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# Identifying and Enhancing Motivating Factors for Students in Collegiate Aviation

Andrew Leonard  
*University of North Dakota*

Anthony Perry  
*University of North Dakota*

Darren Spencer  
*Gaetz Aerospace Institute*

This study was designed to explore the motivating factors for students currently enrolled in Collegiate Aviation Programs. The interest in investigating the pre-college experiences of aviation majors is to improve the field's understanding of factors associated with major selection and to guide future interventions to ensure that all youth have the opportunity to pursue high-paying, in-demand aviation occupations. Prior studies examined ways to recruit individuals into aerospace careers and the barriers to entry, but none prior to this study examined what pushed individuals past these barriers. Understanding what made these individuals choose their path will better assist the industry in enticing the next generation of professionals to follow in their footsteps

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## **Introduction**

The aerospace industry faces persistent shortages in skilled labor across all aspects of operations. With few exceptions in the last three decades, including the post-9/11 and pandemic-era travel slowdowns, the demand for trained and certified maintainers, pilots, and air traffic controllers exceeds market availability, as the commercial, private, and military sectors each compete for a limited talent pool (Boeing, n.d.; FAA, 2024). Estimates of the problem's severity vary, but delayed flights, reduced route availability, and passenger safety concerns are regularly linked to shortages of aerospace professionals (Stock, 2024). This shortage is expected to persist for several more decades, particularly as global demand increases across both the Aviation and Space sectors and experienced professionals approach mandatory retirement ages.

This study was designed as a foundational study with the long-term goal of exploring the motivating factors for students currently enrolled in Collegiate Aviation Programs across all aerospace careers. The interest in investigating the pre-college experiences of aviation majors is to improve the field's understanding of factors associated with major selection and to guide future interventions to ensure that all youth have the opportunity to pursue high-paying, in-demand aviation occupations. Prior studies examined ways to recruit individuals into aerospace careers and the barriers to entry, but not what pushed individuals past these barriers. Understanding what led these individuals to choose their path will help the industry attract the next generation of professionals to follow in their footsteps.

## **Literature Review**

This study addresses a gap in the literature by examining factors associated with students' enrollment in collegiate aviation programs. Many attempts to ascertain what motivates individuals to pursue education and careers in general exist, dating back as far as Walsh's 1935 study that looked at an individual's interest to invest in education based on expected return on investment, but no study appeared in searches of academic journals or Google Scholar that looked specifically at what motivated individuals to pursue aerospace careers. Ultimately, five foundational models and theories in educational psychology pertain to this topic, with Eccles and Wigfield's Situated Expectancy-Value Theory as the model used to analyze the survey results.

### **Walsh's Return on Education Model (1935)**

Like other theories on human motivation, Walsh explored the impact of expected return on investment on an individual's choice to pursue higher education (Walsh, 1935). Approaching the workforce as human capital, or as an input like other assets into a final productivity equation, Walsh looked more at the private and public benefits of education rather than at the individual making the choice. His analysis studied both the narrow and broad social benefits of education for society as a whole (Chiswick, 2023).

### **Roy's Maximization Problem (1951)**

Closely related to Walsh's theory but with a focus on individual choice versus societal benefits, Roy theorized that individuals chose to pursue education when they felt they had the

propensity to maximize their value by doing so (Heckman et al., 1990). The individuals needed to believe they had the skill set to succeed and that this success would yield greater value than in other career choices. If they felt they possessed a comparative advantage or would attain one by pursuing higher education, an individual would likely do so to maximize their return on investment (Heckman et al., 1990).

### **Holland's Theory of Career Choice (1959)**

Largely seen as a method for individuals to analyze if their personalities are a good fit for particular careers, Holland broke personality traits down into primary and secondary traits and defined six personality types - Realistic, Investigative, Artistic, Social, Enterprising, and Conventional (RIASEC) (Batista, 2022). Holland believed that an individual would gravitate to a career that best matched their personality, and an individual who most closely matched their personality with a career's culture would perform better and feel more satisfied.

### **Ben-Porath's Model (1967)**

The Ben-Porath model expanded upon previous research, examining the entire lifecycle of human capital rather than treating it as a single decision in life. This model analyzed how individuals decide where and how much of their time to invest in learning as they age, accounting for salary and other factors as they change. This model theorizes that individuals invest much more time in learning early in life because of the long-term expected returns on this investment, compared to the expected value of an educational investment later in life (Ben-Porath, 1967).

### **Situated Expectancy-Value Theory (SEVT) – Eccles and Wigfield (2020)**

Expectancy Value Theory, as described by Eccles and Wigfield, also known as Situated Expectancy Value Theory, is a well-developed and recognized model that synthesizes decades of study in educational psychology. Building on the work of Atkinson (1957), who argued that individuals will work harder and spend more time on tasks they feel they will succeed at, Eccles and Wigfield developed this model in 2000 and updated it in 2020 (Wigfield et al., 2020).

SEVT includes many of the factors that the previously noted models and theories did, but in an interrelated way that helps to develop a cohesive framework that aligns well with the purposes of this study. The theory expands on Atkinson's work by breaking down two factors for children and adolescents: expectancy beliefs and subjective task value, but is successfully applied throughout life in a variety of studies, as the factors do not change; only the emphasis on each factor (Eccles et al., 2024).

An individual is expected to pursue a career based on the expectation of success, which is shaped by short- and long-term goals, perceptions of their abilities, and social exposure to that career.

The subjective task value concerns how people value the accomplishments associated with a particular career. If they find the subject matter enjoyable, feel they are doing important

things within that field, and find the utility of that career to outweigh the sacrifices they must make to succeed, the tendency to both pursue and succeed in a career in that particular field is much higher (Eccles et al., 2024).

### **Aviation Career Interest Research**

Little prior research exists on aviation-related career interests. Prior studies also leverage sociocultural theories of motivation and find that media exposure, enrollment in aviation-themed secondary courses, and out-of-school role models are factors associated with the development of aviation career interest (Costa et al., 2025). Other retrospective studies examining undergraduate students' choice focus more on programming qualities (e.g., distance from home and student-faculty ratio) than on why students choose aviation as a career pathway (Steckel et al., 2010). Our study is designed to address this gap in the literature while drawing on an adjacent, more established body of literature: STEM career interests.

### **Recent STEM Career Research**

While there is little empirical evidence to draw on in our field, we find research from adjacent, vocationally oriented pathways, such as Science, Technology, Engineering, and Mathematics (STEM) education fruitful to build on and to support the content validity of our survey.

Career interests are developed as much by out-of-school and in-school learning experiences (Sonnert et al., 2025). A survey of 55 papers on the role of mentors in selecting a STEM career aspiration showed mixed impact, but hinted at a positive correlation if the mentor seems reasonably competent, meaningfully similar to the target student group, and in a way that makes the students feel they can attain similar results (Gladstone, 2021). One study exploring the impact of media consumption on STEM career choice showed that consumption of STEM media has a “significant effect in fostering STEM career interest” in an indirect manner via personal value systems as modeled by SEVT (Chen et al., 2023). Another study ranked STEM career choices by perceived utility and attainment value, showing that these factors influence the selection of most- and least-preferred careers (Rosenzweig & Chen, 2023).

With hundreds of careers labeled as STEM, these studies provide some insight but also support focused study in aerospace careers, as factors for each may differ.

This study’s purpose is to determine what motivates individuals to pursue a career in the aerospace profession, and, since no known studies have examined this, selecting the right model to build the survey tool from is critical. The model needs to focus on societal or economic rather than psychological influences, like Walsh’s, Roy’s, or the Ben-Porath model, would be less than optimal. Both Holland and SEVT approach motivation from a psychological perspective and are better suited for these purposes. Additionally, assuming that an individual chooses a career largely because of their personality, as Holland’s model does, limits the study’s ability to identify generational cultural differences.

A prime consideration for this study is the evolving relevance of subjective value, including generational culture. This research studies a narrow demographic who tend to be of similar age, and the model used must account for these differences if they exist. Walsh, Roy, Ben-Porath, and Holland focus on rational calculations and a fixed personality rather than on cultural influences, whereas Situated Expectancy-Value Theory assumes that culture plays a role in decision-making. Ultimately, as SEVT considers both psychological and cultural factors, it is the best fit.

## Methods

Students enrolled in an introductory aviation course at a large research university in the upper Midwest were asked to complete a 10-15 minute online survey to describe their prior experiences and motivations for pursuing an aviation-related college and career pathway. Students were recruited in the Fall 2024 and Spring 2025 semesters. Of 307 students, 92 responses were validated, for a response rate of 29.9%. Table 1 describes the sample demographics.

**Table 1**

*Descriptive Statistics*

<b>Descriptor</b>	<b>N</b>
<b>Age</b>	
18 or 19	74 (80.4%)
20 to 21	14 (15.2%)
22 to 23	2 (2.2%)
Older than 23	1 (1.1%)
Prefer not to say	1 (1.1%)
<b>Gender</b>	
Male	68 (73.9%)
Female	23 (25.0%)
Prefer not to say	1 (1.1%)
<b>Race</b>	
White/Caucasian	72 (81.8%)
Asian American	5 (5.7%)
African American or Black	4 (4.5%)
Other	5 (5.7%)
Prefer not to say	2 (2.3%)
<b>Ethnicity</b>	
Hispanic or Latino	6 (6.5%)
Not Hispanic or Latino	83 (90.2%)
Prefer not to say	3 (3.3%)
<b>Current declared major or program</b>	
Air Traffic Management	1 (1.1%)
Commercial Aviation	75 (81.5%)
Aviation Management	2 (2.2%)
Unknown	1 (1.1%)
Unmanned Aerial Systems	13 (14.1%)
<b>Primary funding source for the school</b>	
Self/Family	54 (60.7%)
Loans/Scholarships/Grants	35 (39.3%)

## Survey Instrument

The research team identified key factors in the prior literature that could be associated with choosing an aviation-related college and career pathway. Given the research team’s interest in identifying opportunities for future intervention, we included pre-college experiences (in-school and out-of-school) that may have contributed to aviation-related subjective task value and the expectancy of success in a four-year aviation degree program, drawing on prior literature. Two of the three researchers have significant experience in the aviation industry, including working with pre-college and collegiate aviation students, to improve item content validity (Ruel et al., 2016).

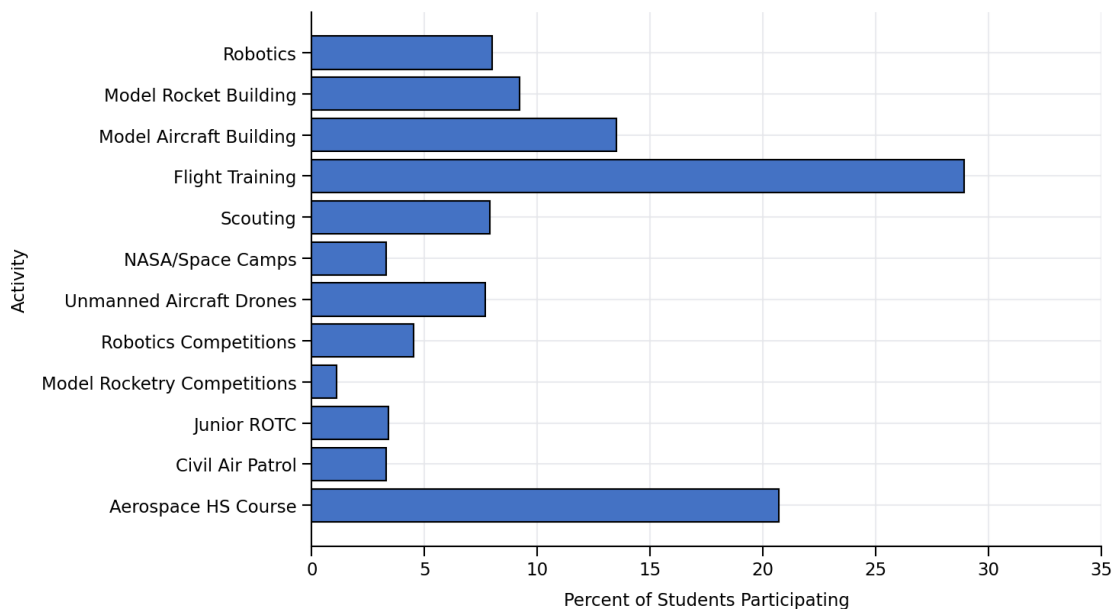
The research was designed to:

- 1) Investigate the pre-college factors associated with choosing an aviation-related pathway and
- 2) Investigate how the factors differ among demographic variables (e.g., gender and family socioeconomic status).

The first question was investigated through reporting descriptive statistics of the survey responses. The second question was investigated by comparing two groups using t-tests or Wilcoxon rank-sum tests (depending on the data type) on variables to describe pre-college experiences and student motivations. Figure 1 describes the in-school and out-of-school aerospace experiences.

**Figure 1**

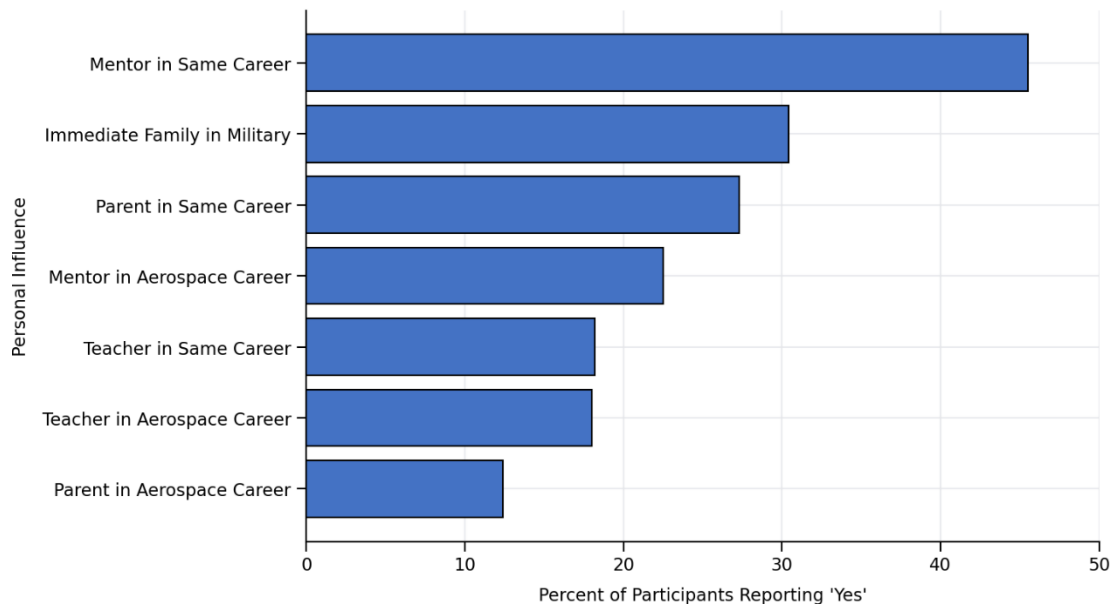
*Participation in in-school and out-of-school aviation activities.*



Students had several common pre-college experiences with respect to aviation career awareness and preparation: an aerospace-themed class in high school (20.7%), Flight training (28.9%), and model aircraft building (13.5%). Few students participated in the most specific aviation-related co-curricular activities (e.g., JROTC and Civilian Air Patrol).

**Figure 2**

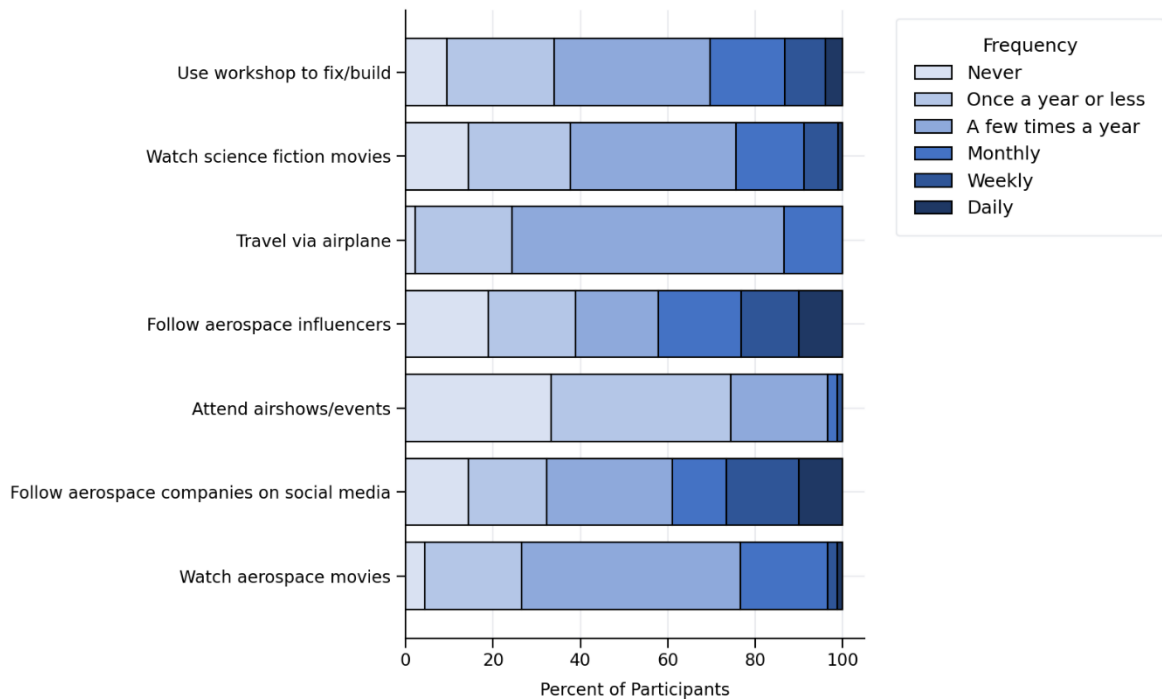
*Pre-college aviation career exposure*



Aviation students report several influences in their lives from adults in aviation-related careers, including parents (12.4%), teachers (18.0%), mentors (22.5%), and the military (30.4%).

**Figure 3**

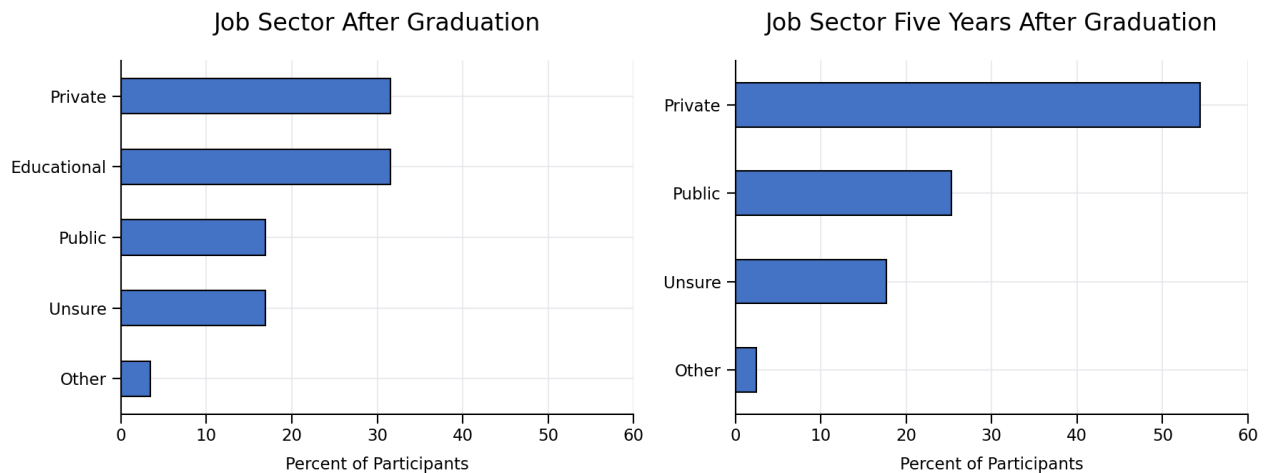
*Aerospace-related media habits*



Participants engaged with aviation-themed media during high school, including aviation movies (73.3% at least monthly), science fiction movies (24.5% at least monthly), social media of aviation organizations (38.9% monthly), and social media of aviation-themed influencers (42.2%). Students also reported more direct experiences in the field, including attending air shows (66.6% at least yearly), taking airplane trips (97.8% at least yearly), and having access to a workshop (59.3%).

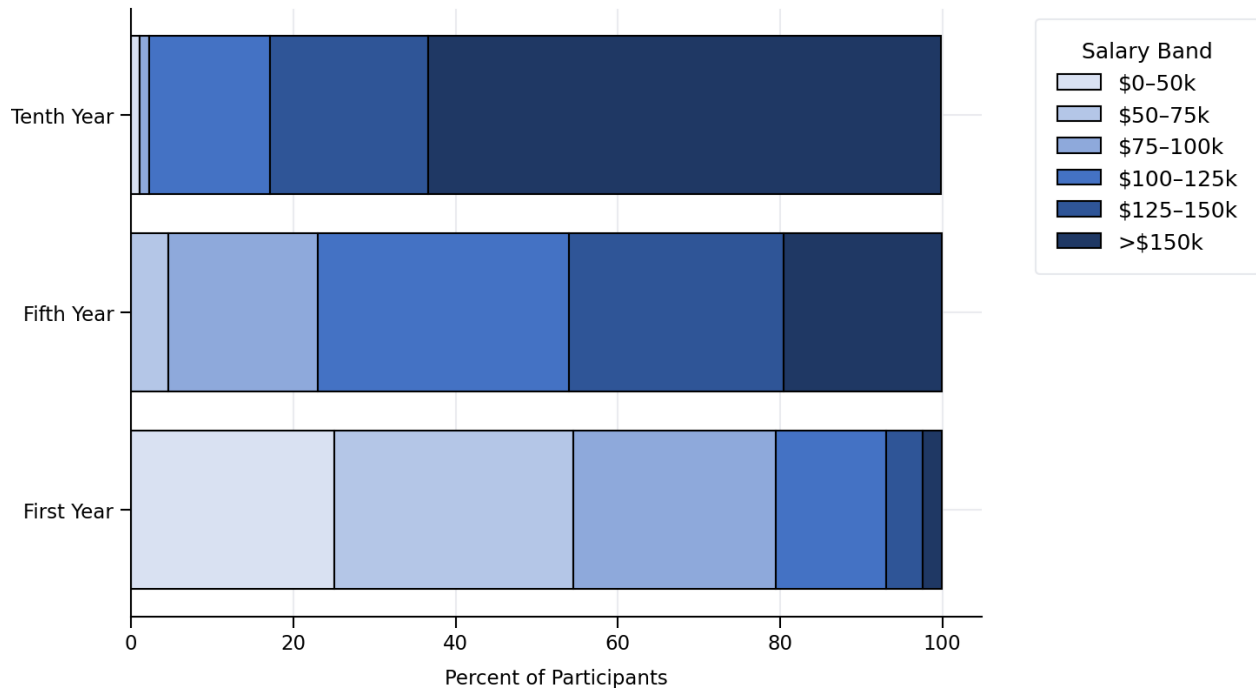
**Figure 4**

*Job sector outcome expectations*



**Figure 5**

*Post-graduation salary progression expectations*



Figures 4 and 5 describe the expected employment sector and salary progression after graduation. Students largely expect to be employed in their field within a year of graduation (85.2%) in a variety of sectors (public, private, or education). While initial salary expectations are lower after five years, students expect to be employed in public or private sectors, with 45.9% expecting an annual salary over \$125,000. After ten years, the majority of students (63.2%) expect an annual salary of over \$150,000.

**Table 2**

*Average Rank Order of Importance for Each Factor (1 = highest, 7 = lowest)*

Expectation	Average
Speed of finding employment within your area of study	2.590 (1.668)
Long-term salary potential	2.988 (1.678)
Initial salary potential	3.566 (1.789)
Mentor(s)	5.205 (1.833)
Teacher(s)	5.482 (1.319)
Family	3.036 (1.714)
Participation in activities outside of formal organizations	6.301 (2.047)
Participation in formal aerospace organizations or teams	6.831 (1.472)

On average, the most important factors were reported as the speed of finding employment, long-term salary potential, and initial salary potential. The least important reported factors were in-school and out-of-school aviation-related activities.

## Between-Group Differences

We use the source of education funding as a surrogate measure representing family socioeconomic status. An aviation degree can be significantly more expensive than other bachelor's degree programs at the same school due to the required flight training. Thus, we investigated whether there were motivational differences by family socioeconomic status. We also examined gender differences. Given that the aviation profession and associated educational programs are heavily male-skewed, we suspected that between-group differences may exist there as well.

In the sections below, report findings of t-tests and Wilcoxon sum-rank tests for scale and ordinal data (respectively). While few of the results are statistically significant at the commonly accepted  $p < .05$  level, we report differences up to  $p < .20$ , given the exploratory nature of the study and the conceptual alignment of the items. In these cases, allowing a larger alpha can be productive in generating discussion for future research while acknowledging the significant risk of false positives.

### In-School and Out-of-School Experiences

There are no statistically significant differences in pre-college experiences by funding source. Students with self-funding reported greater participation in scouting ( $p = .16$ ), flight training ( $p = .16$ ), and Civil Air Patrol ( $p = .152$ ).

No statistically significant differences in pre-college experiences by gender, but males were more likely to participate in scouting ( $p = .10$ ), flight training ( $p = .16$ ), model aircraft building ( $p = .14$ ), and model rocket building ( $p = .08$ ).

### Role Models

Male students were more likely to have a mentor in the same aerospace career they aspire to (63.6%) than females (9.1%) ( $p = .041$ ). No statistically significant differences were found by funding sources compared to students.

### Media Engagement

Male students were more likely to have frequently watched movies highlighting aerospace careers (25.4% at least monthly vs. 17.4% at least monthly;  $p = .004$ ). Male students were more likely to follow or watch the social media of aerospace influencers (53.7% vs. 8.6% at least monthly,  $p < .001$ ). Male students were more likely to have frequently followed or watched the social media of aerospace companies (46.2% vs. 13.0%,  $p = .005$ ). Of students with some workshop access, male students were more likely to use workshop tools at least monthly (37.5% vs. 7.7%,  $p = .010$ ). No statistically significant differences were found by funding sources compared to students.

### Career Outcome Expectations

While there are no statistically significant differences in career outcomes by funding source, self-funded students may expect higher pay after five years ( $p = .145$ ). There are no significant differences in career outcome expectations by gender.

### Motivation Order

There are no significant differences in the rank order of motivations between students who are self-funding their education and those relying on loans, grants, and scholarships.

By gender, male students were more likely to rank the role of a mentor higher than female students.

**Table 3**

*Average Rank Order by Gender (1 = highest, 7 = lowest)*

N	Male 68 (74.7%)	Female 23 (25.3%)	Total 91 (100.0%)	p-value
Participation in formal aerospace organizations or teams	6.766 (1.591)	7.056 (0.998)	6.829 (1.481)	0.466
Participation in activities outside of formal organizations	6.219 (2.112)	6.500 (1.855)	6.280 (2.050)	0.610
Family	2.953 (1.741)	3.278 (1.674)	3.024 (1.721)	0.483
Teacher(s)	5.516 (1.391)	5.333 (1.085)	5.476 (1.326)	0.609
<b>Mentor(s)</b>	<b>4.922 (1.863)</b>	<b>6.222 (1.396)</b>	<b>5.207 (1.844)</b>	<b>0.007</b>
Initial salary potential	3.734 (1.854)	3.000 (1.495)	3.573 (1.799)	0.127
Long-term salary potential	3.156 (1.784)	2.500 (1.098)	3.012 (1.674)	0.143

### Discussion

This study contributes to the limited empirical literature on aviation career choice by applying Situated Expectancy-Value Theory (Eccles & Wigfield, 2020) to better understand how pre-college experiences, social influences, and outcome expectations shape students' decisions to pursue aviation degrees. The findings suggest that students' pathways into aviation are not primarily driven by structured pre-college programming, but rather by a combination of informal exposure and strong perceptions of career utility, particularly employment stability and long-term financial return. This reinforces SEVT's central premise that individuals' choices are shaped by both their expectations for success and the subjective value they assign to a given career.

From a theoretical perspective, the results extend SEVT to aerospace and aviation career pathways, where it has been applied minimally in the past. Specifically, the findings suggest that

utility value (e.g., salary potential, job availability) outweighs attainment and intrinsic value (e.g., enjoyment of aviation activities or participation in aviation clubs) in shaping aviation career choice. This is a notable distinction from other STEM domains, where identity and interest often play a stronger role (Rosenzweig & Chen, 2023). In aviation, the perceived reliability of career outcomes appears to be a dominant motivator, indicating that students are making highly pragmatic, economically driven decisions.

At the same time, the findings refine SEVT by highlighting the importance of informal and indirect exposure in shaping both expectancy beliefs and task value. While formal programs such as Civil Air Patrol or JROTC reached relatively few students, informal experiences, including aviation media consumption, air travel, and general exposure to aviation environments, were far more common. These experiences likely serve as low-barrier entry points that help students envision themselves in aviation careers, thereby increasing both perceived attainability and interest.

The study also reveals important inequities in the distribution of these influences. Gender differences in access to mentorship and media engagement suggest that expectancy beliefs may be unevenly developed across student groups. Male students were significantly more likely to report having mentors in their desired field and engaging frequently with aviation-related media. Given that mentors and relatable role models are known to strengthen expectancy for success, this disparity may contribute to ongoing gender imbalances in aviation programs. The findings suggest that access to social capital, such as mentorship, is not uniform and may systematically advantage certain groups.

While socioeconomic differences were not statistically significant at the  $p < .05$  level, observed trends suggest that early access to aviation experiences (e.g., flight training, scouting, Civil Air Patrol) may still be influenced by financial resources. Given the high cost of aviation training, this raises important questions about how early exposure opportunities and ultimately career entry may be shaped by affordability and access

## **Limitations and Future Research**

This study has a few expected limitations that were anticipated at the initiation of this research, and that will be addressed in future studies. Most notable is the high concentration in Commercial Pilot careers, with 81.5% pursuing manned commercial aviation. Another 14.1% represent Unmanned Pilot careers, leaving just 4.4% of respondents in other fields, including Air Traffic Controllers, which faces critical manning shortages. This foundational study is designed to uncover the most significant factors in careers in the aerospace realm, recognizing that the readily available survey group was largely composed of those pursuing commercial pilot careers. Later studies will compare factors between and within groups to better understand potential similarities and differences in motivation, across a much larger sample size and a much broader set of career focal groups.

The research instrument demonstrates strong validity due to the expertise of the researchers involved in its development and its foundation in established literature. Drawing on prior research from adjacent fields helps ensure that the constructs being measured are

conceptually sound and informed by proven methodologies. However, validity remains a potential limitation, as there is a lack of existing research directly focused on this specific topic. This scarcity makes it more challenging to fully confirm that the instrument captures all relevant dimensions unique to the area of study, highlighting the need for further validation in future research.

## **Implications for Practice**

The findings of this study suggest that collegiate aviation educators and university programs should adopt a more intentional, multifaceted approach to outreach, recruitment, and student support. Because most students in this sample did not participate in formal pre-college aviation programs, institutions should expand their focus to scalable, low-barrier forms of exposure, such as aviation-themed summer camps, partnerships with K–12 schools, and engaging digital or social media content that highlights aviation careers in accessible, relatable ways. At the same time, recruitment messaging should more explicitly emphasize career outcomes, including job placement rates, time to employment, and realistic salary trajectories. However, this messaging must be balanced with transparent communication about career progression and potential challenges to ensure students develop accurate expectations.

In addition, the results highlight the importance of proactively developing structured mentorship opportunities, particularly to address disparities in access observed across gender. Collegiate aviation programs should implement formal mentorship initiatives that connect students with industry professionals and alumni early in their academic careers, with targeted efforts to support underrepresented groups. Integrating career identity development into the curriculum is also critical; programs can incorporate guest speakers, career exploration modules, and reflective activities that help students connect their academic experiences to long-term career goals. Furthermore, increasing access to hands-on and experiential learning opportunities such as introductory flight experiences, simulator use, or partnerships with local aviation organizations can reinforce student interest and persistence by strengthening both confidence and engagement. Finally, although socioeconomic differences were not statistically significant, the high cost of aviation training remains a likely barrier, and programs should continue to expand financial support mechanisms, improve transparency around costs, and explore innovative training models that reduce financial barriers to entry. Collectively, these strategies can help institutions better align their practices with the factors that truly influence students' pathways into aviation, ultimately strengthening both recruitment and retention within collegiate aviation programs.

## **Conclusion**

This study provides new insight into how students enter collegiate aviation pathways, highlighting the central role of career-oriented motivations and informal exposure in shaping these decisions. By applying Situated Expectancy-Value Theory, the findings demonstrate that aviation students are primarily driven by strong perceptions of career utility, particularly job availability and long-term earning potential.

The study's primary theoretical contribution lies in extending SEVT to the aviation domain and demonstrating that utility value may dominate other motivational components in

highly structured, career-specific fields. Additionally, the findings emphasize the importance of informal learning environments and social influences in shaping both expectancy beliefs and career interest, suggesting that pathways into aviation are more diffuse and less programmatically defined than previously assumed.

From a practical standpoint, the results indicate that collegiate aviation programs have significant opportunities to reshape recruitment and student support strategies. Rather than relying on traditional aviation pipelines, institutions can broaden participation by expanding informal outreach, clearly communicating career outcomes, and building structured mentorship systems. Addressing disparities in access to mentorship and early exposure, particularly for underrepresented groups, will be critical to improving both recruitment and retention.

Ultimately, strengthening the aviation workforce pipeline will require a more intentional alignment between how students develop an interest in aviation and how institutions support that interest through accessible, equitable, and career-relevant programming. Future research should build on these findings by examining longitudinal outcomes, evaluating targeted interventions, and further exploring how expectancy and value beliefs evolve throughout students' academic and professional trajectories.

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