

Black Novice Science Teachers' Perceptions of Teaching: A Mixed-Method Study

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What we know

- “Teachers are the single most important in-school factor that affects student achievement” (Workman, 2012, p.1).
- Classrooms where Black teachers instruct Black students, Black students have experienced positive outcomes, including positive academic attitudes and perceptions among students, and higher expectations of Black students among Black teachers (Egalite, Kisida, & Winters, 2015; Gershenson & Papageorge, 2015).

What we know

- Prior to the decision of *Brown v. Board of Education* (1954), more than 80% of Black children were taught by Black teachers.
- Fewer than 5% of high school science teachers teaching in the natural sciences are Black, as compared to 84% of their White counterparts (U.S. Department of Education, 2019).
- Few effective initiatives (i.e. Call Me Mister, alternative certification) support creating pathways to teaching among diverse communities (D'amico et al., 2017).

Purpose of the Study

The purpose of this mixed methods study was to investigate the perceptions of Black novice and pre-service science teachers in the U.S. This study is part of a larger study on motives and satisfaction with career choice.



Expectancy Value Theory: “individuals’ expectancies for success and the value they have for succeeding are important determinants of their motivation to perform different achievement tasks” (Wigfield, 1992, p. 50)



Factors Influencing Teaching Choice: guided by the consideration of self, value, and task variables that predict choices in the EVT model (Watt & Richardson, 2007)

Theoretical Framework

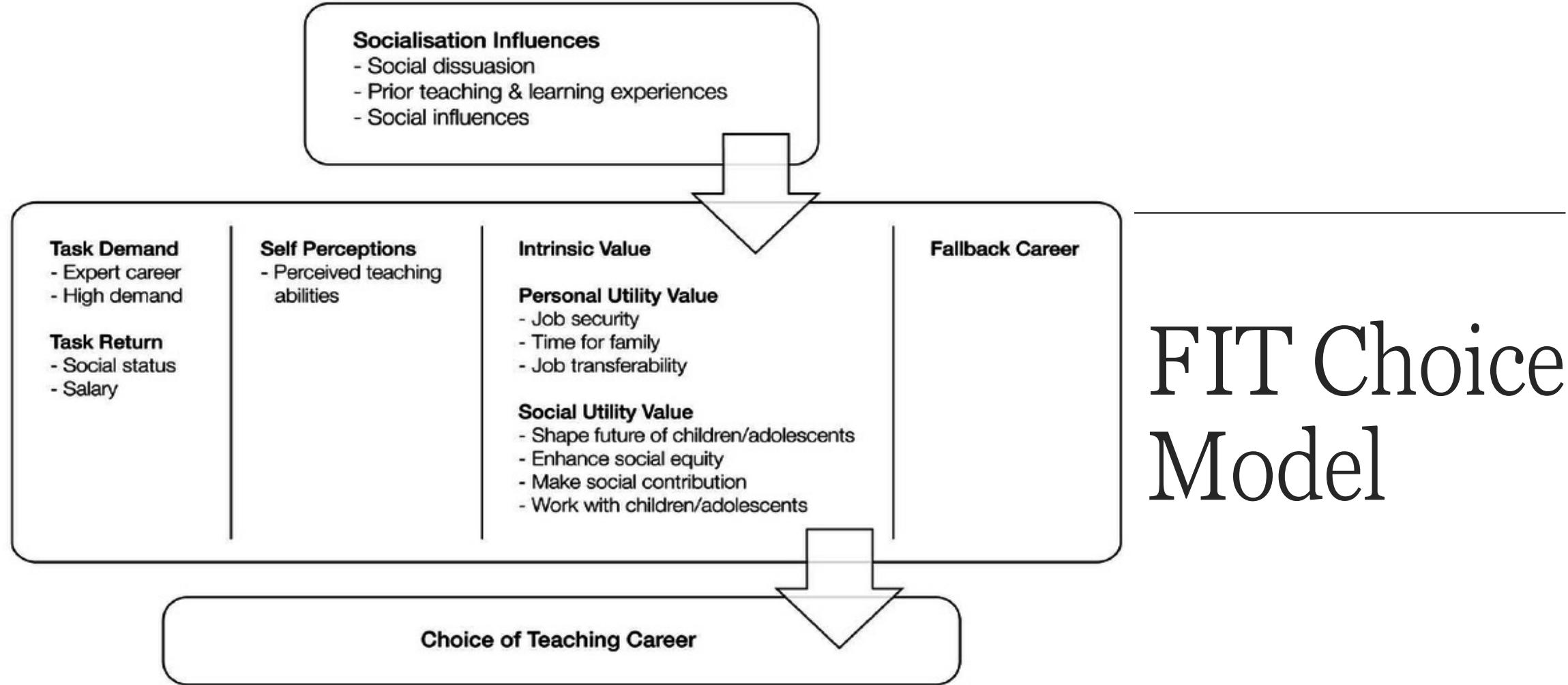
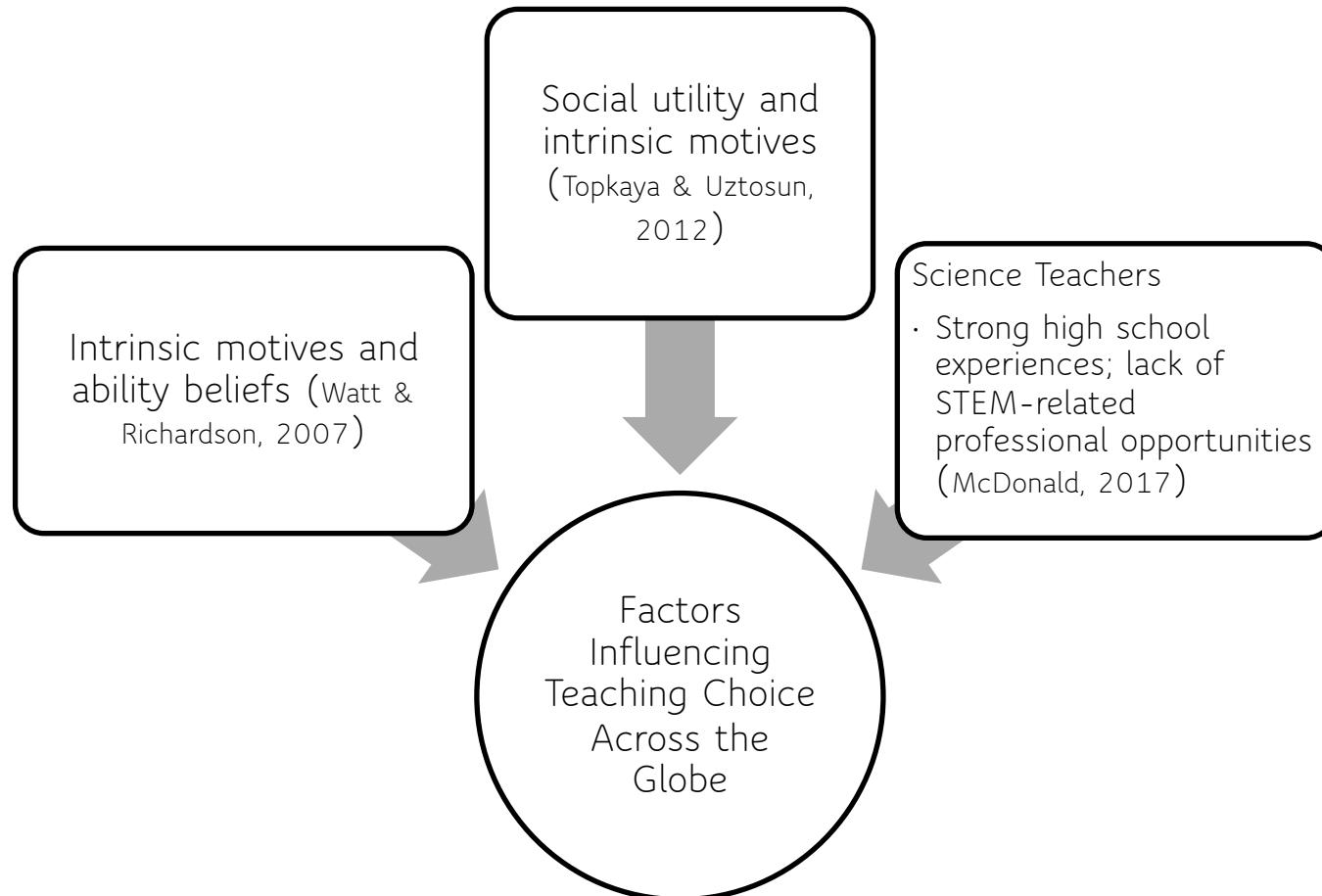


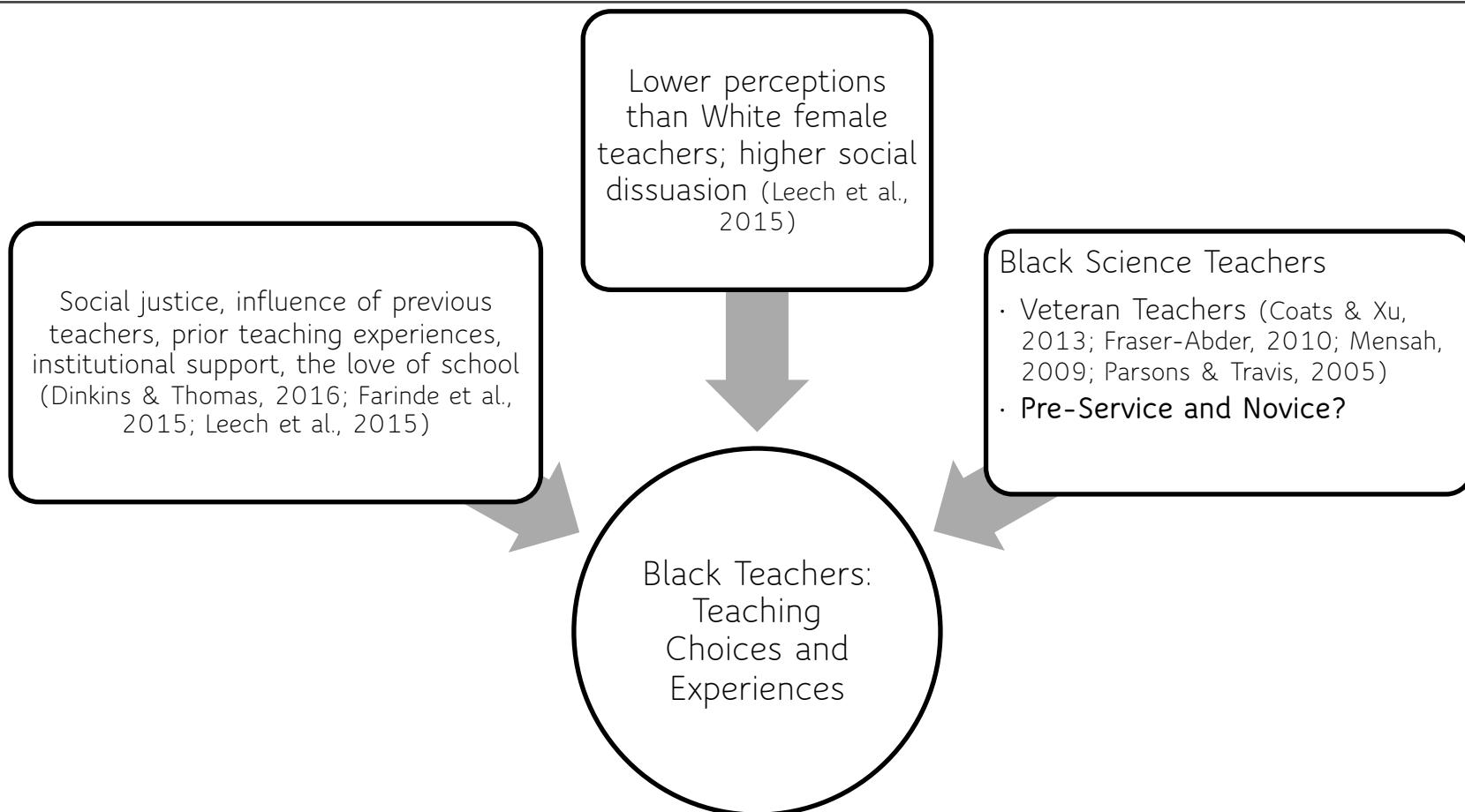
Figure 1. FIT-Choice empirically validated theoretical model.

From: Watt, H. M. G., & Richardson, P. W. (2007). Motivational Factors Influencing Teaching as a Career Choice: Development and Validation of the FIT-Choice Scale. *Journal of Experimental Education*, 75(3), 167-202.

Literature Review



Literature Review



Research Questions

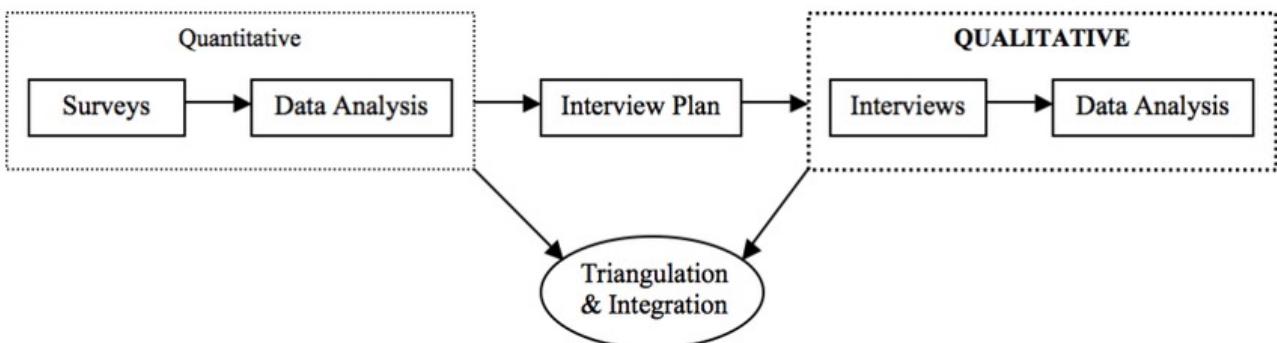
What are Black novice and pre-service science teachers' perceptions about science teaching?

How does qualitative data inform quantitative findings in this population?

Limitations	<p>Data collection was limited to self-reported data from the participants</p> <p>Findings are not generalizable</p> <p>Small population= small sample size</p>
Delimitations	<p>Bound by the research questions of the study</p> <p>Limited to teachers who self-identified as Black pre-service and novice science teachers in the US</p> <p>Applied EVT-based FIT® Choice Framework</p>

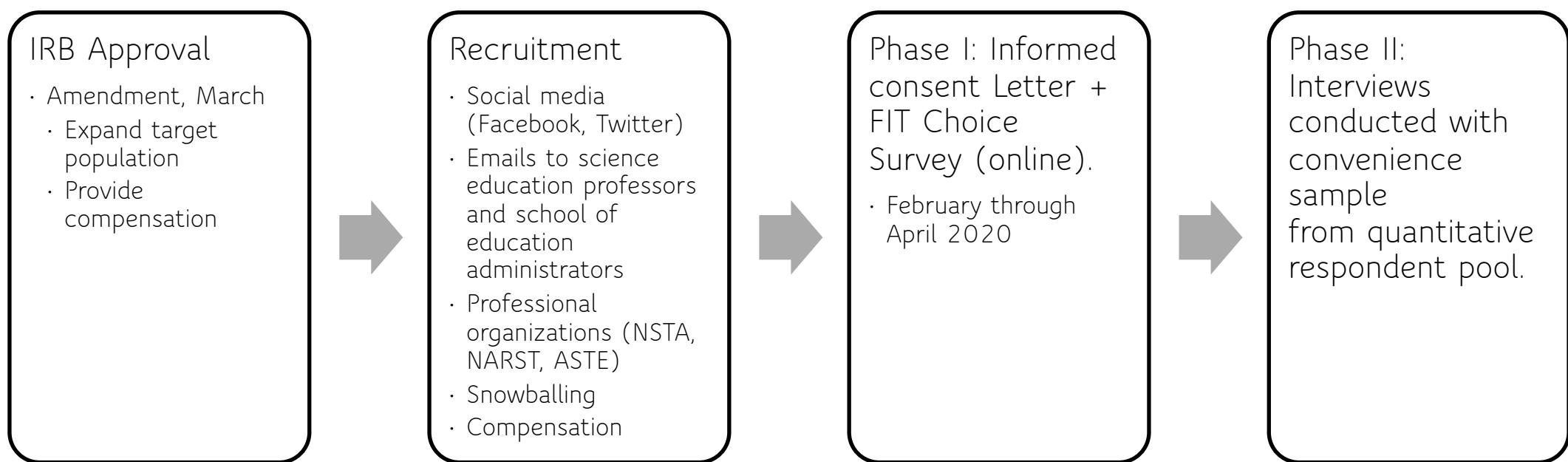
Research Methodology and Design

Explanatory Sequential Design (Creswell & Plano Clark, 2018)

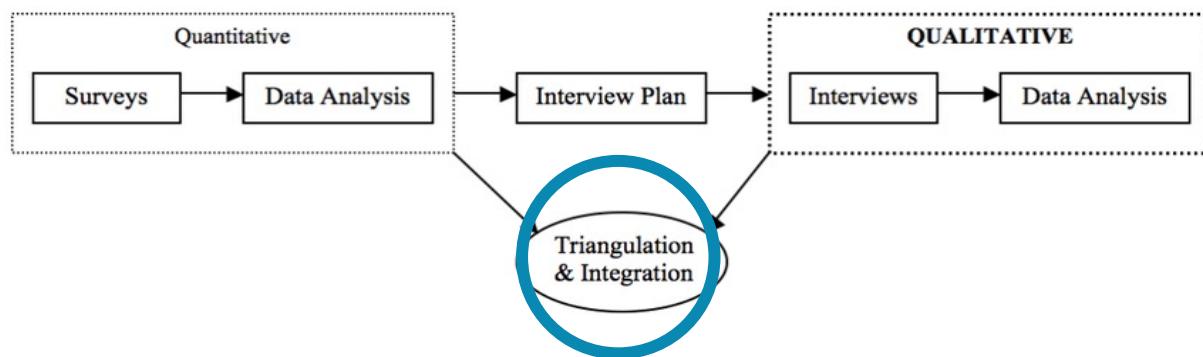


- Quantitative instrument: FIT Choice (motivations, perceptions, and satisfaction)
- Qualitative methods: semi-structured interviews
- Unique characteristics of the population, including small sample size
- More comprehensive understanding of the research problem by mixing both quantitative and qualitative data into a single study (Creswell, 2014)

Study Procedures



Mixed Method Analysis: Triangulation and Integration



- Results were compared, integrated, and interpreted (Creswell and Plano Clark, 2018)
 - Joint display tables

Context and Participants

QUANTITATIVE SAMPLE

Teaching Status	Gender
<ul style="list-style-type: none">Novice=3(12.5%)Alternative/Resident= 14(58%)Pre-service= 7(29%)	<ul style="list-style-type: none">Women=19 (79%)Men=5 (21%)
n=24	
Age Range: 19-60	Geographic Representation: Northeast, South, Midwest

QUALITATIVE SAMPLE

Teaching Status	Gender
<ul style="list-style-type: none">Novice= 2(17%)Alternative/Resident= 6 (50%)Pre-service= 4 (33%)	<ul style="list-style-type: none">Women= (83%)Men= 2(17%)
n=12	
Age Range: 20-60	Geographic Representation: Northeast, South, Midwest

Antecedent Socialization Influences: Prior Teaching and Learning

- Science Camps/programs
- Tutoring/Teaching experiences
- Positive and negative experiences with former teachers

"When I was 15 years old, I went to a free program in Wellington State. So, it was a 14-day excursion for people who don't really get to see nature and I got to work with glaciologist from the University of Lamont when I was only 15. And we hiked to a glacier and a volcano. And it was really exciting to do that by myself. And when I got to college, I knew I wanted to be just like the woman I met when I went to that glacier. And I knew that I wanted to do geology. So, I came in already knowing that geology was something that I wanted to study." (Anilia)

Perceptions of Science Teaching

For each question below, please rate the extent to which YOU agree it is true about science teaching, from 1 (not at all) to 7 (extremely). Please identify the number that best describes your agreement for each.

Rank Order Descriptive Data for Perceptions of Science Teaching				
Construct	N	Range	Mean	Std. Deviation
High Demand	24	4.00	6.35	.92
Expert Career	24	4.00	5.43	1.17
Social Status	24	4.50	3.80	1.16
Salary	24	4.00	2.87	1.18

Perceptions: Rewarding and Demanding

Intangible rewards

- "I do think it is an amazing thing. I think it requires strong people to do it. Just because people don't like dealing with their own kids and if you got to deal with hundreds of other kids, and different personalities, and you got to play mom, sometimes you got to play social worker. So, I think it's a really important job. Like, you can't do any other job without going to school first." (Alex)

Heavy workload

- "Yeah, you know, a downside to it is that you work for your salary, but you work all day. From the sun-up to the sundown, and that if you don't have balance in it, I suppose it would take a toll on your personal life, which was happening to me."(Yarri)

Emotionally Demanding

- "I wouldn't treat my children, or anybody's children, how those children are sometimes being treated and talked to. And, it's just like, absolutely not! So, again, that makes you feel like you're on an island because you're the only person speaking up and saying something about it. " (Yarri)

High Demand

Low FIT Choice® Score	N/A (All scored higher than 6.0)
High FIT Choice® Score	"It's very rewarding despite the fact that it's super long hours, tough, kind of mentally and emotionally draining but like yesterday, was it yesterday, or was it? Sorry, I'm looking at my calendar. Yeah, on Monday. We were teaching a couple of classes online and there were just a couple of kids. It's online, so it's not as interactive as when we're there with them in person, but some of them were like, 'Oh, Miss, I get it' and I was exhausted I spent all weekend doing homework assignments, and doing a lesson for them, and I was exhausted." (Elizabeth)

Expert Career

Low FIT Choice® Score	"So, one of the major challenges that I struggled with was this phenomenon-based teaching. So, it was kind of new to me, the only thing that I was aware of was the five E's, especially since prior to this year, I was predominantly math. ... I don't view myself as creative. I feel like I'm kind of dull compared to her (a close colleague) and a lot of other teachers. But, you know, she just, she told me that over time I will develop what she developed, you know, figuring out how to make the lesson more engaging for students." (Terry)
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High FIT Choice® Score	"I do feel they [new teachers] should become interested in that (professional organizations like NSTA) and become members. Just because when you go to the conferences, you are enlightened with up-to-date ways of teaching. And you can transform that back into your classroom." (Sharda)
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Social Status

Low FIT Choice® Score	"I feel like teachers aren't respected enough. Even though, we are who we are, and we've gotten to where we are because of a teacher. I just have noticed that people don't really give teachers the credit that they deserve. From just listening to stories from my master teachers of them getting yelled at by parents. Like, one of my master teachers, I'll never forget, she told this story of a student who threw a chair at her. I was like 'what?' It's just, they aren't respected. And that's just because of how I grew up, I'm really big on like respect." (Hazel)
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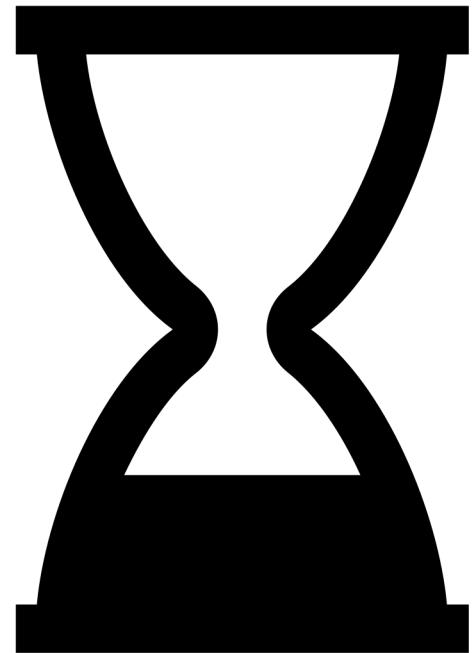
Moderate FIT Choice® Score	"I can sometimes feel burnt out from all the undergraduate work that I'm doing. And so, my plan initially was to go from undergrad to medical school. And so, the program gave me a chance to get certified as teacher, and then I will be able to teach and have an actual career instead of working a job while I take my 'gap' between undergrad and medical school. But I would be working in a real field, I would have a real job versus again just working at McDonald's or just working somewhere." (Illiana)
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Salary

Low FIT Choice® Score	"I think they're just looking out not necessarily thinking, oh, you're not gonna be a teacher or that, you know, it's not a good profession. I think they're just looking out to make sure that financially I will be okay by myself. But luckily, I was able to score two really good jobs that pay well enough for me to be on my own. So, I've been okay so far." (Bianca)
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Moderate FIT Choice® Score	"No, I am not [worried about finances] actually. And I think I'm lucky to be in a more progressive state and city. I think if I was working or teaching anywhere else, I might be a little bit more concerned. But assuming I can budget and do math okay and I think I can be just fine. So, I'm not too worried." (April)
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Quan + Qual Integration



Four years and counting...

- "*I told my mom I was gonna die in my classroom. I [feel]like I would keel over from a heart attack in my classroom in the middle of the lesson. But I want to be in [education] forever.*" (Hazel)
- "*Now, I wouldn't say anything is off the table. You just never know. It's not something I'm like actively pursuing right at this moment or, but you know, time goes by and it's like hey I might ...want to close that door.*" (Yarri)

Discussion of Findings

Qualitative and quantitative findings indicate that respondents view science teaching as a rewarding, but demanding career (Dixon et al., 2019; Ingersoll & May, 2011) .

Teaching perceptions were largely influenced by media, community members, family, and friends.

Despite the negative perceptions science PSTs and novice teachers have of the profession, they still intend to enact a form of "political caring" (McKinney de Royston et al., 2020) as a member of the Black community.

Significance of Findings

- There are few studies where Black science teachers are represented as the main subject of research, and few identify perceptions of those who have made science teaching career decisions.
- Understanding perceptions for pursuing science teaching may provide essential knowledge to districts and recruiting agencies when looking to diversify K-12 STEM teaching faculty.

Implications

- Funding and scholarships have the potential to broaden the reach of informal experiences for Black students to participate in science and/or teaching programs, as well as provide counter-perspectives for students.
 - Teacher Cadet Programs
 - Summer Research Programs.
 - EPPs should commit to more aggressive recruitment and support of Black STEM teachers through their local undergraduate STEM programs.

Recommendations

Longitudinal study
to assess changes
in perceptions
and satisfaction

Replication with
larger sample

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