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Exploring the Interrelation of Family, Society, and Cultural Influence on International Chinese and Indian STEM Doctoral Students in the U.S.

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ABSTRACT: *This phenomenological study explores how familial, social, and cultural factors influence the academic choices, experiences, and career decision-making of Chinese and Indian STEM doctoral students in the U.S. Through semi-structured interviews with three Chinese and three Indian international students, thematic analysis identified five themes and ten subthemes. According to the findings, Indian students reported a strong impact from familial and societal expectations to pursue academic and career paths in engineering and medicine. In contrast, Chinese students were less likely to be influenced by their family in choosing specific fields of study. Moreover, the acculturation experience of studying abroad played an important role in shaping their identity, particularly through the transition from seeing themselves as students to researchers, and the desire to be financially self-sufficient. Additionally, students' post-graduation plans were impacted by social policies and family backgrounds, such as China's one-child policy, work-life balance, employment opportunities, and parents' work backgrounds.*

Keywords: Familial expectations, STEM doctoral students, Chinese international students, Indian international students, Acculturation, Identity development, Career decision-making

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INTRODUCTION

The increasing influx of international students into the United States reflects a significant trend in global higher education mobility (Altbach et al., 2019; Guruz, 2011). According to the Open Doors 2023 Report by the Institute of International Education, the United States serves as a global leader in international education, and it hosted 1,057,188 international students in 2023, with a climbing rate of 12% from 2022. Within this group, over half (53%) are from China (27.4%) and India (25.4%). Although there is an increasing trend for international students to choose various majors, the majority are enrolled in science, technology, engineering, and mathematics (STEM). Notably, more than 42% of international students chose to study a math and computer science, and engineering-related major (Institute of International Education, 2023). The diverse international student population enriches the diversity and inclusion of U.S. higher education pathways, bringing invaluable experiences and backgrounds to the overall education ecosystem (Beri et al., 2025; Rose-Redwood, 2010; Zou & Fu, 2025).

Chinese and Indian students constitute two of the largest and most demographically significant student populations in the U.S., yet their distinct acculturation experiences, particularly the role of family expectations, remain underexplored in the existing literature. Previous literature has either examined findings across heterogeneous international students' acculturation experiences (Campbell, 2015; Smith & Khawaja, 2011) or focused on challenges and coping strategies with specific countries such as China, India, or Korea (Chennamsetti, 2020; Ching et al., 2017; Chun & Poole, 2009). Recent research has also explored how language and culture as factors influence academic outcomes among Chinese and Indian international students in the U.S. higher education (Gong et al., 2025). However, few have questioned how deeply ingrained cultural norms, such as familial influences, shape these students' academic and career trajectories while studying abroad. This gap is noticeable based on the centrality of family in a collectivist cultural framework, which dominates Chinese and Indian societies (Chao & Tseng, 2002). In these contexts, educational and career decisions are rarely individualistic; rather, they are often intergenerational endeavors shaped by familial expectations, social norms, and cultural environments (Czaika & Toma, 2017; Wu, 2020). Recognizing the significant influence of family, society, and culture in shaping educational and career decisions in Chinese and Indian cultures, this study was designed to explore the role of family expectations in influencing their academic pathways, mental well-being, and career pathways while studying abroad. The following research questions were addressed:

1. How do familial, societal, and cultural expectations influence the academic choices and experiences of Chinese and Indian doctoral students in STEM fields at U.S. universities?
2. What strategies do Chinese and Indian students employ to manage acculturation challenges, family pressures, and societal expectations while studying in the United States?
3. How do these expectations continuously influence their future career paths?

LITERATURE REVIEW

Family, Social, and Cultural Factors Influence on Chinese Students

Familial, social, and cultural factors closely influence each other. From the family perspective, Chinese parents usually hold high expectations for their children's academic performance (Huang & Gove, 2015; Tan & Yates, 2011). They are inclined to impose their mindsets on their children's educational choices, which often encourages children to pursue careers in fields perceived as prestigious or financially stable. In some cases, these expectations are not merely suggestions but are seen as obligations that children are expected to follow.

Social norms further amplify these circumstances. Chinese students navigate a highly competitive academic environment, particularly under China's college entrance exam (Gaokao) system, where exam performance is seen as a determinant of future socioeconomic status (Muthanna & Sang, 2015). This system creates an environment that fosters intense peer competition, which compels students to adopt the study habits and career aspirations of top-performance peers (Liu et al., 2014). Additionally, collectivism is another value in Chinese society, which encourages conformity and creates a herd mentality. This can be understood as once a certain idea gains traction within the group, many students will follow suit (Earley, 1993).

Then, cultural traditions solidify this interrelation. China is deeply influenced by Confucian culture, which emphasizes the importance of education, and students often view academic achievement as a familial responsibility (Huang & Gove, 2015). This culture also emphasizes filial piety and reinforces parental authority over career choices (Lee & Morrish, 2012), while societal structures such as the Gaokao institutionalize the link between academic success and collective progress. For these reasons, the influence of family, society, and culture is interconnected, and each factor shapes the others.

Family, Social, and Cultural Factors Influence on Indian Students

Similarly, Indian families place great importance on education. Parents often impose influence over their children's educational and career choices. They want their children to choose majors like engineering or medicine, viewing these fields as pathways to financial stability and enhanced social standing (Alexander & Lowe, 2023; Ray et al., 2020). These expectations are rarely negotiable and reflect

a familial duty where career choices are tied to collective family aspirations rather than individual preferences.

This familial emphasis on choosing certain majors is also reflected in broader societal norms. Indian society encourages engineering and medicine as prestigious professions, considering them as a pathway to elevate a family's social status (Arulmani et al., 2003). This societal phenomenon is further manifested in students' decision-making. According to the findings from Pruthi et al. (2013), some Indian students reported choosing medicine and engineering as their college majors not only out of personal interest but also due to family and societal expectations. The institutionalization of major entrance exams, such as the Joint Entrance Examination (JEE) for engineering and the National Eligibility cum Entrance Test (NEET) for medicine, further entrenches these norms. By trying to access top institutions to perform on these exams, society reinforces the notion that success in these fields is both a personal achievement and a social obligation.

Moving beyond societal influences, India has its unique cultural background. India has been influenced by the caste system and hierarchical social structures, and historically placed importance on education as a tool for social advancement and economic security (Vaid, 2016). In this context, education goes beyond individual willingness and becomes a means to overcome socioeconomic constraints and fulfill generational aspirations. The cultural background aligns with familial and societal expectations, and it creates a self-reinforcing cycle where family, society, and culture collectively prioritize stability and prestige.

THEORETICAL FRAMEWORKS

While the primary approach was inductive, family system theory (FST) and acculturation theory (AT) served as tenets to shape and deepen the understanding of the complex interrelation between familial, social, and cultural influences on Chinese and Indian STEM students in the United States. In essence, FST believes that the family is an interconnected system where changes in one part impact the entire system (Broderick, 1993). This study adopts six components from FST that are either in a rigid or hierarchical way to provide a fundamental understanding of how the family system can have interactions that affect individual behaviors and dynamics (see Figure 1). The first one is family emotional climate; Chinese and Indian families are often seen as close-knit and collectivistic (Chadda & Deb, 2013; Chan, 2009). Therefore, decisions are not made in isolation by the students but are influenced by their family system. The second is the differentiation of self; both Chinese and Indian students may struggle to balance their own desires with their family's expectations.

Then, the family project process and multigenerational transmission process are also involved in family expectations that may not only be from their parental levels but also be passed through generations (Englund et al., 2004; Mortimer & Lee, 2021). Emotional cutoff is another perspective from the theory that could potentially explain the situation in which some international students may try to emotionally or physically distance themselves from their families to avoid the pressure and intensity they feel (Wei et al., 2005). Furthermore, societal emotion

is an insight from FST, especially since many East Asian and South Asian cultures often measure societal success by educational achievements (Zhou & Kim, 2006). As such, the family could raise their expectations of the students who study abroad in the STEM fields.

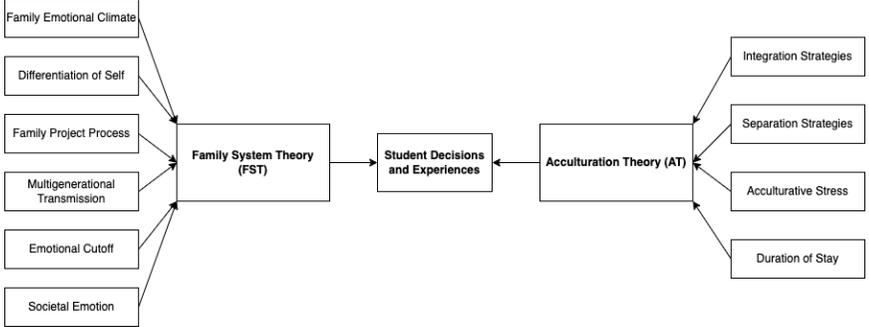


Figure 1: Conceptual Frameworks

AT examines how individuals from one cultural background adapt to a new cultural environment, focusing on the psychological and social changes that occur during this transition process (Schwartz et al., 2010). This theory has been utilized in many research studies that investigate the acculturation experiences of international students from various countries' educational backgrounds (Campbell, 2015; Smith & Khawaja, 2011). In this study context, acculturation strategies are a key concept derived from AT. It contains two major strategies: integration and separation strategies (Schwartz et al., 2010). Integration strategies can be understood as students who may balance familial expectations while also adapting to the academic and social norms of U.S. universities. Separation strategies refer to students feeling more pressure to conform to their family's desire without engaging deeply with U.S. cultural or academic practices.

Then, acculturative stress is another insight that examines how students balance their own academic goals with the pressures from their families to succeed in studying abroad (Bai, 2016). Lastly, the duration of time international students spend studying in the U.S. is important, as students who have newly arrived may struggle more with acculturative stress, adapting more towards a separation strategy, whereas students who have been in the U.S. longer may have opposite effects on handling the stress (Campbell, 2015; Smith & Khawaja, 2011).

FST and AT guide the initial understanding of how individuals' family structures, societal and cultural environments influence their decision to study in the United States, as well as their response to intercultural disparities. This study leverages insights from these theories to explain the specific ways in which familial and cultural dynamics shape students' academic choices and mental health outcomes.

METHOD
Participants & Recruitment Methods

This study involved six participants who attended higher education institutions in the United States. Among the six participants, three were Chinese students ($n = 3$) and three were Indian students ($n = 3$). This sample size is considered adequate for a phenomenological study because it allows for in-depth exploration of individual experiences (Creswell & Poth, 2016).

In this study, international students were defined as individuals who temporarily resided in a country other than their country of citizenship to pursue educational opportunities (Smith & Khawaja, 2011). Participants were recruited using convenience sampling and snowball sampling through the author's interpersonal and professional network. This data collection approach may introduce selection bias and limit demographic diversity. However, this concern is mitigated due to the sample was intentionally selected to include participants from various academic disciplines and different stages of U.S. study entry. The details of demographic information are presented in Table 1. All participants were assigned pseudonyms for confidentiality.

Table 1: Participants' Demographic Information

Pseudo	Field of Study	I	Nationality	Sex	Age	Initial Degree in the U.S.	FG
Cai	Biology	A	Chinese	F	24	High School	Y
Huang	Biological Engineering	B	Chinese	F	23	PhD	N
Zhou	Systems Engineering	C	Chinese	M	29	PhD	Y
Ahuja	Cell and Molecular Biology	A	Indian	F	30	PhD	N
Bedi	Engineering Education	C	Indian	F	30	Bachelor	Y
Patel	Human System Engineering	C	Indian	M	29	Master	N

FG = First generation. **I** = Institution attended.

Procedure

The data for this study were collected through semi-structured interviews. Each interview lasted 40-50 minutes via Zoom. The semi-structured interview protocol was developed based on the perspectives of two theoretical frameworks and the research questions of the study (see Appendix for the full protocol).

Prior to each interview, informed consent was obtained, and after obtaining consent, the video recording began. The first section collected participants' demographic information. Then, the second section was the semi-structured interview, consisting of a total of nine questions. During each interview, field notes were taken to capture non-verbal expressions and contextual details. After finishing the interview, \$30 gift cards were sent by email to each participant as a token of appreciation.

Methodology & Data Analysis

Data analysis was conducted using thematic analysis, following the guidelines established by Braun & Clarke (2006). Thematic analysis was suited for this study as it allowed for an in-depth exploration of how students constructed and interpreted their experiences within the socio-cultural contexts of their home countries. It also provided insights into how they navigated the U.S. education system while balancing these expectations. Interviews were coded in the Qualcoder (version 3.50) software. During the data analysis process, approximately ninety initial codes were generated. While there were similarities across some of these codes, a classification process was implemented to merge overlapping codes and improve coherence in the coding structure. Finally, themes were generated from the merged codes.

Research Quality & Ethics

This study adhered to Tracy's (2010) criteria for qualitative rigor to strengthen research quality. First, credibility was supported through member checking. Specifically, participants had the opportunity to review and confirm the accuracy of the transcribed interviews and preliminary findings. Second, sincerity was addressed through a positionality statement, which acknowledged that personal experiences may contain biases and their potential impact on the research process. Third, ethical standards were upheld through IRB approval prior to data collection. Collectively, these strategies aligned with established qualitative research benchmarks, which enhances the trustworthiness of the study.

Positionality Statement

As an international doctoral student in a STEM major, I have personally experienced the challenges of navigating academic and cultural transitions. I grew up in China and came to the United States in high school. I am familiar with the cultural pressures surrounding academic success and familial obligations in Chinese families. This background has influenced my decision to explore this

study as I can personally relate to aspects of their experiences. Moreover, my personal experiences inform my decision to use a phenomenological approach to explore participants' lived experiences comprehensively. While my lived experience provides valuable insights, I acknowledge that my cultural background may differ from certain Chinese and Indian students. To mitigate this, I will engage in critical reflection and peer feedback throughout the research process, ensuring that the voices and experiences of my participants are represented with accuracy and care.

FINDINGS

A total of five themes were identified through the thematic analysis of the interview data (refer to Table 2).

Table 2: Five Themes and Ten Subthemes of the Study

Themes	Subthemes
Familial, Social, and Cultural Influences in Shaping STEM Doctoral Mobility	Societal and Familial Emphasis on Engineering and Medicine in Indian Education
	The U.S. as a Beacon of Prestige and Opportunity: Family Influence and Cultural Status in Choosing American Education
	Social and Mentorship Influences on Pursuing Education Abroad
Redefining Personal and Family Roles Through Independence and Achievement	Diminished or Shifted Family Expectations on Post-Doctoral Admissions
	Pursuit of Financial Independence as a Form of Personal and Familial Fulfillment
Navigating Identity and Interpersonal Dynamics in a Western Cultural Landscape Personalized Coping Mechanisms and Strategies for Managing Stress	Evolving Academic and National Identities in Transition
	Physical Activity, Social and Community Support as Mental Health Resources
	Family Support System in Emotion and Finance
Diverse Motivations Behind International Students' Decisions to Stay Abroad or Return Home	The Influence of Family Entrepreneurship Backgrounds or the One-Child Policy
	Work-Life Balance and Job Opportunities as a Pro

Each theme captured unique aspects of experiences influenced by family, coping strategies, and participation approaches to balancing cultural values with academic and personal aspirations. These themes shed light on how familial expectations, societal influence, and the acculturation process shape their academic journey and future career prospects.

Familial, Social, and Cultural Influences in Shaping STEM Doctoral Mobility

Multiple external factors influenced Chinese and Indian students' decision-making in choosing majors and deciding to study in the U.S., including familial and societal emphasis on engineering and medicine, the reputation of U.S. higher education, and the surrounding environment's influence.

Societal and Familial Emphasis on Engineering and Medicine in Indian Education

A recurring pattern among all three Indian participants was societal norms favoring academic paths where students were expected to pursue an engineering-related program or a medical doctorate degree. This expectation was evident not only at the family level but also as a broader social and cultural norm in India. As Ahuja said, "There's an expectation [in India] that you'll either go into engineering or get a medical degree." Another participant, Bedi, emphasized this notion by describing her family and overall Indian societal phenomenon in her expression: "Before, during undergrad and master's, [my parents' expectations] were all about either engineering or being a [medical] doctor." Ahuja further illustrated this strong preference with a humorous yet telling example of this push towards engineering over medicine. He explained that his family encouraged him toward engineering because of his strengths in math while recognized his challenges in biology: "Not just STEM, [my family members] pushed me toward engineering specifically because they knew that if I became a doctor, I would probably start killing people! They knew I couldn't be a doctor because I was a really bad student in biology." These illustrations emphasized how India's societal emphasis on engineering and medicine fields shaped students' educational trajectories, reinforcing familial involvement in their academic choices.

The U.S. as a Beacon of Prestige and Opportunity: Family Influence and Cultural Status in Choosing American Education

Several participants indicated that their decision to study in the U.S. was because of education abroad being a social status symbol and the worldwide reputation of U.S. higher education. Specifically, Cai mentioned that there was a common social perception in China that U.S. education was primarily designed for an elite class: "[In China] people say that U.S. education is for the elite." This idea was similar in India and emphasized by Bedi, explaining how studying in the U.S. aligned with their family's status in upper-class social standing in India: "[My parents] belong in the upper class of the Indian economic society. So they have friends who are, you know, rich and influential and all that. So I think that's

where this kind of started. It was like a social status symbol for them.” This sentiment suggested that the global reputation of U.S. education was an academic opportunity and also a symbol of their status in their home country.

In addition, Patel emphasized such an idea implicitly with an example of the United States’ prominence in aerospace engineering, noting how the booming industry in the U.S. attracted international students seeking to study abroad in a globally recognized field. Meanwhile, Patel mentioned his uncle, who previously studied in the U.S. and was now employed there. His uncle expressed the quality of the U.S. education system, and to some extent, his uncle’s academic and career trajectory influenced Patel’s family, encouraging them to support Patel in pursuing a higher education degree in the U.S. Precisely because the U.S. education was highly recognized worldwide and had achieved excellence in certain fields, Chinese and Indian parents and students often considered the U.S. as their top choice for studying abroad. In particular, when a family had a pioneer who had experienced the education system, it provided additional evidence for the family to make a determination.

Social and Mentorship Influences on Pursuing Education Abroad

Participants acknowledged that their decision to study abroad was partially shaped by the influence of the surrounding environment. One Chinese participant, Huang, mentioned that she went to a foreign language junior high school in her home country, which initiated her idea to study abroad. Later, the university environment, where many peers were actively pursuing higher degrees, solidified her aspiration to pursue a higher degree. Combining these two experiences ultimately led her to study internationally for higher education.

Moreover, observing friends and classmates preparing for standardized exams and planning for overseas study created a collective sense of ambition, as was shown in Patel’s answers. He shared that: “In my undergraduate class in India, we were about 100 students, and almost everyone was studying for the Graduate Record Examinations (GRE) and planning to go to the U.S., UK, or Canada. If everyone’s doing it, it must be something good”. Being immersed in an environment where studying abroad was a common goal fostered his own interest in pursuing advanced degrees in foreign countries, and it was perceived as a logical and socially reinforced pathway within their community.

In essence, the decision to pursue higher education in the U.S. had been long-distance shaped by various factors throughout different stages in their lives. Early experiences, such as exposure to foreign language education, peer pressures and ambitions, and mentorship guidance, all of these factors contributed to a growing desire to study abroad. These cumulative effects in social and mentorship experiences ultimately crystallized their desire to pursue higher education in the United States.

Redefining Personal and Family Roles Through Independence and Achievement

Chinese and Indian doctoral students mentioned that their personal and family roles were redefined after arriving in the United States. Specifically, the redefining was from two perspectives, one with varying family expectations across different stages of life, and the other centered on the pursuit of financial independence as they navigated their academic and professional journeys.

Diminished or Shifted Family Expectations on Post-Doctoral Admissions

Although from the interviews, both Chinese and Indian families held high expectations for their children regarding grades and admission to high-ranking universities, these expectations often shifted or lessened once students entered a university or a PhD program, or had reduced academic expectations regarding performance and instead focused more on aspects of their children's personal well-being and cultural values. For example, Patel mentioned that his family did not have that many expectations of him while studying in the U.S., they were more concerned with cultural and religious values, particularly ensuring he did not drink alcohol or engage in illegal activities. This idea of diminished or shifted family expectations was also supported by Huang, who mentioned that her parents had high expectations for grades in junior high and high school because grades were the threshold to gain admission to a prestigious school. However, after she was admitted to the university, her family's focus shifted toward her well-being, such as whether she exercised regularly and felt happy daily. Even more, after Huang arrived in the U.S. for her doctoral program, her family no longer focused on whether she would complete the degree. Instead, their primary concerns had completely shifted to her physical and mental health.

All these diminished or shifted family expectations could be interpreted for various reasons. First of all, children have already met the family's expectations for the highest achievable degree. Hence, there was a reduced emphasis on demonstrating academic achievement, as the family felt a significant milestone had been accomplished. Moreover, family members and parents were not familiar with the U.S. education system, leading them to focus less on specific academic achievements and more on general success and well-being. The diminished and shifted priorities were illustrated by Ahuja's experience. She shared that: "I think my parents are mostly happy with whatever I decide. Nobody they know has ever done a PhD before, so I think they don't really understand what my options are. They're supportive in the sense that they don't have a strong opinion since they don't know the different options." Ahuja's account aligned with others', which indicated their families generally lacked detailed knowledge of the U.S. education system. Over time, as students became more independent, family involvement in their academic decisions tended to diminish.

Pursuit of Financial Independence as a Form of Personal and Familial Fulfillment

To a certain degree, financial investment implicitly generated expectations for strong academic performance and successful employment. There was an emerging sense of becoming financially independent. In other words, although all participants had research assistantships or teaching assistantships that provided financial support, there remained an underlying pressure that the current financial sources were inadequate for their living expenses, and they often experienced stress as a result. Students started to think about being financially independent as a necessary goal. Such goals were motivated by a combination of personal willingness, family expectations, and the practical challenges of covering costs while studying abroad. Bedi expressed that she had been financially independent since starting the PhD program, and research assistantships sometimes failed to adequately cover her living expenses. Hence, she perceives limitations in her lifestyle, which affected certain consumer behaviors and led to financial pressures. For example, she mentioned that unlike when she was receiving financial support from her family, she could no longer afford to purchase sneakers as frequently.

Similarly, Ahuja shared emotions related to financial insecurity. Her financial insecurity was not a result of an inadequate PhD stipend. Instead, her sense of insecurity was constantly involved in evaluating expenses against currency exchange rates and comparing prices to those back in India. This led her to constrain spending even on basic necessities such as food, and she also refrained from participating in social activities to reduce expenses. The insecurity from currency exchange also resonated with other participants Huang and Zhou. Zhou said: “When I first came here, I used to compare the prices of the same products between China and the U.S., and I’d think, ‘Oh, the price here is so expensive.’”

However, financial independence was not a self-initiated realization for all participants; rather, it was their family members who emphasized its importance for some participants. Zhou shared an account of his brother-in-law who asked him to be financially independent prior to coming to the U.S., emphasizing obtaining graduate assistantships as participating in the workforce and accepting financial responsibility. Based on Zhou’s story, certain families subtly encouraged their children to become financially self-sufficient. This external push potentially introduced an additional dimension to motivation or pressure for participants to manage their finances independently as they navigated their studies abroad.

Navigating Identity and Interpersonal Dynamics in a Western Cultural Landscape

Participants underlined the necessity of adapting to the autonomy and self-driven nature of U.S. graduate programs as a central challenge in their academic transition from their home country's education system to the U.S. education system. They also discussed cultural and identity shifting from their home country

to the U.S. Participants observed several differences between their original environments to the current circumstances.

Evolving Academic and National Identities in Transition

Participants described changes in how they perceived themselves and their roles within academic and cultural contexts after transitioning to new cultural and educational environments. Specifically, they believed that individuals had undergone shifts in both identity and cognition. For instance, Huang explained that she primarily recognized herself as a student focused on learning from established knowledge in the educational setting in China. However, she increasingly perceived herself as a researcher, actively engaged in research, and contributed to her research discipline in the U.S. education setting. This could also be described as the genuine identity shift from an undergraduate student to a PhD student role. This idea aligned with Ahuja's perspective, in which she considered herself to be a researcher compared to the previous student identity in the Indian education system. There were distinct differences between these educational systems. According to Huang and Ahuja, for example, China and India placed a stronger emphasis on theory-based education, while the U.S. focused more on practical, experimental approaches.

Beyond the transition from student identity to that of a researcher, there was another identity that manifested in Patel's story. He recently passed the Employment-Based, Second Preference, National Interest Waiver (EB2 NIW), an immigration approach for people with international status to obtain a U.S. green card. Despite being on track to receive a U.S. green card and potentially become a U.S. citizen in the future, Patel expressed a firm commitment to retaining his Indian nationality, saying, "I want to continue staying [in the U.S.] for long-term stability, financial stability, and because of the aviation industry itself, it's much more promising in the US. But I'll never give up Indian citizenship. I'll always be an Indian". Patel's words shed light on the complex relationship international students and researchers often have with their home and host countries. They sometimes balanced professional ambitions and personal identity, and while their roles and environments might shift, their personal ties and national identity often remained constant.

Personalized Coping Mechanisms and Strategies for Managing Stress

Individuals encountered stressful times during their time studying abroad, and each of them had their own unique ways of digesting their emotions and managing the associated pressures.

Physical Activity, Social and Community Support as Mental Health Resources

The experience of studying abroad presented numerous difficulties, ranging from cultural adjustments to academic expectations. These challenges were often marked by feelings of isolation, stress, and academic pressures from research. To cope with these difficulties, participants sought various approaches as mental

health resources. These approaches included: engaging in physical activities, sharing experiences with peers for social support, and enjoying their own hobbies during their spare time. Many participants considered physical activity as a resource for managing stress and supporting mental health. Patel shared that he engaged in gym workouts or running on occasion as part of his routine. Zhou frequently engaged in activities such as exercising, swimming, and climbing as a channel to release his emotions.

Social support from peers was another approach that helped international students reduce their stress and maintain well-being. Zhou mentioned that during his downtime, he usually connected with friends or lab mates who shared similar academic challenges because individuals who had similar experiences might understand each other's feelings better.

Personal interests were another approach that participants mentioned to cope with stress. For example, Huang shared: "When I'm not really satisfied with the [research] progress, I usually go see a movie or talk to my parents. Or, if it's something that's not manageable by talking to my parents or going out for a show like musicals or concerts, I'll travel." Overall, participants had their own unique ways of coping with the challenges they faced during their studies abroad. Each of them utilized a combination of physical activities, social support, and personal interests to manage stress and maintain mental well-being.

Family Support System in Emotion and Finance

Although, as previously mentioned, many international students' families became less engaged in deep conversations as their children entered different educational systems and life stages, due to unfamiliarity with these systems and experiences, this did not mean that families could not provide emotional support. Nevertheless, most of the participants mentioned that maintaining routine-based communication with parents allowed them to share information and lived experiences. Parents were always available when needed, and they offered both emotional and financial support. For instance, Zhou was concerned with the exchange rate from the Chinese Yuan to the U.S. dollar, which made him increasingly concerned about the high cost of living. In this situation, Zhou's parents persuaded him not to worry too much about the costs and to focus on his life experience and study instead. This support helped Zhou to overcome the financial difficulties of landing in the U.S. in the first place, making a smooth transition for him with reduced mental pressures from the family's understanding and support. This form of family support is further validated by Huang, who communicated with her family often. Specifically, she would call her parents nearly every time she was stuck in traffic during her daily commute, as she was located in a major U.S. city known for its heavy congestion. The primary reasons for her frequent communications were her close relationship with her parents; she believed that talking to family was a relaxing way that helped her reduce a certain degree of anxiety from her daily life.

Family support came not only from the emotional perspective but also from the financial side. Most of the participants mentioned that they wanted to be

financially independent. However, almost all of them had encountered financial pressure while studying abroad. In this case, parents always asked their children if they needed financial help from the family. Bedi shared an experience of her parents offering financial support, and she felt that her parents always backed her up no matter what happened: “I feel like if I needed [financial support], I would just need to tell my dad”. This financial support from their family was further validated by Huang’s conversations, who shared an experience from the past involving her physical health and the support she received from her parents: “I hurt my lower back recently, and the medical cost here was way higher compared to China. My mom asked if I needed money and said she could wire me some for treatment”. To some extent, familial support both emotionally and financially served as a way to alleviate stress. This meant that families did not solely impose pressures; rather, they often provided significant help and support to solidify participants’ mentalities.

Diverse Motivations Behind International Students’ Decisions to Stay Abroad or Return Home

Participants experienced varying familial expectations and societal influences regarding their decisions to stay in the U.S. or return to their home country for employment. Two participants from China mentioned that their parents had no expectations or suggestions regarding their careers. Two participants from India mentioned that their families wanted them to stay in the U.S. for future career plans. Two participants (one from China and one from India) expressed that their parents wanted them to return to their home country in the future.

The Influence of Family Entrepreneurship Backgrounds or the One-Child Policy

Parents had diverse perspectives on whether they preferred their children to stay in the U.S. or return to their home country for employment. Some parents did not offer specific guidance or pressure regarding this decision, instead expressing support for whatever choice their children felt was best for their careers and personal growth. Others leaned toward one option but ultimately prioritized their child’s happiness and success. Within all participants’ answers, two particular reasons stood out, explaining in detail why their parents wanted them to return to their home country after graduation.

Bedi explained that her family expected her to return to India post-graduation, as they had sufficient financial resources to support her in establishing her own business there: “My parents are business people. He’s been working 35-plus years. He has a construction, real estate, property development, all those kinds of business. So he doesn’t believe in working for somebody else in a job”. Bedi’s father’s perspectives were closely aligned with his background in entrepreneurship, shaping his views on various working approaches from the standpoint of a business owner. The divergent thoughts between Bedi and her

parents exhibited the experience of different forms of situations and diverse understandings of working or being an entrepreneur.

Similarly, Huang demonstrated why her parents wanted her to return to China for her future career, largely because of the impact of the one-child policy in the past decades of China and the responsibility of taking care of elders in East Asian culture. In this situation, Huang was the only child in her family: “They’re also concerned that as they get older, if I’m in the U.S. and they’re in China, it won’t be convenient. For example, if they’re in the hospital, I wouldn’t be able to get there in time, and they’d have to rely on others to take care of them. Because I’m an only child, that’s the main thing”. It is evident that Huang’s parents strongly felt the importance of family proximity and support. It reflects traditional East Asian values of filial duty and elder care that guided their hope for her return. Nonetheless, parents’ expectations in this stage only worked as suggestions or advice, and all the participants mentioned that they had their own ideas in terms of how to plan for their future careers, or they expressed that they were still unsure about future plans.

Work-Life Balance and Job Opportunities as a Pro

Although parents had certain guidance on whether to stay in the U.S. or return for employment, some participants stated two major reasons why they wanted to stay in the U.S.: the work-life balance and the corresponding job opportunities for many years of research. As Ajuha shared, there were many reasons behind the scenes for her to stay in the U.S., but work-life balance was undoubtedly one of the biggest reasons compared to the working environment in her home country. She expressed it as follows: “ I think compared to India, the work environment here is better, and the work-life balance is better. ..That was one of the things that made me want to [stay in] the U.S.” Similarly, Patel further emphasized the importance of work-life balance in his experience, stating: “Professionally, I’ve started to understand the importance of work-life balance, which didn’t really exist in India”. These perspectives underscore that the work-life balance in the United States played a crucial role in participants’ decisions to stay for employment.

Nevertheless, some participants expressed their concerns about the difficulty of finding jobs in their home country as their doctoral research expertise did not align with many job opportunities. Therefore, the U.S., in essence, offers more job opportunities that can better accommodate their specialized skills and expertise. Ultimately, such situations led to their decision to stay in the U.S. for jobs in the future. Overall, work-life balance, working environments, and corresponding job opportunities in the U.S. have a significant contrast with those in their home country. Hence, some participants aspired to stay in the U.S. for future employment.

DISCUSSION

This study leverages five main themes and ten subthemes from the analysis, revealing several patterns that align with findings from previous literature, as well as introducing new insightful themes from an alternative perspective. In this discussion section, the focus is placed on how the findings both align with and extend the conceptual frameworks (FST & AT). Additionally, the analysis highlights and contrasts the similarities and differences in the experiences of Chinese and Indian international students during their doctoral studies.

For Chinese students, previous literature found that Chinese families often emphasize prestige, stability, and financial security when choosing majors or pursuing a pathway (Kim et al., 2016; Yang et al., 2013). This point is also proved and supplemented in the interview, Chinese students' academic decisions reflect the interrelations between societal emotions and the family project process, which is consistent with FST. While parental expectations are prominent, they coexist with students' agency with influences from practical considerations and peer influence. Notably, the finding regarding the One-Child Policy in China has amplified the pressure, aligning with previous literature suggesting that the policy compels parents to place their willingness on a single child (Deutsch, 2006; Wang & Mireles-Rios, 2025). This fosters an internalized sense of duty and familial responsibility and ultimately influences their future decision-making. Moreover, the findings of the study indicate that familial expectations sometimes diverged from the participants' personal desires. Participants' conflicts between personal desires and familial expectations illustrate FST's differentiation of self (Guo et al., 2020), where an individual's thoughts and desires may conflict with those of their family. It also reflects FST's emphasis on emotional independence even in the absence of explicit coercion.

For Indian students, the findings confirm that Indian society tends to have a strong emphasis on engineering and medical fields due to perceived strengths and suitability (Roysircar et al., 2010). This also reflects FST's assertion that families function as emotional units and are influenced by societal emotion, where decisions are influenced by family and societal norms. The Indian family and social emphasis on engineering and medicine reflect this structural interdependence, where individual aspirations are closely aligned with broader family goals. In addition, one Indian participant referenced his uncle's stories as a source of inspiration, affirming his family's decision to support his pursuit of studying abroad. This exemplifies findings from the previous studies that the multigenerational transmission process described in FST, which exists in the phenomenon of inheritance, leads the next generation to follow a similar path to the family members (Broderick, 1993).

Interestingly, both Chinese and Indian families consider studying in the U.S. as a symbol of their social status. These findings reinforce the perception that pursuing a doctoral degree at a U.S. institution enhances family prestige, feelings of pride, and secures a competitive edge in career prospects. This finding resonates with FST as their decisions reflect the interplay of societal emotion and family project process, wherein familial aspirations intersect with broader social

networks. This also aligns with previous literature that suggests education abroad is often perceived as a strategic investment for families seeking long-term social and economic gains (Wang, 2020). Moreover, the identity shifts experienced by both Chinese and Indian doctoral students align with AT from the perspectives of acculturation integration and separation. Specifically, it illustrates how students transition from being knowledge learners in their home countries to becoming knowledge creators and researchers in the U.S. academic system (Ye & Edwards, 2017; Zhang, 2016). Many of the participants in this study described a shift in self-perception from passive absorption of structured knowledge in a tiered educational system to active participation in research, critical thinking, and independence in U.S. doctoral training environments. This also illustrates the process of detaching from their original research and learning environments and adapting to new identity roles in the new surroundings, as the ways of acculturation strategies.

In addition, while familial expectations served as both motivations and constraints, both Chinese and Indian students developed their coping strategies to manage the pressures in their daily lives. Notably, the theme of gradual decline or shift in familial expectations over time is consistent with the previous studies that students who leave home to receive an international education experience a gradual decrease in family involvement over time, both emotionally and in decision-making (Coryell, 2011; Lörz et al., 2016). However, despite the decreased or shifted expectations on direct involvement, the findings demonstrate that family influence persists in shaping their long-term career choices or even furthering the decision-making process.

Lastly, the pursuit of financial independence is a common theme across both groups and has been found in previous literature, which suggests that family often plays an important role in students' financial situations, and it often affects their behaviors and decision-making prior to and during the study abroad process (Pimpa, 2005; Whatley, 2017). Specifically, Pimpa (2005) found that financial contributions are one of the key factors influencing family expectations, and they have a significant impact on students' ability to manage expenses and decisions related to studying abroad and their lifestyles abroad.

CONCLUSION

This study provides valuable insights into Chinese and Indian STEM doctoral students' experiences at U.S. universities, particularly through familial, social, and cultural factors that shape their academic choices, learning experiences, and long-term career plans. Building on these insights, this research provides a distinctive contribution to understanding international academic mobility and culturally embedded decision-making in doctoral education. Especially, family academic expectations and cultural traditions often entail responsibilities and pressures for students. At the same time, families frequently provide financial stability and emotional reassurance, which can ease cultural adaptation and sustain students during their doctoral journey in the U.S. The interrelation of these dynamics reflects how they navigate their unique backgrounds and priorities.

Furthermore, Familial expectations continue to influence Chinese and Indian doctoral students even as they progress with their future trajectories. This is associated with their family background, such as an entrepreneurship background, as well as associated with a country's policy in a broader context. This study demonstrates the persistent and multifaceted impact of familial expectations on Chinese and Indian STEM doctoral students in the U.S. These expectations serve a dual role, affecting students positively or negatively. Regarding such situations, higher education systems should recognize these unique cultural challenges and take responsibility for prioritizing student-centered and culturally responsive counseling services, particularly for students from backgrounds requiring an acculturation process.

LIMITATIONS AND FUTURE DIRECTIONS

While this study provides several nuanced insights into how Chinese and Indian doctoral students' familial expectations influence their mental health and academic and future pathways, there is still room for improvement. This experiment utilized convenience sampling. While this approach was the most feasible for obtaining data and provided a wealth of valuable insights, the representativeness of the sample is limited. Future studies could use random sampling methods to enhance the transferability of the results.

Interestingly, one participant with a Chinese/Indian ethnic background but with U.S. citizenship and thus not included in the study provided certain insights for future directions. In her situation, she transitioned to becoming a U.S. citizen and is now married with children; future studies can examine how culture influences their academic decisions, mental health, and overall adaptation to diverse educational environments when their roles have been shifted as parents. Specifically, future studies can explore whether there is a passing of norms from the participant's original culture to the next generation, and how these norms are retained or influence their family and social adjustment dynamics.

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APPENDIX

Semi-Structured Interview Protocol

Demographic Questions:

1. Personal Information

- How old are you?
- What's your gender identity? (open-ended, can be anything)
- What's your nationality? (Chinese or Indian)

2. Academic Information

- What's your current degree program (Master's or Doctorate)?
- What's your field of study?
- Did you get your undergraduate or master's in the U.S.? What was your major?
- What's your parent's education level (first-generation students? Bachelor or higher?)

3. Time in the U.S.

- How long have you spent in the U.S.? (month, year)

4. Funding sources for studying in the U.S.

- What primary source of funding supports your study in the U.S.? (Personal or family funds, scholarship, university assistantship, student loan, or others)
- Did this cover most of your expenses? (some, little, or none)?
- Do you have a part-time job right now? (on-campus or off-campus)

5. Future Plan

- What are your intended career plans after graduation? (work in the United States; Return to home country for employment; future studies; Undecided, or some others)

Semi-structured Interview Questions (The subpoints are some potential follow-up questions or thoughts that can be asked)

1. Background Questions – one question:

- Can you tell me about your educational journal? What motivated you to pursue a graduate STEM degree in the U.S.?
 - Studying in the U.S. is your goal?
 - Family influence on studying in the U.S.?
 - Any societal influence on study in the U.S.

2. Research Question 1 (Decision Making & Mental Health) – four questions:

- How would you describe your family's expectations regarding your education and career?

- Did your family encourage you to pursue a certain STEM major?
 - In many Chinese or Indian families, there's a strong emphasis on education or career paths in a certain way.
 - Does your family expect you to go a certain universities (e.g., high rankings)?
 - How important is academic success in your family?
 - Can you share specific instances where your family's expectations have impacted your educational decisions or experiences?
 - Follow-up question from the last one.
 - Understanding that education abroad can be a significant financial investment for families in China/India, how has this impacted your sense of responsibility or pressure to succeed?
 - What were your thoughts when you faced such situations?
 - Feel obligated to have certain outcomes?
 - Affect your mental health?
 - How do you communicate with your family about your academic progress and experiences in the U.S.?
 - Do you think the communication puts more pressure on you?
 - How often do you communicate with your family?
- 3. Research Question 2 (Strategies & Coping Mechanisms) – four questions**
- What coping mechanisms or strategies do you use to manage the challenges of academic pressures?
 - Like any activities help you? (Peers, faculty, school activities)
 - associated with family expectations Mental health counseling services or school-related services?
 - Since studying in the U.S., have your perspectives on your family's expectations or cultural norms changed?
 - Different cultures influence your views on certain things.
 - Any changes when you communicate with your family?
 - How have you navigated cultural differences between China/India and the U.S. in terms of educational approaches and family dynamics?
 - Adopted any new ideas or mindsets in the U.S.
 - How do differences affect your and your family relationships?
- 4. Research Question 3 – 1 Question:**
- What are your career aspirations after completing your degree, and how do they align with your family's expectations?
 - Family expects you to stay or return?
 - Expectations on working for a certain field or company?
 - Family expectations influence your decisions or not? How?
- 5. Closing Question – 1 question**
- Is there anything we didn't talk about related to the study purpose? Or is there anything you would love to add before we finish the interview?

Interview Protocol Matrix

	Background Question	Research Question 1 (major choice & mental health)	Research Question 2 (coping strategies)	Research Question 3 (Future Plan)	Closing Question
Question 1	X				
Question 2		X			
Question 3		X			
Question 4		X			
Question 5		X			
Question 6			X		
Question 7			X		
Question 8			X		
Question 9				X	
Question 10					X

Closing Remarks

Thank you so much for sharing your experience today. Please let me know if you have any questions or concerns after this research. Before we conclude, is there anything else you'd like to add that we haven't covered?