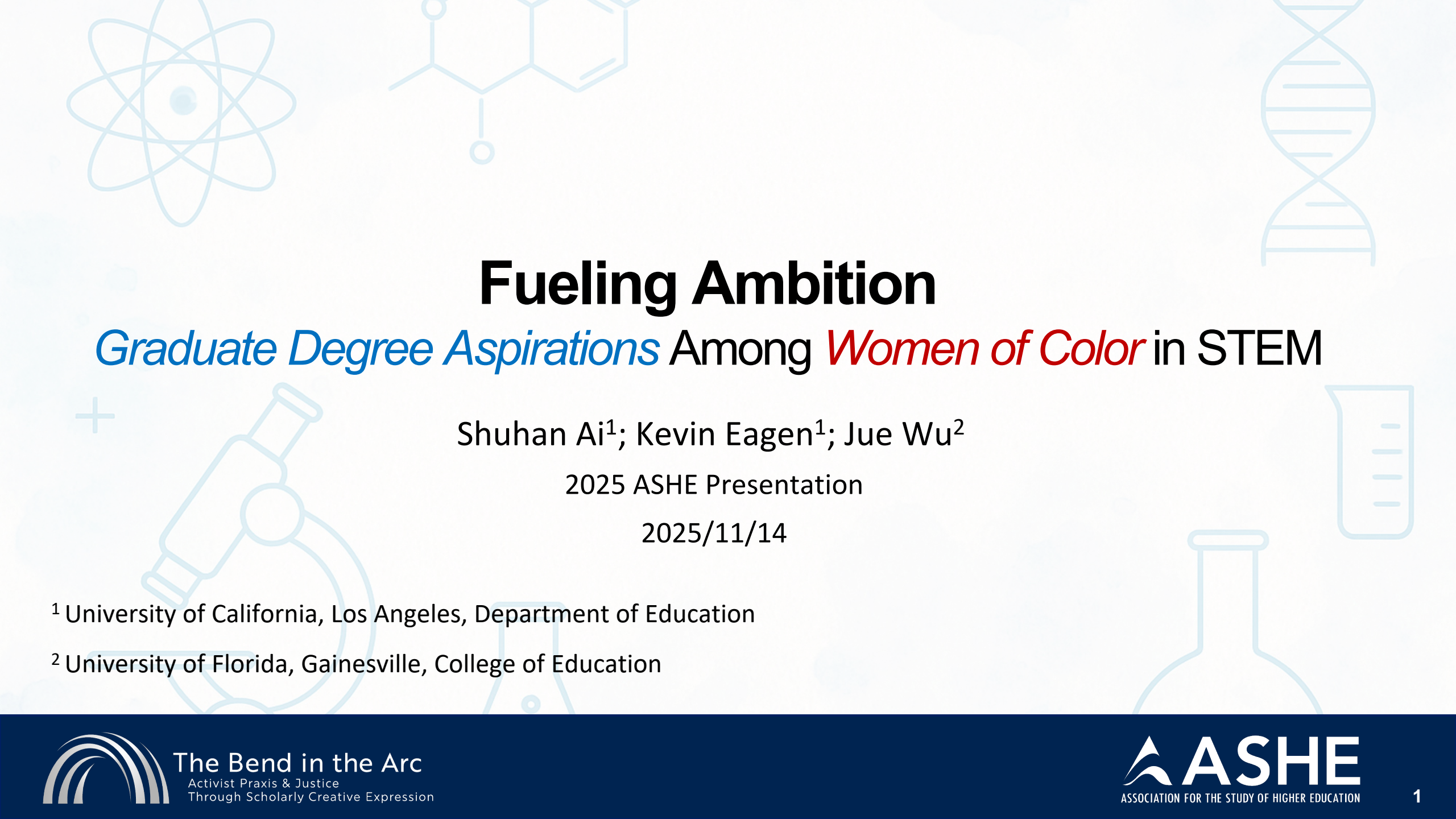




Fueling Ambition

Graduate Degree Aspirations Among *Women of Color* in STEM

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2025 ASHE Presentation

2025/11/14

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The Bend in the Arc

Activist Praxis & Justice
Through Scholarly Creative Expression

Land Acknowledgement

Denver is located on the traditional territory and homelands of the Nuuchiu (Ute), Tsistsistas (Cheyenne), and Hinono'ei (Arapaho) peoples. Forty-eight Tribal Nations are also connected to and continue to be in relation with the lands that are now known as Colorado. Denver was a site for the Indian Relocation Act of 1956, which sought to relocate Indigenous people from reservations to urban areas as a part of the federal government's broader termination policy era.



Motivation

- Underrepresentation of WOC in STEM
 - As of 2021, WOC remain a small fraction of **STEM graduate enrollment**:
4% Hispanic women, **3%** Asian women, **3%** Black women, **1%** multiracial women, **0.05%** Native (NCSES 2023; Fry et al. 2021)
- Systemic Racism and Sexism
 - manifest through **discrimination**
 - inequities in access to **resources**
 - exclusionary practices in both **higher education** and the **workforce**
- Research Gap
 - Deficit-based perspectives vs **anti-deficit framework**
 - Studies on CCW focus on qualitative methods; limited **quantitative** exploration of its impact in **STEM contexts** (Hiramori et al., 2024)



Literature Reviews



Key Factors Influencing Graduate STEM Degree Aspirations

- **Parental career** and **family SES** (Lehman et al., 2023)
- Structured academic support, e.g., **research engagement opportunities** (Cuellar & Gonzalez, 2021)
- Extracurricular activities such as **volunteer experiences** (Park et al., 2023)
- Institutional context, such as **selectivity**, **research-intensive** universities (Xu, 2016)



Leveraging CCW in STEM

- **CCW in STEM** highlights its role in helping URG students overcome systemic barriers, build resilience, and achieve academic and career success (Nhien, 2024)
- **Aspirational**: leadership and career aspirations
- **Social and Navigational**: engagement with institutional services, faculty support (Hiramori et al., 2024)
- **Resistant**: ethnic organization participation, social agency, and civic engagement (Connors, 2023; Rincón & Rodriguez, 2021)

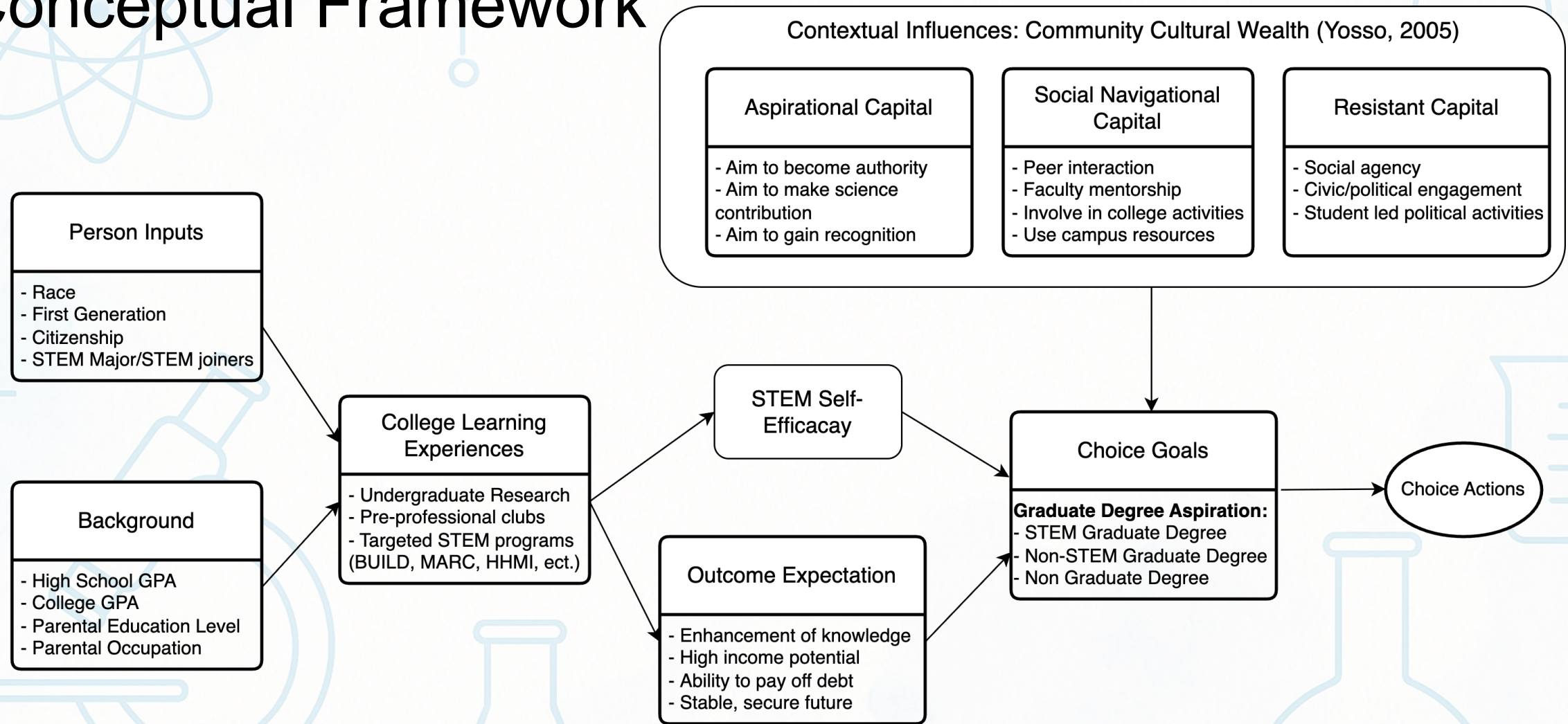


Research Questions

- RQ1: What are the **demographic characteristics**, **family backgrounds**, and **STEM disciplines** of **senior WOC majoring in STEM**? Do these characteristics differ significantly among students with **STEM graduate aspirations**, those with **non-STEM graduate aspirations**, and those with **no graduate study plans**?
- RQ2: Controlling for relevant **background characteristics**, do measures of **aspirational**, **social-navigational**, and **resistant capital** predict **intentions to pursue STEM graduate degrees** among **WOC in undergraduate STEM majors**?



Conceptual Framework



Data

- Data: HERI's 2018-2020 Freshman Survey and the 2022-2024 College Senior Survey.
- Analytical Sample: 1,353 senior WOC graduating with STEM major who responded to both surveys.
- QuantCrit's Principle: disaggregate race/ethnicity as granularly as possible and used binary indicators.
- Sample: 24% East Asian, 9% South Asian, 18% Southeast Asian, 1.6% Other Asian, 19% Black, 20% Chicana, 11% Latina, 4% Indigenous, and 5% Other.



Variables

Dependent Variable

Graduate Degree Aspiration

No Grad Degree Aspiration (ref), Non-STEM Grad Degree Aspiration, STEM Grad Degree Aspiration.

Independent Variable

Institutional Context

Institution Type; Institutional Selectivity; Institution Control; HBCU

Personal Inputs & Background

Race/Ethnicity (Binary); Parental Education/Career; STEM field; GPA

SCCT Components

Undergraduate research program; Campus Programs (e.g. BUILD, MARC, HHMI, S-STEM); Joined a pre-professional or departmental club.

Aspirational Capital

Make a theoretical contribution to science; become authority in their field; gain recognition from colleagues for contributions to their specialty

Social-Navigational Capital

Faculty Mentorship; College Involvement; Reach Out to Career counselor

Resistant Capital

Social Agency; Civic Awareness



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Analytical Approach

- RQ1: Descriptive statistics and cross-tabulations
- RQ2: Nested multinomial logistic regression

Model	Blockwise nested model
M ₁	Contextual & Personal Background & STEM fields
M ₂	M ₁ + College Learning Experience (SCCT)
M ₃	M ₂ + CCW dimensions (aspirational, social-navigational, and resistant)

$$\log \frac{P(Y_i = j)}{P(Y_i = 0)} = \beta_{0j} + B_i^\top \boldsymbol{\beta}_{Bj} + SCCT_i^\top \boldsymbol{\beta}_{SCCTj} + CCW_i^\top \boldsymbol{\beta}_{CCWj}, \quad j = 1, 2$$

- $Y_i = 0$ (no grad-degree plan); $Y_i = 1$: STEM grad-degree aspiration;
- $Y_i = 2$: non-STEM grad-degree aspiration



Descriptive Crosstabs

	No Grad Degree Aspiration	Non-STEM Grad Degree Aspiration	STEM Grad Degree Aspiration	Total % within the Sample	Person χ^2
East Asian	59.69% (194)	6.15% (20)	34.15% (111)	24.02% (325)	0.10
South Asian	63.49% (80)	5.56% (7)	30.95% (39)	9.31% (126)	1.08
Southeast Asian	61.41% (148)	4.98% (12)	33.61% (81)	17.81% (241)	1.33
Other Asian	50.00% (11)	0.00% (0)	50.00% (11)	1.63% (22)	3.38
Black	52.71% (136)	9.69% (25)	37.6% (97)	19.07% (258)	8.26**
Chicana/o/e/x	58.82% (160)	5.88% (16)	35.29% (96)	20.1% (272)	0.31
Latina/o/e/x	68.52% (111)	4.32% (7)	27.16% (44)	11.97% (162)	6.78*
Biological & Life Sciences	60.14% (338)	6.23% (35)	33.63% (189)	42.54% (562)	43.34***
Math & Computer Science	63.19% (115)	10.99% (20)	25.82% (47)	13.78% (182)	
Engineering	69.57% (112)	4.97% (8)	25.47% (41)	12.19% (161)	
Physical Science	35.62% (26)	4.11% (3)	60.27% (44)	5.53% (73)	
Health Professions	54.52% (187)	5.83% (20)	39.65% (136)	25.97% (343)	



STEM Graduate Degree Aspiration (vs. No Graduate Aspirations)

	Model 1			Model 2			Model 3		
	OR	SE	Sig.	OR	SE	Sig.	OR	SE	Sig.
SCCT: Personal Inputs & Background									
One of parents works in STEM	1.42	0.16	0.030 *	1.39	0.17	0.051	1.34	0.18	0.106
Physical Science (Ref: Bio)	3.12	0.30	0.000 ***	2.93	0.32	0.001 ***	2.12	0.35	0.031 *
Health Professions (Ref: Bio)	1.50	0.17	0.016 *	1.75	0.18	0.002 **	1.72	0.20	0.006 **
Participated in undergraduate research program				1.42	0.16	0.029 *	1.19	0.17	0.317
Participated in campus program that promotes STEM careers (e.g. BUILD, MARC, HHMI, S-STEM)				1.37	0.16	0.041 *	1.32	0.17	0.095
Faculty Mentorship Score (social navigational)							1.42	0.09	0.000 ***
College Involvement Score (social navigational)							1.21	0.08	0.016 *
Social Agency Score (Resistant)							0.79	0.09	0.009 **
Civic Awareness Score (Resistant)							0.96	0.08	0.638
AIC			1981.89			1824.05			1676.84
BIC			2173.49			2081.99			2009.13



Non-STEM Graduate Degree Aspiration (vs. No Graduate Aspirations)

	Model 1			Model 2			Model 3		
	OR	SE	Sig.	OR	SE	Sig.	OR	SE	Sig.
University (Ref: 4-year college)	0.60	0.34	0.132	0.51	0.35	0.053	0.43	0.37	0.024 *
Institution Control: Private (Ref: public)	0.46	0.39	0.044 *	0.37	0.41	0.015 *	0.24	0.46	0.002 **
Race: Chicana/o/e/x	0.65	0.51	0.396	0.54	0.53	0.244	0.27	0.66	0.045 *
Math & Computer Science (Ref: Bio)	2.12	0.35	0.034 *	2.10	0.37	0.044 *	2.03	0.41	0.086
Participated in undergraduate research program				1.93	0.30	0.027 *	2.49	0.32	0.005 **
Aim to make a theoretical contribution to science (aspirational)							0.58	0.18	0.003 **
College Involvement Score (social navigational)							1.34	0.14	0.041 *



Limitation

- Partial CCW Construct Coverage:
 - HERI secondary data, several CCW dimensions are missing or measured roughly, the analysis may understate CCW's influence.
- Nested Data Nature:
 - + • Students are clustered within institutions and programs, leaving potential between-college or between-program variation unexplored.
- Causality:
 - Study design is correlational, cannot infer direct causation between CCW and STEM graduate degree aspirations.



Conclusion & Discussion

- **Mentorship** play a key role in STEM graduate degree aspirations
- **Undergraduate research experience** as an important factor in promoting non-STEM graduate degree aspirations
- Future Research
 - Explore the mechanisms behind these relationships
 - how institutions can better leverage CCW to support WOC STEM persistence
 - Qualitative study; longitudinal; multilevel modeling; causal inference
 - Dive deeper into the students which strong **commitment to social agency** and **civic awareness**
- Future Practice/Policy:
 - Structured mentoring program
 - Connect STEM graduate education to **social impact** and **community contribution**



Q&A

- Thank you for your listening!

