

The Roles of Socializers in Career Choice Decisions for High School Students in Rural Central Appalachia: “Who’s Doing What?”

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Abstract—Students from low social economic status (SES) groups remain underrepresented in higher education and particularly in STEM fields. From existing literature, we know some of the barriers in promoting STEM careers among people in low SES groups include a lack of role models, understanding or misconceptions of STEM careers, and knowing about STEM career opportunities. The purpose of our research is to explore the potential influence of socializers on students as they make career choice decisions (primarily in science and engineering) from student’s and educator’s perspectives. We focused on students from Appalachia because they typically come from lower SES, are often first generation college (FGC) students, and are underrepresented in STEM fields, making their college and career choices particularly important to understand. We framed our research in Eccles’ Expectancy Value Theory using data from an on-line informational questionnaire with educational stakeholders and in-person interviews with high school students from rural central Appalachia. Consistent with EVT, our findings reveal that students consider their parents and their educators as valuable socializers. Educators, however, value outreach activities provided by professionals to help students explore engineering career choices. This is consistent with a reported lack of confidence in ability to talk with students regarding engineering careers. By comparing the perspectives of students and educators, we begin to address the potential gaps of “who’s doing what” with respect to assisting students as they navigate career choice decision making in high school.

Keywords—socializers; career choice; motivation; Rural Central Appalachia

I. INTRODUCTION

Students from low social economic status (SES) groups remain underrepresented in higher education and particularly in Science, Technology, Engineering, and Math (STEM) fields. From existing literature, we know some of the particular difficulties in promoting STEM careers among people in low SES groups. For example, we know that barriers include a lack of role models, a lack of understanding or misconceptions of STEM careers, and a lack of knowing about STEM career opportunities. Moreover, while we do know that socializers - people with whom students have significant relationships - are important [1,17], we do not know which socializers are most important or the extent of the socializers’ knowledge of STEM careers.

The purpose of our research is to explore, from student and educator perspectives, the potential influence of socializers on students as they make career choice decisions and to compare the student’s and educator’s perspectives on the importance of different socializers with regard to students’ career choice decisions. We focused on students from Appalachia because they typically come from lower SES backgrounds, are often first generation college (FGC) students and are underrepresented in STEM fields making their college and career choices particularly important to understand. Furthermore, we scope this research on science and engineering careers for two reasons. First, healthcare (taken as a science related field) is a common career choice stated by high school students while engineering is an uncommon choice [9, 18].

To meet our purpose, we answered three research questions:

- 1) Whom, if anyone, do high school students report as key influencers as they (the students) make career choice decisions?
- 2) How do educators describe their role and the role of others as potential influencers of high school students with regard to making career choices?
- 3) How do educational stakeholders’ beliefs shape their roles as influencers of student career choices?

Our data included qualitative interviews with high school students and an on-line informational questionnaire with educational stakeholders within the same school systems.

II. THEORETICAL FRAMEWORK

Our study is grounded in an expectancy-value theory (EVT) of achievement motivation [1,2]. We chose this theory for three reasons: 1) it is a prominent theory in educational research backed by significant evidence (Gender and Achievement Research Program (GARP) [3]), 2) EVT emerged from research intent on explaining choices to pursue math-related degrees and majors [2] making it relevant specifically to this purpose, and 3) EVT positions socializers (e.g., parents and teachers) as having a prominent role with regard to shaping students’ choices about college major and career engagement [1].

In a simple form, EVT suggests that people engage in tasks or activities in which they believe that 1) they can succeed (expectancy of success) and 2) that it is important to succeed

(subjective task values) [3-6]. The model also suggests that many factors can influence success beliefs and task values. Socializers are one factor that can have significant impact and Eccles [1] identifies families and school systems as particularly important socializers. She posits that background characteristics influence socializers' beliefs, which then influence socializers' behaviors. These behaviors directly impact student outcomes, including success beliefs, values and activity engagement and persistence. Career choice is one such important outcome.

III. METHODS

To address our research questions, we used exploratory multi-case methods [7] with EVT as a guiding framework. Our primary data sources were semi-structured interviews with high school students and an on-line informational questionnaire with high school education stakeholders. Our data sources enabled us to compare student and educator perspectives.

A. Case Sites

Two case sites were used for this research, one in the rural Central Appalachian region of Virginia (Virginia case site) and the other in the rural Cumberland Plateau Appalachian region of Tennessee (Tennessee case site). The Virginia case site is situated in the nine southwestern most counties of Virginia and the Tennessee case site contains the counties in the Cumberland Plateau of Tennessee [8,9]. Both case sites are rural areas with a high level of poverty, primarily Caucasian people, and fewer post-secondary degrees obtained than the national averages. Differences between the regions include geographical features with the Virginia case site being in a mountainous area associated with mining (especially coal) and the Tennessee case site being in a less mountainous area and primarily farming. In addition, the transportation varied between the sites. The Tennessee case site had no interstates and primarily flat open secondary roads. The Virginia case site had an interstate through the majority of counties, but the mountainous secondary road system results in increased travel times over short distances. Both regions have seen a decline in industry jobs (e.g., furniture manufacture, textiles, and coal mining). Also, both regions have, on average, small high schools (ranging between 20 – 120 students in a graduating class) and between 1 and 3 high schools per county (with the number per county in Virginia shrinking due to school consolidations). Finally, both regions have declining populations.

B. Participants and Data Collection

High School student participants were sought by obtaining approval from high school superintendents and principals in the two regions of interest and then requesting participation from all junior and senior students at the consenting high schools. All students who agreed to be interviewed were interviewed. In total, 24 students were interviewed in Virginia (eight male and 16 female) and 27 students in Tennessee (12 male and 15 females). The interview protocol was designed to elicit information on current planned career choices and reasons for those choice and is fully described in [9, 19]. We also included probes contextually and culturally relevant for the research setting. In addition, the open ended questions were developed to allow rich, deep descriptions of participant's experiences and

beliefs [10,11]. Interviews ranged from 30 – 60 minutes in length.

The sample of education stakeholders consisted of 31 respondents in the same school systems as the students and included high school teachers, counselors, and principals as well as county administrative staff within the case study sites. We requested county superintendents to respond with concurrence or rejection of their support for our effort to distribute our online questionnaire. Though no superintendents declined, we do not have data regarding the actual distribution and thus do not have information on the total possible number of participants, response rates, or questionnaire completion rates. Within the questionnaire however, demographic information was requested and is shown in Table 1. The majority of respondents were teachers with a 2:1 ratio of female to male respondents (the ratio of female to male teachers for these regions is unknown). One-third of the respondents had 10 years or less experience, one-third were between 11 and 20 years, and the final third had more than 21 years of experience.

The purpose of the questionnaire was to gain knowledge from the educational stakeholders' perspective while allowing them to provide information at a time and location convenient to them. Using an online questionnaire allowed the research team to gain more responses than possible with in-person interviews. The educational stakeholder questionnaire was approximately 15-minutes in length, contained both closed-ended (primarily Likert scale) and open ended questions, and related to the participants' perspective of their knowledge of STEM careers, STEM activities in their school and region. The questionnaire also asked the participants for their perspective on the importance different influencers have with students who are making career decisions. In the results section, some of the descriptive statistics of the responses are used to expand the results obtained from the qualitative interview data.

C. Analysis

The student interviews were transcribed verbatim and we used MAXQDA software to code segments using a combination of a priori and emergent codes [10]. We began by analyzing factors potentially salient to career choice reasons. Questions such as who helped participants know about career choices and probes of "how did they help" were particularly useful in our analysis. In addition, codes potentially relevant as Appalachian cultural items, such as continuing generation Appalachian, prospective first generation college, and local jobs emerged as salient and were used to assist in analyzing how socializers influenced students.

TABLE I. DEMOGRAPHIC CHARACTERISTICS OF THE SAMPLE

Education Stakeholders' Characteristics	n (31)	%
<i>Primary role</i>		
Administrative Office	1	3.2%
Guidance Counselor	2	6.5%
Teacher	25	80.7%
Principal	3	9.7%

<i>Years in the public school system</i>		
0 – 5	3	9.7%
6 – 10	7	22.6%
11 – 15	3	9.7%
16 – 20	7	22.6%
21 – 25	4	12.9%
26 – 30	4	12.9%
31 – 35	1	3.2%
36 or more	2	6.5%
<i>Gender</i>		
Female	19	61.3%
Male	10	32.3%
Prefer not to answer	2	6.5%

Analysis of the educational stakeholder questionnaire consisted of descriptive statistics for the closed-ended questions and an exploratory analysis of the open-ended questions. The intent of the closed-ended questions was to capture participant demographics and to facilitate comparison among the respondents; the intent was not to infer findings to the larger research population, thus we did not conduct inferential statistics on the data. The closed-ended responses were tabulated and compared to each other regarding consistencies and discrepancies in the responses. In addition, the questionnaire responses were compared to the qualitative analysis of the student interviews to determine how high school students' responses were similar (or not) to educator stakeholders regarding their perceptions on the importance of socializers toward high school students' career choices.

D. Quality of Research

Multiple techniques were used to assure the quality of the data collected and the analysis [7,12]. With respect to the data collection, experts reviewed the interview protocol and we piloted the protocol prior to use. For the analysis, inter-coder agreement checks occurred. Inter-coder agreement included multiple researchers coding the same transcripts independently and using the analysis tools within MAXQDA to determine inter coder agreement. Finally, researcher bias clarification occurred via research team discussions.

Similarly, the educators' questionnaire was developed using procedures suggested by Rea and Parker [13]. For example, gathering key issues via a stakeholder meeting, review of questions by expert team members for question clarity and comprehensiveness, and piloting the questionnaire with education stakeholders.

IV. RESULTS AND DISCUSSION

We have three key findings from our study including who students report as key socializers, who educational stakeholders report as key socializers, and how these two compare.

A. Whom, if anyone, do high school students report as key influencers as students make career choice decisions?

Based on the student interviews, we identified parents/legal guardians and teachers as having high influence on students' decisions about career paths. Students believe their parents/legal

guardians want them (high school students) to: (1) find a stable job, (2) earn a good salary, and (3) stay in the area. These results were independent upon gender [9]. This results in some students making career choices in alignment with parental goals rather than his or her interests. For example, Fred was interested in cars but through parental influence, he was planning on another career:

Well . . . [sighs] mostly my parents kind of pushed me into it because they, I mean, we both of us, me and dad, uh, really like cars and everything, and he just, we both talked about it, how the auto industry is failing and how everything else is going up in the medical field so that was pretty much the deadline of how we pretty much chose it.

- Fred, High School Senior

Hilary also spoke of pursuing a career other than her interest based on her mother's influence. Hilary's mother worked at a medical center as a receptionist and believed that the medical field always had openings and were thus stable employment. Of note is that Hilary's preferred occupation is one that many may consider a stable occupation that pays well, however, in central Appalachia, Hilary (and her mother) did not believe this to hold true.

I love animals. Like I always wanted to be a veterinarian, I know this sounds awful, but it's just like I don't know if there's that much money into it, and it's just like I want to get a really good job so I can, you know, not have to worry about money and the economy. And I don't know if many people actually take their animals to the vet. So I, I really kind of am geared more toward the medical field and going into something like that, because my mom, um, she works in like a nursing office, or whatever, and they always talk to her about how there's always jobs opening up and stuff like that.

- Hilary, High School Senior

Our finding is consistent with research showing that students from lower SES backgrounds often choose careers for reasons other than interests [14, 15]. Our study adds an understanding of how this can happen; one way is through parental influence. This is consistent with Eccles' model [1] that shows that parents' beliefs for their children can be influential. Within our case site regions, the parental belief that healthcare fields provide stable jobs with a good income may overshadow other career fields that also have a potential to provide stable jobs and a good income.

Also consistent with Eccles' model [1], participants in our study recognized educational stakeholders (e.g., teachers) as being important. Often these stakeholders were the teachers that had introduced students to an activity that helped the students learn about career options. For example, Ashley enjoyed a middle school experience with Lego Robotics but it was a teacher that suggested engineering as a possible career. As Ashley stated,

In my middle school we had a robotics team and a science fair team, and it was very fun, and we had a thing called Lego robotics where we made robots with Legos, and I really liked that. And, when my teacher said, there are people out there who

actually do this for a job. I was like, I would love to do this for a job. And, after I started researching what jobs out there had the same things around that, then I realized I wanted to go into an engineering major.

- Ashley, High School Senior

Likewise, a teacher assisted Donna with her planned career choice by suggesting a way she could incorporate her career interest (theatre) with her parent's desire for Donna to pursue a career from which she could support herself. As Donna stated,

I have a passion for theater. But I have more of a sense for stability and a secure financial standing in a career which is influence from my mother, because obviously that's something that I see as very important after everything. So I want to incorporate what I love and what I'm interested in. But obviously I wouldn't want to pursue my passion of theater, because statistically, you don't really make a lot of money and you can go tons, for years without jobs and that's not really smart to me.

- Donna, High School Senior

When asked how she learned about combining theatre and psychology, she responded that her theatre and English teacher talked to her about the potential unsteady work of acting and that his wife used play therapy with children. In addition, Donna has heard some of her teachers mention psychology as a course they took and liked.

When interest is a primary reason for a career choices, as in Ashley's case, socializers often play an important role in helping students turn an externally supported interest "spark" into an internally sustained interest. Hidi and Renninger describe this process in a four-phased model of interest development [16]. In Ashley's case, the activities were an environmental support for her interest but learning that engineering was a possible career set her on a path of learning about engineering and exploring options on her own. For Donna, a socializer recommended a career choice based on what he knew of Donna's interests and that was sufficient for Donna to consider the career. After learning about play therapy, Donna realized that the career also incorporated her interest in working with children, but is also considering clinical work demonstrating Donna has internalized the career choice by actively learning more about it.

B. How do educators describe their role and the role of others as potential influencers of high school students with regard to making career choices?

Within our questionnaire, educational stakeholders identified themselves and parents/legal guardians as key influencers on students' career choices. However, when asked specifically about engineering careers or "STEM" overall, our data reveal that educators valued outreach activities that would put students in contact with socializers other than themselves to help students with career choices. For example, activities such as career day, industry visits, or exposure to professionals in different fields were listed as valuable ways to help students understand engineering career choices.

With regard to the roles of others, educators note that parents play an import role in student's career choices in three ways: financial, lack of general support, and expected value of what are important career outcomes.

Educators consider, besides financial issues, the lack of support by parents, legal guardians, or family members, is the second most important factor that prevents students from attending college. In addition, their perceptions on the most important thing for high school students in rural central Appalachia regarding career choices are similar to what was expressed by the students, and it is related to the expected value that the students feel their parents/legal guardians have regarding what is important for them in their career path (availability of local, stable, and well-paid job). Finally, as shown in Figure 1, educators consider students that have at least one parent or family member that attended college have an advantage over other students when they are going through the decision-making process (mean of 3.84 out of 4 on an agreement scale) while educators responded with an average of 2.9 and 3.1 out of 4 that students have knowledge of experience applying to and knowing about the college application process. Specific to engineering careers, however, when asked the importance of different engineering related items toward influencing students, exposure to engineering had the highest mean score (4.2 out of 5) and knowing an engineer had the lowest score (3.6 out of 5).

C. How do educational stakeholders' beliefs shape their roles as influencers of student career choices?

When educational stakeholders were asked which programs are available in their schools, how much the programs are likely to help students understand STEM (and in particular engineering) careers, and their familiarity of the programs, the results suggest a gap in consistency. For example, educators indicated programs such as First Robotics, Project Lead the Way, and the Technology Student Association have the most influence on students, yet the overwhelming majority also indicated the programs not being available at their school and not being familiar with those programs.

When asked specifically about their confidence to talk to students about science, STEM, and engineering careers, respondents had the most confidence talking about science and the least talking about engineering. As shown in Figure 2, twice as many respondents indicated "a lot" of confidence for science as engineering careers. Likewise, the number of respondents indicating no confidence for discussing engineering careers was twice that for science, though the overall numbers were small (13% compared to 6%). Separating the data between the male and female respondents, the male respondents were three times more likely to have "a lot" of confidence talking about engineering, nearly three times in science, and half again as much confidence in discussing STEM careers in general than females (see Figure 3). Interestingly, male and female respondents were comparable in their percentages of those indicating no confidence to discuss these career fields; the males were at 10% for each field and the females varied from 5 to 15%. Notably, none of the males indicated having "little" confidence for any career field. Females were three times more likely to have none or little confidence in discussing engineering careers

compared to females with “a lot” of confidence. This lack of confidence is consistent with educational stakeholders’ high valuation of outreach activities to influence student career activities, as opposed to activities in which educators play a leading role.

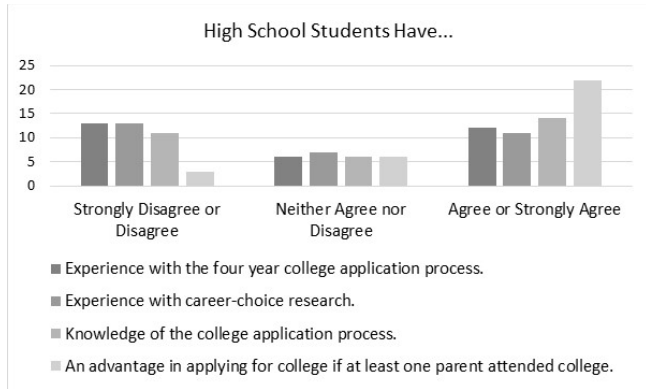


Figure 1. Educators’ Perceptions of Student Knowledge

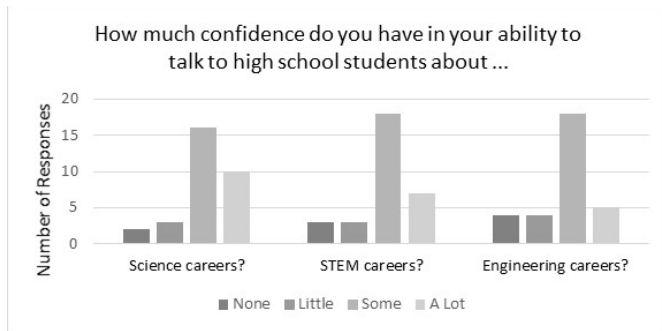


Figure 2. Educators’ Confidence in Discussing Careers

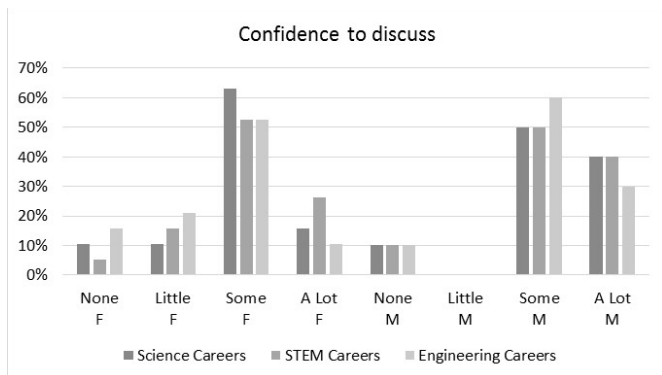


Figure 3. Educator’s Confidence to Discuss Careers by Sex

When asked about barriers to students’ pursuing an engineering career, the open ended responses included students’ lack of knowledge about engineering and ways to help students learn about engineering. A high occurrence of improving exposure was noted, as was an absence of recommendations to improve the educators’ (as influencers) knowledge.

V. SIGNIFICANCE

Exploring the relationship between students and educators perspective of the role of socializers on career choice decision making can improve our ability to understand the importance of including parents, as socializers, in discussions regarding career options for students. As suggested by our results, the interconnection of parents, educators, and students as socializers (influencers) on student career choices is complicated. In particular, STEM related careers may have added complications due to the variety in educational stakeholders’ self-reported levels of knowledge about, comfort talking about, and other beliefs in influencing students’ career choice decision making. Whereas students consider parents and educators as significant socializers and influencers on their career choices, some educators, in particular female educators, do not have a lot of confidence in discussing some STEM careers. In addition, educators recommend using influencers outside of the parental or education system to promote STEM, in particular engineering, career fields, yet the ability of these outside influences to be socializers (people with whom students have significant relationships [17]) is unknown. Keeping in mind the rural case sites and transportation distances (and times), the ability for outside resources to travel to and work with some of these schools may be significant compared to other regions (e.g., urban) within the united states.

Regarding parents as key influences, within Appalachia added complications may exist do to cultural beliefs and the desire for their children to have stable employment and remain local as well as the majority of adults do not have formal college education and therefore are unlikely to be familiar with some STEM, in particular engineering, career opportunities. Consistent with EVT [1], these beliefs affect influencers’ actions which, in turn influence student outcomes (career choices).

Implications for policy makers and school superintendents include 1) the need students have for increased exposure to engineering and other STEM careers and 2) the potential for educators to have a lower confidence in discussing these careers than for discussing other careers. Educators agree that students should have increased exposure to engineering, engineering majors, and engineering careers – but if not by educators, then by whom? And how do we accomplish this in rural areas which may have less engineers per capita than other careers? To reduce the gap between who students consider socializers and who educators think should inform students about engineering majors and careers can be reduced, targeted interventions with teachers and parents are recommended.

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