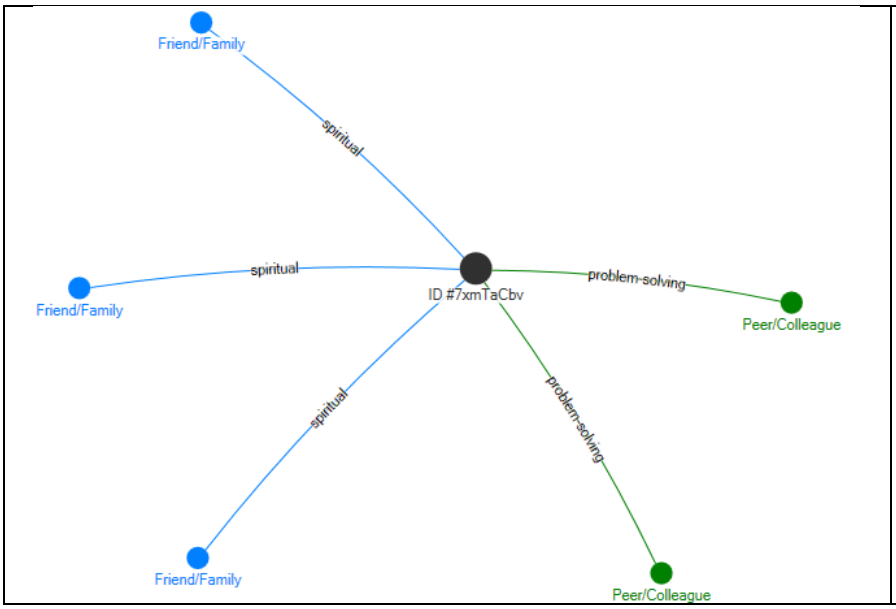
A total of 358 founders of tech businesses completed the SIDE 2 Survey. The inclusion criteria for the study were as follows: (1) participants must self-identify as founders of tech companies; (2) they must have completed at least 50% of the survey items; (3) they must have provided race/ethnicity information, as this variable was central to the study's primary research question; and (4) they must have responded to the series of network questions, identifying at least one individual within their network.

Participant Demographics

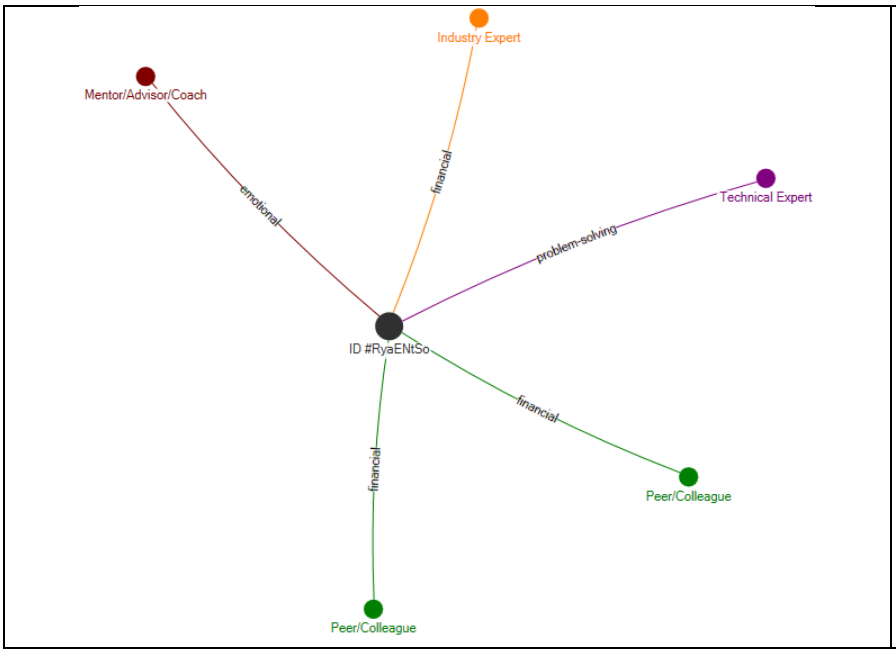
Our dataset consisted of 358 participants, with 55% identifying as URM and 45% as non-URM. Racial and ethnic composition included 42% African American or Black, 11% Latinx/Hispanic/Spanish descent, 1% American Indian or Alaska Native, 20% Asian, and 25% White. Gender representation comprised 51% women, 47% men, and 1% preferring not to disclose. In terms of education, 68% of participants held postgraduate degrees, while 25% held bachelor's degrees, and 7% reported Associate's degrees, some college, and high school diplomas. Business structures of the participants were overwhelming for-profit entities, consisting primarily of Limited Liability Companies (LLCs) (47%), S-Corporations (23%), and C-Corporations (20%), with smaller proportions operating other structures. Participants' businesses spanned diverse technology categories, including Information Technology (22%), Engineering and Advanced Technologies (15%), Biotech and Health Tech (12%), Artificial Intelligence and Machine Learning (10%), and other sectors. See Appendix A for more details (Tables A1–A6).

Analytic Approach

We employed SNA to map and quantify the structure and composition of respondents' social networks using NodeXL—an open-source network analysis and visualization software package for Microsoft Excel (Smith et al., 2009). The analysis focused on the frequency of engagement with different network members, as well as the types of relationships and support received. A key component of this approach involved constructing ego-networks for each participant, which represent the immediate connections of a central individual (the "ego") and their direct ties ("alters"). See the figures below as examples:



URM Founder (example)



Non-URM Founder (example)

Note. The sociograms, or ego-networks, above illustrate examples of "ego networks" for a URM tech founder and a non-URM tech founder. In each sociogram, the central node represents the participant (the "ego"), while the surrounding nodes represent individuals identified as important to their entrepreneurial ventures. Nodes are color-coded by relationship type, and the type of support provided is labeled along each connecting edge. The geographic arrangement of nodes around the ego reflects categories such as friends/family, peers/colleagues, etc., highlighting gaps or abundances in specific relationship types within each network.

For each relationship type and support type, we computed frequency percentages to assess the composition of participants' networks. For example, if a participant did not list any individuals as technical experts, they would receive a 0% for technical experts. Similarly, if a participant listed four individuals in their network and three provided spiritual support, they would be assigned a 75% for spiritual support. This method provided a detailed understanding of the distribution of relationship and support types within each network and followed the same approach outlined by Yap et al. (2024), who used frequency percentages to analyze network composition and its implications for women of color in STEM majors.

To further explore differences in networking patterns and support systems across demographic groups, we conducted independent samples t-tests. Correlation analyses were also employed to examine the relationships between network composition, support types, and entrepreneurial outcomes. This approach allowed us to begin to assess how social networks are related to entrepreneurial outcomes for URM and nonURM founders.

RESULTS

Network Properties

The degree centralities, which represent the number of individuals connected within each ego network, ranged from 1 to 5 individuals across all networks analyzed. On average, URMs had a degree centrality of 4.01, while non-URMs averaged slightly lower at 3.99. See table below. However, this difference was not statistically significant, indicating that the number of individuals

(or alters) in the ego networks was similar for both URMs and non-URMs. This finding suggests that, in terms of network size, there is no notable difference between the two groups.

	nonURM (n=161)		URM (n=197)		Independent samples t-test
	Mean	SD	Mean	SD	
Degree Centrality	3.99	1.33	4.01	1.36	t(345)=-0.08, p=0.937

Note. **p<.01, *p<.05; ±p<.10 (trending toward significance)

Relationship and Support Type Differences

The table below highlights differences in the relationship and support types present in the networks of URM and non-URM tech founders. The results suggest that URMs had a significantly higher percentage of their networks comprised of **friends and family** members compared to non-URMs. Conversely, non-URMs had significantly more **industry experts** in their networks compared to URMs.

Regarding support types, non-URMs had significantly greater access to **problem-solving** support, while URMs were more likely to have individuals in their networks who provided **spiritual** (t(319)=−1.82, p=0.069, *marginally significant*) and **personal/emotional** support. These findings suggest distinct patterns in the composition and support structures of the networks for URM and non-URM tech founders. While non-URMs have more access to problem-solving support and connections with industry experts, URMs tend to rely more on emotional and spiritual support possibly from friends and family.

		nonURM		URM		
		Mean	SD	Mean	SD	Independent samples t-test
Relationship Type	Mentor/Advisor/Coach	0.25	0.26	0.26	0.24	t(330)=-0.48, p=0.628
	Friend/Family member	**0.17**	**0.22**	**0.25**	**0.27**	**t(356)=-3.11, p=0.002****
	Peer/Colleague	0.23	0.26	0.21	0.26	t(344)=0.50, p=0.620
	Industry expert	**0.20**	**0.23**	**0.14**	**0.18**	**t(300)=2.39, p=0.017***
	Technical expert	0.15	0.20	0.13	0.18	t(329)=1.32, p=0.187
Support Type	**Problem-solving**	**0.37**	**0.29**	**0.29**	**0.26**	**t(298)=2.62, p=0.009****
	Spiritual	**0.10**	**0.16**	**0.13**	**0.18**	**t(319)=-1.82, p=0.069±**
	Career Advice	0.11	0.17	0.11	0.17	t(306)=-0.08, p=0.935
	Opportunities	0.21	0.23	0.19	0.21	t(303)=0.62, p=0.533
	Personal/Emotional	**0.09**	**0.17**	**0.14**	**0.22**	**t(326)=-2.07, p=0.039***
	Networking	0.13	0.17	0.15	0.18	t(316)=-0.83, p=0.407

Note. **p<.01, *p<.05; ±p<.10 (trending toward significance)

Outcomes Differences

Examining psychosocial and business venture outcomes, the table below reveals important differences between URM and non-URM tech founders. While no significant differences were observed in ENT self-efficacy and only marginal differences in ENT identity, URM tech entrepreneurs reported significantly higher levels of **racial activism** and **equity ethics** and were more likely to develop products or services targeting marginalized communities. This reflects a

stronger commitment to social and racial justice within their ventures. Additionally, URM entrepreneurs showed a marginally *lower* likelihood of stopping their businesses, indicating potential differences in persistence, resilience, or dedication to both their ventures and their social and racial justice goals.

Together, these findings suggest that URMs may approach entrepreneurship with a unique emphasis on addressing systemic inequities and advancing social/ racial justice. This focus could influence the types of network relationships and support systems they rely on, potentially leading them to cultivate networks that prioritize community connections, shared values, and collective action rather than purely transactional or profit-driven relationships.

	nonURM		URM		
	Mean	SD	Mean	SD	Independent samples t-test
ENT Identity	**4.36**	**0.79**	**4.51**	**0.78**	**t(340)=-1.76, p=0.080±**
ENT Self-efficacy	3.99	0.59	4.03	0.68	t(355)=-0.56, p=0.578
Racial Activism	**3.46**	**1.56**	**4.60**	**1.56**	**t(342)=-6.89, p=0.000****
Equity Ethics	**3.67**	**0.86**	**4.04**	**0.76**	**t(319)=-4.30, p=0.000****
Economic Value	64.21	22.66	64.46	20.94	t(330)=-0.11, p=0.916
Societal Value	35.79	22.66	35.54	20.94	t(330)=0.11, p=0.916
Financial outlook	**4.05**	**1.08**	**4.23**	**0.94**	**t(312)=-1.65, p=0.099±**
Marginalized Product/ Service (1, yes)	**0.30**	**0.46**	**0.50**	**0.50**	**t(351)=-3.89, p=0.000****
Stopping Business	**2.26**	**1.04**	**2.06**	**0.96**	**t(324)=1.86, p=0.064±**

Note. **p<.01, *p<.05; ±p<.10 (trending toward significance)

Correlations between Network Composition and Outcomes

To examine how network composition, relationship, and support types relate to psychosocial and venture outcomes, correlations were analyzed separately for URM and non-URM tech entrepreneurs to explore how these relationships differ based on participants' race/ethnicity. See Appendix B for the correlation tables. The results reveal the following:

For non-URMs, **problem-solving support** emerges as a *key* factor associated with positive venture-related outcomes. It is significantly correlated with confidence in one's financial future (r=.18), ENT identity (r=.21), and ENT self-efficacy (r=.17). Interestingly, it is also positively and significantly associated with racial activism (r=.18) and equity ethics (r=.19), suggesting that problem-solving support may extend beyond financial and technical assistance to encompass addressing social issues related to their ventures. Conversely, relationships with **industry experts** show negative associations with racial activism, equity ethics, and financial opportunities support, indicating that these connections may prioritize financial or technical goals over socially driven objectives. See Table B1 for more information.

For URMs, the relationship between one's network and support types and psychosocial and business venture outcomes was less pronounced and straightforward, suggesting that the influence of specific support types may be more nuanced or context-dependent for this group. The correlations indicate that **support related to financial opportunities** is positively associated with economic values (r=.16) and negatively associated with social values (r= −.16). This may suggest

that URMs who prioritize economic outcomes are more likely to value networks tied to individuals who provide financial opportunities, whereas those focusing on social values may not emphasize such connections. Additionally, **spiritual support** was negatively correlated with ENT self-efficacy (r= −.15), indicating that reliance on spiritual support may be less conducive to fostering confidence in entrepreneurial abilities. However, as this is a correlational finding, the direction of the relationship is not clear—it is equally plausible that individuals with lower entrepreneurial self-efficacy may seek spiritual support as a source of encouragement and resilience to persevere in their business endeavors. **Mentors/advisors/coaches** were positively correlated with racial activism (r=.15), while friends/family members (r=−.17) and personal/emotional support (r= −.16) were negatively correlated with racial activism. Similarly, personal/emotional support was negatively associated with equity ethics (r=−.17). Together, these findings suggest that more professional relationships, such as those with mentors or advisors, may reinforce activism and equity-focused goals, while personal or emotional support from friends and family may be less aligned with socially driven entrepreneurial pursuits for URMs. See Table B2 for more details.

Correlations between Relation Type and Support Type

To understand the connections between relationship types and the kinds of support they provide, correlation matrices for URM and non-URM participants (see Appendix C) were analyzed. The results reveal some consistencies across both groups. For both URMs and non-URMs, **friends and family members** are positively associated with **spiritual support** and **personal/emotional support**, but are not negatively related to financial opportunities. This suggests that friends and family occupy similar roles in providing personal and spiritual support across groups. Similarly, **industry experts** are negatively associated with spiritual support, but positively correlated with **financial opportunities**, indicating that these relationships help connect entrepreneurs with financial resources. Technical experts, on the other hand, are negatively associated with personal/emotional support for both groups, suggesting that their contributions are more technical (reflecting specific domain expertise) and less personal in nature. Finally, **mentors/advisors/coaches** are positively correlated with **career advice** across both groups, highlighting their shared role in guiding entrepreneurs' professional development.

Where differences emerge is in the role of specific relationship types for URMs compared to non-URMs. For URMs, networking support is positively associated with peer colleagues (r=.19) and industry experts (r=.19), whereas this pattern is not seen for non-URMs. Moreover, for URMs, industry experts provide both financial opportunities (r=.18) and networking support, highlighting their dual role, which is absent for non-URMs. Additionally, technical experts offer problem-solving support for URMs (r=.24), but not for non-URMs who tend to rely on industry experts for problem-solving support.

Together, these findings suggest that while there are shared patterns in how relationship types align with support types—for example, mentors providing career advice and friends/family offering emotional and spiritual support—URMs benefit from additional roles played by certain relationships. Specifically, for URMs, industry experts and technical experts appear to play a broader role by offering networking and problem-solving support, respectively. This expanded functionality may reflect the unique needs of URMs as they navigate structural inequities (Brush et al., 2018; Fox et al., 2011).

DISCUSSION

This study explored the network composition and support types that are accessible for URM and nonURM entrepreneurs in tech sectors, and their relationship to psychosocial and venture outcomes. One key finding is that URMs rely more heavily on friends and family for spiritual and emotional support, whereas non-URMs are more likely to access industry experts and problem-solving support within their networks. This difference suggests that URMs prioritize trust-based, personal relationships, potentially reflecting systemic barriers to accessing professional networks. Conversely, non-URMs appear to have more access to transactional, expertise-driven relationships that provide specialized knowledge and opportunities.

Psychosocial outcomes also differed significantly between the two groups. Validating earlier findings on nascent entrepreneurs (Monroe-White & McGee, 2024), URM tech founders reported higher levels of racial activism and equity ethics and were more likely to develop products or services targeting marginalized communities. This reflects a stronger commitment to social and racial justice within their ventures, suggesting that URMs approach entrepreneurship with a focus on addressing systemic inequities. This emphasis may influence the types of networks that they cultivate as they may prioritize shared values and collective action over purely transactional or profit-driven relationships. Alternatively, this reliance on friends, family, and emotional/spiritual support may reflect structural barriers such as limited access to industry experts or other forms of social capital due to systemic racism (e.g., Brush et al., 2018).

The relationship between network and outcomes also differed by group. For non-URMs, the relationship was clearer and slightly more straightforward: problem-solving support was positively associated with entrepreneurial identity, self-efficacy, and financial confidence, indicating that actionable guidance strengthens these outcomes. For URMs, the relationship was more complex. Spiritual support negatively correlated with entrepreneurial self-efficacy, suggesting a potential misalignment between the emotional focus of spiritual guidance and the confidence required for entrepreneurial decision-making. At the same time, the positive correlation between mentors and racial activism highlights the importance of professional relationships in advancing equity-focused goals. In contrast, the negative correlation between personal/emotional support and racial activism or equity ethics suggests that these types of relationships may not align directly with socially driven entrepreneurial pursuits. These findings underscore the nuanced role of networks and support types for URMs and suggest the need for further exploration of contextual factors. For instance, industry-specific dynamics or cultural influences may shape how URMs utilize their networks. Additionally, systemic inequities may restrict their access to problem-solving or expertise-driven relationships, which are linked to positive entrepreneurial outcomes for non-URMs. Future research should investigate these variables to provide a more comprehensive understanding of how social networks influence entrepreneurial success, particularly for URMs navigating structural barriers.

How Should These Results Be Used in the Teaching of Entrepreneurship?

The findings from this study highlight the essential role that social networks play in the success of entrepreneurs in STEM and technology fields. To ensure that entrepreneurship education is more inclusive and effective, courses should integrate networking as a core component. Students should be trained on how to build and leverage both formal and informal networks (Bui & Tran, 2022; Fugate et al., 2004), including industry mentorship, accelerators, and professional organizations. Given that URM entrepreneurs often rely heavily on personal networks for emotional and community support, targeted interventions should be designed to help them expand their access to industry connections and resources.

Additionally, entrepreneurship programs should emphasize equity-centered networking strategies that acknowledge and address systemic barriers URM entrepreneurs face. This includes experiential learning activities where students engage with established entrepreneurs, investors, and mentors who understand the challenges of navigating predominantly White and male-dominated industries (Kerr & Mandorff, 2023; Vongswasdi et al., 2024). Furthermore, since URM entrepreneurs often experience limited access to venture capital, entrepreneurship courses should provide hands-on training in securing funding. This includes pitch preparation, grant writing, and strategies for building relationships with investors who prioritize diversity-led businesses.

Another key area for improvement is the introduction of Social Network Analysis (SNA) tools to help students assess and strategically expand their professional relationships. Understanding the distinction between strong ties (e.g., family and community support) and weak ties (e.g., professional and industry connections) can empower students to develop more effective networking strategies. Finally, entrepreneurship education should foster self-efficacy and identity development by helping students build confidence in their entrepreneurial skills while affirming their racial and cultural identities. This can be done through race-conscious mentorship programs, leadership development initiatives, and a curriculum that highlights successful URM entrepreneurs.

Practical Implications for Engineering Curriculum Reform

As the engineering industry shifts toward innovation-driven economies, it is crucial for engineering education to integrate entrepreneurship training with a focus on racial equity and social capital development. Currently, entrepreneurship is often treated as an elective in engineering programs, but to be more effective, it should be embedded into core engineering coursework (Addae et al., 2015). This would expose all engineering students, including URM students, to entrepreneurial thinking early in their education and provide them with the necessary tools to explore venture creation.

One critical reform is the development of structured mentorship and sponsorship programs that connect URM engineering students with experienced professionals, investors, and entrepreneurs in STEM fields. Such programs can help counteract systemic barriers that limit URM entrepreneurs' access to professional networks. Engineering programs should also prioritize experiential learning by incorporating real-world entrepreneurial training through university incubators, innovation labs, and startup competitions. Institutions should establish partnerships

with community organizations and minority-focused business development initiatives to provide students with direct exposure to entrepreneurship in action.

Additionally, engineering entrepreneurship curricula should include equity ethics training, recognizing that many URM entrepreneurs integrate social impact and racial activism into their business ventures. Teaching students how to develop ventures that prioritize sustainability, social justice, and community engagement can better prepare them to launch businesses that address systemic inequities. Another area of reform should focus on equipping students with the skills to navigate funding barriers. Since URM entrepreneurs face challenges accessing venture capital, engineering curricula should include workshops on alternative funding sources, such as impact investing, minority-focused venture funds, and crowdfunding platforms.

Lastly, Social Network Analysis should be incorporated into engineering entrepreneurship education as a tool for students to evaluate their professional networks. Teaching students how to map their connections, identify gaps, and strategically build relationships with industry leaders and investors will improve their ability to succeed as entrepreneurs. By integrating these changes into the engineering curriculum, institutions can better support URM students in overcoming systemic challenges and thriving as innovators and business leaders in STEM fields.

Limitations

This study has several limitations. First, the reliance on self-reported data introduces the potential for response bias; for instance, participants may overestimate or underestimate the importance of certain relationships or support types. Second, the cross-sectional nature of the study limits our ability to infer causation, making it unclear whether certain network features lead to improved outcomes or if successful entrepreneurs are better positioned to cultivate certain types of networks. Third, while the sample intentionally oversampled URMs, differences in network access may vary across subgroups within URMs, such as gender, ethnicity, or industry type, which were not explicitly disaggregated in this study. Lastly, the survey design limited participants to listing up to five key network members, potentially underrepresenting the breadth of their networks.

Next Steps

Future research could address these limitations by employing longitudinal designs to explore how network composition and support types evolve over time and their causal relationships with entrepreneurial outcomes. Additionally, as a next step, we plan to explore regression models (using relationship and support types as predictors) and expand the list of venture outcomes to include metrics such as revenue and profits to help broaden our understanding of entrepreneurial success. Likewise, including and controlling for additional demographic variables, such as gender and specific industry type, would provide more granular insights into subgroup-specific dynamics and intersectionality issues regarding race and gender. Furthermore, interviews or case studies could deepen our understanding of the lived experiences behind these networks and offer richer context to interpret the quantitative findings.

Intervention-based research is also warranted to explore how targeted programs can enhance URM entrepreneurs' access to industry experts and problem-solving support while preserving the trust-based nature of their existing networks. For example, programs that connect URMs with industry professionals while maintaining cultural responsiveness could bridge gaps in access to expertise.

Additionally, further research into the interplay between personal and emotional support and equity-focused goals could examine how these forms of support influence the ability of URM entrepreneurs to prioritize and advance social and racial justice in their ventures. Such studies could explore whether and how personal networks or “weak ties” foster resilience and offer encouragement needed to persevere within an entrepreneurial ecosystem influenced by historical inequities (Cook, 2014; Fechner & Shapanka, 2018).

References

Acheamponmaa, A. (2024). *Examining the role of access to capital, social capital networks, and education in supporting Black founders and investors in technology-based entrepreneurship* [Doctoral dissertation, Old Dominion University]. Norfolk, VA.

Addae, I. Y., Singh, R. P., & Abbey, A. (2015). Cultivating Black technology entrepreneurs through HBCU engineering & business programs. *Journal of Entrepreneurship Education, 17*(2), 12–30.

Akella, D., & Eid, N. L. (2023). *Justifying entrepreneurship: A socio-economic emancipatory strategy*. Springer.

Berkman, L. F., Kawachi, I., & Glymour, M. M. (2014). *Social epidemiology*. Oxford University Press.

Bourdieu, P. (1986). The forms of capital. In J. G. Richardson (Ed.), *Handbook of theory and research for the sociology of education* (pp. 241–258). Greenwood.

Bourdieu, P. (2020). *Habitus and field: General sociology* (P. Collier, Trans.; Vol. 2). Polity Press.

Brush, C., Greene, P., Balachandra, L., & Davis, A. (2018). The gender gap in venture capital-progress, problems, and perspectives. *Venture Capital, 20*(2), 115–136. https://doi.org/10.1080/13691066.2017.1349266

Bui, C. B., & Tran, L. H. N. (2022). Using Bourdieu's concepts of social field, habitus, and capital for employability-related research. In T. L. H. Nghia, B. C. Bui, J. K. N. Singh, & V. N. Lu (Eds.), *Graduate employability across contexts: Perspectives, initiatives, and outcomes* (pp. 47–62). Springer. https://doi.org/10.1007/978-981-19-3959-4_3

Burt, R. S. (2004). Structural holes and good ideas. *American journal of Sociology, 110*(2), 349–399.

Chung, K., Hossain, L., & Davis, J. (2005*). Exploring sociocentric and egocentric approach for social network analysis.* Proceedings of the 2nd international conference of knowledge e management in Asia Pacific. Victoria University, Wellington, NZ.

Coleman, J. S. (1988). Social capital in the creation of human capital. *American journal of Sociology, 94*, 95–120.

Cook, L. D. (2014). Violence and economic activity: evidence from African American patents, 1870–1940. *Journal of Economic Growth, 19(2):* 221-257.

Fairlie, R. W., & Robb, A. M. (2007). Why are black-owned businesses less successful than white-owned businesses? The role of families, inheritances, and business human capital. *Journal of labor economics, 25*(2), 289–323. https://www.jstor.org/stable/10.1086/510763

Fairlie, R. W., & Robb, A. M. (2010). *Race and entrepreneurial success: Black-, Asian-, and White-owned businesses in the United States*. MIT Press.

Fechner, H., & Shapanka, M. S. 2018. Closing Diversity Gaps in Innovation: Gender, Race, and Income Disparities in *Patenting and Commercialization of Inventions. Technology & Innovation, 19(4):* 727-734.

Fox, M. F., Sonnert, G., & Nikiforova, I. (2011). Programs for undergraduate women in science and engineering: Issues, problems, and solutions. *Gender & society, 25*(5), 589–615. https://doi.org/10.1177/089124321141680

Fugate, M., Kinicki, A. J., & Ashforth, B. E. (2004). Employability: A psycho-social construct, its dimensions, and applications. *Journal of Vocational Behavior, 65*(1), 14–38. https://doi.org/10.1016/j.jvb.2003.10.005

Granovetter, M. S. (1973). The strength of weak ties. *American journal of Sociology, 78*(6), 1360–1380.

Hechavarría, D. M., Terjesen, S. A., Ingram, A. E., Renko, M., Justo, R., & Elam, A. (2017). Taking care of business: The impact of culture and gender on entrepreneurs' blended value creation goals. *Small Business Economics, 48(1*): 225–257.

Higgins, M. C., & Kram, K. E. (2001). Reconceptualizing mentoring at work: A developmental network perspective. *The Academy of Management Review, 16*(2), 264-288. https://doi.org/10.5465/amr.2001.4378023

Hörisch, J., Kollat, J., & Brieger, S. A. 2017. What influences environmental entrepreneurship? A multilevel analysis of the determinants of entrepreneurs' environmental orientation. *Small Business Economics, 48(1):* 47–69.

Kerr, W., & Mandorff, M. (2023). Social networks, ethnicity, and entrepreneurship. *Journal of Human Resources, 58*(1), 183–220. https://doi.org/10.3368/jhr.58.3.0719-10306R2

Light, I., & Dana, L. P. (2013). Boundaries of social capital in entrepreneurship. *Entrepreneurship theory and Practice, 37*(3), 603–624. https://doi.org/10.1111/etap.12016

Liguori, E. W. (2012). *Extending social cognitive career theory into the entrepreneurship domain: entrepreneurial self-efficacy's mediating role between inputs, outcome expectations, and intentions.* (PhD thesis). Louisiana State University.

McGee, E.O., Naphan-Kingery, D., Miles, M. L., & Joseph, O. (2022). Black Engineering and Computing Faculty's Equity Ethic: Serving Black Students Between and through Academic Stages. Journal of Higher Education.

McGee, J. E., Peterson, M., Mueller, S. L., & Sequeira, J. M. (2009). Entrepreneurial self–efficacy: *Refining the measure. Entrepreneurship Theory and Practice, 33(4):* 965-988

McKinsey & Company. (2019). *The economic impact of closing the racial wealth gap.* https://www.mckinsey.com/~/media/mckinsey/industries/public%20and%20social%20sector/our%20insights/the%20economic%20impact%20of%20closing%20the%20racial%20wealth%20gap/the-economic-impact-of-closing-the-racial-wealth-gap-final.pdf

Milli J., Williams-Baron E, Berlan M, Xia J, Gault B. (2016). *Equity in innovation: women inventors and patents.* Washington (DC): Institute for Women's Policy Research.

Monroe-White, T., & McGee, E. (2024). Toward a race-conscious entrepreneurship education. *Entrepreneurship Education and Pedagogy*, *7*(2), 161-189.

Renzulli, L. A., Aldrich, H., & Moody, J. (2000). Family matters: Gender, networks, and entrepreneurial outcomes. *Social Forces, 79*(2), 523–546. https://doi.org/10.1093/sf/79.2.523

Ruef, M. (2002). Strong ties, weak ties and islands: structural and cultural predictors of organizational innovation. *Industrial and corporate change, 11*(3), 427–449. https://doi.org/10.1093/icc/11.3.427

Seibert, S. E., Kraimer, M. L., & Liden, R. C. (2001). A social capital theory of career success. *The Academy of Management Journal, 44*(2), 219-237. https://doi.org/10.2307/3069452

Smith, M. A., Shneiderman, B., Milic-Frayling, N., Mendes Rodrigues, E., Barash, V., Dunne, C., ... & Gleave, E. (2009, June). Analyzing (social media) networks with NodeXL. In Proceedings of the fourth international conference on *Communities and technologies* (pp. 255-264).

Sorenson, O. (2018). Social networks and the geography of entrepreneurship. *Small Business Economics, 51*, 527–537. https://doi.org/10.1007/s11187-018-0076-7

Szymanski, D. M., & Lewis, J. A. 2015. Race-related stress and racial identity as predictors of African American activism. *Journal of Black Psychology, 41(2*), 170-191.

U.S. Census Bureau. (2022). *Census Bureau releases new data on minority-owned, veteran-owned and women-owned businesses.* https://www.census.gov/newsroom/press-releases/2022/annual-business-survey-characteristics.html

Vongswasdi, P., de Groote, J., Heinrich, J., & Ladge, J. (2024). Beyond the prototype: Unpacking the intersectional identity and image work of female minority founders in a startup

context. *Journal of Applied Psychology*, Advance online publication. https://doi.org/https://doi.org/10.1037/apl0001234

White, J. V., & Gupta, V. K. (2020). Stress and well-being in entrepreneurship: A critical review and future research agenda. In P. D. H. P. L. Perrewé & C.-H. Chang (Eds.),

Entrepreneurial and small business stressors, experienced stress, and well-being (pp. 65–93).

Yap, M.-J., Foriest, J., Walker, K., Sanford, S., & Rice, A. (2024). Family helps transform the STEM Pathways of community college women of color STEM majors. *CBE—Life Sciences Education, 23(1)*, ar10. https://doi.org/10.1187/cbe.21-09-0273

Appendix A. Demographics

Table A1. Race/Ethnicity, URM/nonURM

	n	%
nonURM	161	45%
URM	197	55%
Total	358	100%

Table A2. Race/Ethnicity

	n	%
African American or Black	152	42%
Latinx/Hispanic/Spanish descent	40	11%
American Indian/Alaska Native	5	1%
Asian	71	20%
White	90	25%
Total	358	100%

Table A3. Gender

	n	%
Woman	184	51%
Man	170	47%
Non-Binary	0	0%
Prefer not to Answer	4	1%
Total	358	100%

Table A4. Highest Degree

	n	%
Post graduate degree (MBA, MS, MA, PhD, JD, MD, DDS, etc.)	245	68%
Bachelor's degree	91	25%
Associate's Degree	4	1%
Some College/High School diploma	17	5%
Other	1	0%
Total	358	100%

Table A5. Legal Status of Business

	n	%
Limited Liability Company	169	47%
C-Corporation	71	20%
S-Corporation	83	23%
Sole Proprietorship	20	6%
Nonprofit Corporation	7	2%
Partnership	3	1%
Other	3	1%
B-Corp	2	1%
Total	358	100%

Table A6. Type of Tech Business

Category	**%**	**Examples**
Artificial Intelligence (AI) and Machine Learning (ML)	10%	AI solutions for drones
Information Technology (IT) and Cybersecurity	22%	Cybersecurity governance solutions
Engineering and Advanced Technologies	15%	Rocket and satellite manufacturing
Biotech, Health tech, and Medical Devices	12%	Biopharmaceutical drug development
Data Analytics and Consulting	10%	Data Analytics for healthcare/infrastructure
Education and Workforce Development	7%	STEM teacher workflow tools for rubrics
Business Consulting and Marketing	12%	Business process improvement consulting
Environmental and Renewable Energy Solutions	5%	Carbon dioxide recycling
Media, Design, and Creative Services	5%	Media promoting STEAM
Other	10%	IT related to accounting and financial services

Note. Percentages may not add up to 100% as participants' businesses could fit into multiple categories.

Appendix B. Network and Psychosocial Outcomes, Correlation Tables

Table B1, non-URM only, Correlations

Non-URMs	Mentor/ Advisor/ Coach	Friend/ Family member	Peer/ Colleague	Industry expert	Technical expert	Problem-solving Support	Spiritual Support	Career Advice	Financial Opportunities	Personal/ Emotional Support	Networking Support	Degree Centrality
Economic values	-0.105	-0.040	-0.015	0.126	0.056	-0.002	-0.040	-0.039	0.130	0.003	-0.096	0.010
Social values	0.105	0.040	0.015	-0.126	-0.056	0.002	0.040	0.039	-0.130	-0.003	0.096	-0.010
Financial Future	-0.021	0.028	-0.015	-0.039	0.061	.183*	-0.060	-0.034	-0.121	0.071	-0.145	-0.010
Marginalized product (1,yes)	0.123	-0.026	-0.025	-0.018	-0.079	0.023	0.040	0.013	-0.077	-0.002	0.014	0.003
Stopping business	-0.108	0.049	-0.031	0.111	0.003	-0.098	-0.048	-0.041	0.130	0.083	-0.004	0.037
ENT Identity	0.091	-.192*	-0.010	0.026	0.076	.205*	-.304**	-0.067	-0.081	0.129	-0.013	0.010
ENT Self-efficacy	0.003	-0.114	0.070	-0.102	0.147	.166*	-0.082	-0.049	-0.155	0.057	-0.006	-0.013
Racial Activism	0.068	0.048	0.042	-.200*	0.036	.181*	0.114	-0.036	-0.160	0.020	-.187*	.241**
Equity Ethics	.171*	0.014	0.070	-.257**	-0.036	.187*	0.110	-0.119	-.243**	0.048	-0.028	0.082

Note. *p<.05; **p<.01

Table B2, URM only, Correlations

URMs	Mentor/ Advisor/ Coach	Friend/ Family member	Peer/ Colleague	Industry expert	Technical expert	Problem-solving Support	Spiritual Support	Career Advice	Financial Opportunities	Personal/ Emotional Support	Networking Support	Degree Centrality
Economic values	-0.098	-0.022	0.080	0.009	0.036	-0.112	-0.022	0.017	.159*	-0.038	0.025	-0.136
Social values	0.098	0.022	-0.080	-0.009	-0.036	0.112	0.022	-0.017	-.159*	0.038	-0.025	0.136
Financial Future	0.055	-0.050	-0.013	0.026	-0.005	0.078	-0.039	-0.013	0.012	-0.002	-0.076	-0.030
Marginalized product (1,yes)	0.067	-0.047	-0.104	0.117	0.016	0.056	0.056	-0.065	-0.089	-0.073	0.120	0.131
Stopping business	-0.100	0.020	0.027	-0.029	0.090	0.051	-0.002	0.019	-0.075	-0.013	0.015	0.011
ENT Identity	0.106	-0.064	0.016	0.046	-0.113	-0.116	0.090	0.027	0.057	-0.037	0.036	0.053
ENT Self-efficacy	0.019	-0.095	0.121	-0.011	-0.046	0.063	-.150*	-0.040	0.053	-0.013	0.049	0.008
Racial Activism	.146*	-.167*	-0.038	0.125	-0.009	0.105	-0.051	-0.052	0.083	-.157*	0.036	.246**
Equity Ethics	0.116	-0.040	-0.034	0.080	-0.122	-0.023	0.020	-0.030	.163*	-.168*	0.064	.255**

Note. *p<.05; **p<.01

Appendix C. Relationship and Support Type, Correlation Tables

Table C1, non-URM only

Non-URMs	Mentor/ Advisor/ Coach	Friend/ Family member	Peer/ Colleague	Industry expert	Technical expert
Problem Solving support	0.066	-.211*	0.061	-0.088	0.160
Spiritual Support	-0.112	.596**	-0.070	-.239**	-0.146
Career Advice	.189*	0.042	-.190*	0.008	-0.057
Financial Opportunities	-.209*	-.277**	0.148	.332**	0.022
Personal/ Emotional Support	-0.028	.211*	0.070	-0.106	-.168*
Networking Support	0.110	-0.107	-0.111	0.037	0.070

Note. *p<.05; **p<.01

Table C2, URM only

URMs	Mentor/ Advisor/ Coach	Friend/ Family member	Peer/ Colleague	Industry expert	Technical expert
Problem Solving support	0.039	-0.107	-0.125	0.041	.242**
Spiritual Support	0.090	.310**	-.148*	-.201**	-.168*
Career Advice	.276**	-0.139	-0.113	-0.044	0.045
Financial Opportunities	-0.038	-.296**	.210**	.179*	0.013
Personal/ Emotional Support	-.244**	.448**	-0.005	-.181*	-.158*
Networking Support	-0.064	-.211**	.193**	.186*	-0.059

Note. *p<.05; **p<.01