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Agricultural Student Perceptions of Career Success Factors: Ranking Attributes of Collegiate Experiences

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Abstract

There is an ever-imminent need for career-ready graduates from collegiate agriculture programs. Generational shifts in attitudes and background experiences of agricultural students challenge educators to maintain curricular programming which establishes a successful career trajectory for students. Students studying animal science and/or agricultural economics were surveyed to understand their perception of how collegiate curricular, co-curricular, and extracurricular experiences (coursework, club participation, relevant work, international experience, advising/mentoring, college life, and professional networking) contribute to their anticipated career success. A best-worst scaling experiment was used to force respondents to make tradeoffs between the collegiate experience attributes in a manner designed to be free of scale biases. Responses were related back to additional demographical and experience/perception characteristics of respondents through various approaches. Based on their responses, students solely in a pre-veterinary Animal Science curriculum represented a particularly interesting category of students regarding their beliefs and reported experiences. Students indicated relevant work experience was overwhelmingly the most critical of the 7 factors they were asked to evaluate. Further research should investigate possible disconnects between student perceptions and reality in higher education.

Keywords: agricultural student; career success; work experience; pre-veterinary; financial stress

Introduction

There is a projected shortage of U.S. college graduates with bachelor's degrees to fill job openings within the related industries of agriculture, food, environment and natural resources (Goecker, Smith, Fernandez, Ali, & Theller, 2015). Projected growth in domestic meat production and exportation indicates a critical need for college graduates with a career interest in one of the largest sectors of U.S. agriculture, the meat and poultry industry, according to the North American Meat Institute (2017). Certainly, one of the goals of agricultural higher education is effective workforce preparation and as such, has been deemed a research priority by several institutions (T. G. Roberts, Harder, & Brashears, 2016).

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Designers of an effective collegiate curriculum must consider the knowledge gaps existing between first year students and expected competencies of program graduates. Background experiences of agricultural students have changed over time as students now predominantly hail from urban upbringings and a low percentage have enrolled in high school agriculture courses (Swan & De Lay, 2014). The student body is predominantly female, and among animal sciences, there is prevalent interest in companion animals; the most common career objective is veterinary medicine, and a shrinking number of students have career interests in food animal production (Lyvers Peffer, 2011; Swan & De Lay, 2014).

Educational opportunities and priorities are also changing, thereby requiring the use of co-curricular experiences to enhance student learning. High impact learning initiatives are supported at the university, college, and departmental levels, but when it comes to the perceived value of these experiences, differences in perception among agricultural educators may be biased by the number of years of teaching experience (Murphrey, Odom, & Sledd, 2016). Since perceptions vary among individuals, understanding student perception of the relative value of common college experience attributes is critical to meeting student expectations and/or countering misbeliefs among educators and employers.

The undergraduate curriculum is increasingly tasked with the development of noncognitive competencies of students. The highest ranking competencies of graduates valued by employers are noncognitive, even to the exclusion of major-relevant skills and technical knowledge for some employers (Finch, Hamilton, Baldwin, & Zehner, 2013; Gillespie & Bampasidou, 2018; National Association of Colleges and Employers [NACE], 2017). Consequently, few employers consider college transcripts helpful predictors of job candidate success (Hart Research Associates, 2015) and although employers traditionally rely upon grade point average (GPA) as a screening factor and/or potential job qualification (Henrich, 2016; NACE, 2017), employers may be losing confidence in the importance of GPA (Pearce, 2017). Regardless of whether students are acutely aware of these shifting employer attitudes, a myriad of experiences extraneous to coursework vie for time in the student's schedule.

Study abroad outcomes are generally hailed as beneficial for agricultural students and can make candidates more attractive to potential employers (Harder et al., 2015; White, 2016). However, incongruity exists among faculty perceptions of the curricular importance and prioritization of study abroad for preparation of globally competent graduates (Rampold, Bunch, Cater, Blackburn, & Burnett, 2018). This divergence of opinion might be partially attributable to the variability in duration of study abroad experiences and student outcomes (Gaia, 2015). Yet regardless of the perceived value, student financial concerns might present a barrier to pursuing international experience since collegiate funding status appears to influence student intentions to study abroad (Salisbury, Paulsen, & Pascarella, 2011). Consequently, considerable effort has been focused on documenting study abroad impact and expanding study abroad opportunities for students while less effort devoted to understanding how agricultural students perceive their career success being relatively benefited by international experience.

Employers in animal science and related industries ranked internships, relevant work experience, and general employment during college among the most important experiences potential employees should have (Robinson & Mulvaney, 2018). Internships can serve as an avenue for employment offers by the sponsoring organization (Lyvers Peffer, 2012). Unsurprisingly then, work experience and internships are linked to career success factors such as expedited post-graduation job placement, employment in a role consistent with one's college major, and larger starting salary (Blau et al., 2014, 2017). However, students may or may not perceive

these benefits if they are engaging in part-time work during college for financial reasons, a circumstance which students believe encumbers their involvement in collegiate activities and academic achievement (Furr & Elling, 2000).

Student engagement in extracurricular activities is also impactful to career preparation. Employers value extracurricular activity involvement at a similar level to high GPA and regard leadership experience more highly than either; over 70% of employers evaluate college graduates for leadership skills (NACE, 2017). However, students have demonstrated overvaluing group or club activities and internship participation while undervaluing farm work experiences compared to post-graduates now employed in agribusiness (Radhakrishna & Bruening, 1994).

The need for formal academic advising arose as collegiate programs became more discipline specific and student diversity increased (Himes & Schulenberg, 2016). Presently, advising has greater potential to impact students since agriculture programs are recruiting more diverse students with less familiarity with agriculture (Setterbo et al., 2017). However, perceptions of academic advising can differ by student gender, particularly regarding career and internship opportunities (Suvedi, Ghimire, Millenbah, & Shrestha, 2015). Fouad et al. (2006) found that although students voice a need for more information on occupations as well as on stages of the career development process, students appear to seek career advice from professional advisors only as much as they do from other sources such as parents, family members, friends, and peers, and slightly more frequently than from professors. Despite being aware of campus resources, students choose to underutilize professional counseling services.

College living environment has considerable implication for learning and career outcomes. Integration of coursework and college life through living/learning communities or Freshmen Interest Groups has been shown to improve the graduation rate among agricultural students (Purdie, Williams, & Ellersieck, 2007). Students who do not live on campus are less engaged especially in university-based career and professional development opportunities (Blau et al., 2014; Kuh, Gonyea, & Palmer, 2001). Conversely, campus life provides opportunities for stronger community and mentoring connections such as those derived from participation in Greek letter organizations (Hale, 2015).

Networking and mentoring relationship opportunities have been identified as valuable curriculum components by both students and agriculture industry stakeholders (Curtis & Mahon, 2010; Trexler, Parr, & Khanna, 2006). Networking opportunities such as career fairs give students crucial exposure to tangible career opportunities and allow them to establish lines of communication with potential employers (Payne & Sumter, 2005). Another engagement opportunity is Student Professional Organization involvement, which has been shown to be correlated with securing employment consistent with one's major upon graduation (Blau et al., 2017). Despite the majority of professional jobs being obtained through networking and networking's impact on career advancement in terms of salary and promotion, students often do not fully appreciate the value of networking (de Janasz & Forret, 2008).

Theoretical Framework

Commonly used techniques to ascertain rankings or preferences, including Likert scale questions and forced ranking of attributes, are relatively simple and flexible across various subject matters. However, Likert scale questions allow respondents to rate all attributes or factors equally, without tradeoffs. Forced ranking questions elicit tradeoffs but can be complex and difficult for respondents. Best-worst scaling (BWS) has advantages over rating methods, because it forces respondents to make tradeoffs between attributes and is free of scale biases (Lusk & Briggeman,

2009; Wolf & Tonsor, 2013). Best-worse scaling is rooted in random utility theory in that respondents make choices within the model to maximize their utility (Scarpa, Zanoli, Bruschi, & Naspetti, 2012). The presentation of every possible combination of attributes to respondents would require many choice sets (questions) and would likely result in survey fatigue, which is known to negatively impact responses (Galesic & Bosnjak, 2009). Therefore, a partial factorial designed using the SAS %MkrtBSize macro with a block design efficiency criterion of 100 was employed (SAS, 2018). The particular experimental design chosen included showing three attributes to respondents per choice set from which to choose their most-important/least-important attribute. Each attribute appeared seven times, and seven choice sets were required (SAS, 2018). Employing data from a designed BWS experiment to prioritize attributes involves identification of the most important and least important attributes from the BWS experiment to determine each attribute's location along the continuum. For attribute *j*, the location on the scale of most important to least important attribute is represented by λ_j. How important a respondent views a particular attribute, for respondent *i* is:

$$I_{ij} = \lambda_j + \varepsilon_{ij} \quad (1)$$

where ε_{ij} represents a random error term. For respondent i, the probability that he/she chooses attribute j as most important and attribute k as least important is the probability that the difference between I_{ij} and I_{ik} is greater than all potential differences available from the choices presented to each respondent. Assuming the error term is independently and identically distributed type I extreme value, the probability of choosing any most important-least important combination takes the multinomial logit form (Lusk & Briggeman, 2009) of:

$$Prob(j = best \cap k = worst) = \frac{e^{\lambda_j - \lambda_k}}{\sum_{l=1}^{J}\sum_{m=1}^{J} e^{\lambda_l - \lambda_m - J}} \quad . \quad (2)$$

The parameterλ_j, estimated using maximum-likelihood estimation, represents how important attribute j is relative to the attribute that is least important. An attribute must be normalized to zero in order to prevent multicollinearity, which is caused by the dummy variable trap (Lusk & Briggeman, 2009).

Purpose and Objectives

The purpose of this study was to gain insight on the perceptions undergraduate agricultural students have of various collegiate factors with respect to their relative contributions to one's personal career success. Understanding students' views of how various college experience attributes contribute to career success will provide educators, administrators, and employers' awareness of attitudes which may be contradictory to or corroborate stakeholder value beliefs. Consequently, the study employed known methodology, rooted in theory surrounding prioritization and relative ranking, to attributes contributing to students' own successes. Specific objectives were to:

1) Determine the undergraduate agricultural student's ranking of the relative importance of seven different attributes of the college experience to his/her intended career success utilizing BWS;

2) Investigate how student experiences are related to various demographical characteristics with special attention to college funding, career interest, and motivation for career path; and

3) Establish how the relative perception of collegiate factors contributing to career success varies among agricultural students according to personal characteristics and experiences.

Methods

Survey Instrument and Data Collection

A survey was administered in the spring semester of 2018 to undergraduate students within the two largest departments based on undergraduate enrollment numbers within the Purdue University College of Agriculture: Agricultural Economics (AGEC) and Animal Sciences (ANSC). The 51-question survey was made available to students from February 20, 2018 to March 9, 2018, in both electronic (Qualtrics®; Provo, Utah) and nine-page paper booklet formats available through the respective departments' advising offices. Survey responses from 487 students were obtained via the electronic (n=462) and paper booklet (n=25) formats. All responses were voluntary and collected anonymously. Students were not offered extra credit of any kind to participate, although course instructors in both departments did allow announcements by researchers that the data collection effort was taking place. Data collection procedures were approved by the Purdue Institutional Review Board (IRB) Human Research Protection Program (Protocol No. 1801020154).

The survey instrument began with a BWS experimental design to elicit rankings of key student success factors. This task was accomplished by presenting the student with a series of choice sets (questions) where they were tasked with choosing the most (best) and least (worst) important attribute included in that choice set (Figure 1). Students were presented with seven unique choice sets; each was configured as a combination of three of the seven attributes using SAS (v9.4, SAS Institute Inc., Cary, NC) to optimize positional frequencies of each of the attributes across the seven choice set questions.

Definitions

Coursework – learning course content and/or gaining exposure to course materials.

Club participation - involvement in collegiate clubs, leadership groups, fraternity/sorority activities, and judging team/competitions.

Relevant work experience – research or work activities which are related to your field of study through either on- or off- campus volunteer time, full/part time jobs, and internships.

International experience - university affiliated study abroad trips of any duration.

Advising/mentoring - both informal and formal advising provided by university staff, professors, and academic/career advisors.

College life – living in an on-campus residence hall, learning community housing, or sorority/fraternity house.

Professional networking experience – attendance at seminars, conferences, guest lectures, professional development activities, recognition banquets, industry tours, career fairs, etc.

Q1 -7. Within each question's list of three options, select the attribute that you believe is the most important for your anticipated career success plus the attribute that you believe is the least important for your anticipated career success:

Question 1

Most Important		Least Important
□	Club Participation	□
□	International Experience	□
□	College Life	□

Question 2

Most Important		Least Important
□	Professional Networking	□
□	College Life	□
□	Advising/Mentoring	□

Question 3

Most Important		Least Important
□	Advising/Mentoring	□
□	Relevant Work Experience	□
□	International Experience	□

Question 4

Most Important		Least Important
□	Relevant Work Experience	□
□	Club Participation	□
□	Professional Networking	□

Question 5

Most Important		Least Important
□	International Experience	□
□	Professional Networking	□
□	Coursework	□

Question 6

Most Important		Least Important
□	Coursework	□
□	Advising/Mentoring	□
□	Club Participation	□

Question 7

Most Important		Least Important
□	College Life	□
□	Coursework	□
□	Relevant Work Experience	□

Figure 1. The survey began with a best-worst scaling (BWS) experimental design which presented respondents with a series of choice sets. Factor definitions and the seven BWS choice set questions are shown here.

In this particular experimental design, students were asked to select what they believed was the most important and least important attribute contributing towards their future career success. Attributes were briefly defined for students and included: coursework, club participation, relevant work experience, international experience, advising/mentoring, college life, and professional networking. After completing the BWS experiment, information on student gender, age, race,

current and youth living environment, engagement in animal/agricultural activities, academics, career aspirations, and collegiate experiences was sought. Respondents were also asked to characterize 27 factors according to the level of influence each had on their decision to pursue their intended career, self-report their financial stress and funding means for college, and indicate their academic performance level.

Data Analysis

Summary statistics, including means and frequencies of responses, for both the whole sample as well as subsamples of interest (i.e. by department or by key identified demographics of interest) were developed. Cross-tabulations of student responses were evaluated by chi-square analysis (z-test, unadjusted; 95% confidence interval) using IBM Statistical Package for the Social Sciences (SPSS 24) software.

The student's choices of the most important and least important attributes from the BWS experiment were used to determine each attribute's location along the continuum from most to least important attribute. The BWS experiment was modeled in NLOGIT 6.0 using two distinct methods for incorporating student heterogeneity of preferences, a random parameters logit (RPL) and a latent class model (LCM). The RPL model allows for continuous heterogeneity amongst individuals and the individual-specific parameter estimates were used to calculate individual-specific preference shares. Parameter estimates are not intuitive to interpret, thus shares of preferences were calculated following Wolf and Tonsor (2013) and must sum to one across the seven attributes:

$$share_j = \frac{e^{\lambda_j}}{\sum_{k=1}^{J} e^{\lambda_k}} \quad (3)$$

The Krinsky-Robb method was used to determine confidence intervals for the result of the RPL preference shares (Krinsky & Robb, 1986). Overlapping confidence intervals method was used to determine if the sizes of the preference shares were statistically different from one-another within the RPL model results; it is acknowledged that comparing 95% confidence intervals and examining overlap is more conservative than the standard method of significance testing (Schenker & Gentleman, 2001).

Within the LCM, people have homogenous preferences within a class, and heterogeneous preferences across classes (Boxall & Adamowicz, 2002). The latent class model classifies individuals into a class (*S*), based on their attitudes and preferences. Parameters for each class are simultaneously estimated, and individual respondents are assigned to an unobserved latent class (Swait, 1994). Given the respondent belongs to a specific latent class, denoted as *s*, the conditional probability of choices is:

$$(Prob(j = best \cap k = worst)|s) = \frac{e^{\lambda_{js} - \lambda_{ks}}}{\sum_{l=1}^{J} \sum_{m=1}^{J} e^{\lambda_{ls} - \lambda_{ms} - J}} \quad (4)$$

where the λ_{js} and λ_{ks} parameters are class specific (Ouma, Abdulai, & Drucker, 2007). The probability of membership in the unobservable classes has the multinomial logit form:

$$Prob(s) = \frac{e^{(\theta_s Z)}}{\sum_{s=1}^{S} e^{\theta_s Zk}} \quad (5)$$

where Z is a set of hypothesized drivers of class membership, the s^{th} parameter vector is normalized to zero for model identification, and θ_s characterizes the impact the drivers have on class

membership (Ouma et al., 2007). Preference shares for each latent class were also calculated using equation 3.

Linking Preferences with Respondent Demographics

Although the RPL provides information regarding respondent preferences and relative ranking of the attributes, it does not include the relationship between preferences and the respondent demographics. Therefore, Pearson correlations (Pearson, 1894; Pearson, 1895) were used to evaluate the relationship between RPL preference shares and respondent demographics.

The LCM estimates the probability of class membership for each individual respondent. Post-estimation, individual respondents were assigned to the class in which they had the highest probability of membership following Lai (2017). Respondents who did not have at least a 50% difference in probability between their first and second highest probability classes were not included in the demographic analysis. A total of n=316 respondents were included for the LCM demographic analysis.

Results and Discussion

Student Sample Demographics

Respondents (n=487) reported studying a major in the department of Agricultural Economics, a major in the department of Animal Sciences, or majors in both (n=96). The majority of respondents was female, between the ages of 18 and 21, and described themselves as White/Caucasian (Table 1). Fall 2017 undergraduate enrollment in the Purdue University College of Agriculture consisted of a female majority (59%) and respondent ethnicity mirrored percentages of Asian (2.9%), Black/African American (1.8%), and Hispanic/Latino (4.0%) students enrolled in the college (Purdue University Data Digest, 2017).

Table 1

Demographic Information of Respondents

Demographic variable	% of all respondents (*N*=487)	% of AGEC major (*N*=170)	% of ANSC major (*N*=413)	% of ANSC PREVET (*N*=186)	% of ANSC non-PREVET (*N*=227)
Gender[a]	*n=462*	*n=163*	*n=395*	*n = 180*	*n = 215*
Female	78.4	62.6	85.1	86.1	84.2
Age[a]	*n=463*	*n=163*	*n=396*	*n=180*	*n=216*
18 - 19	48.2	39.3	51.8	69.4	37.0
20 - 21	39.5	44.2	36.6	25.6	45.8
22 - 23	11.2	14.1	10.6	4.4	15.7
24 +	1.1	2.5	1.0	0.6	1.4
Class[a]	*n=464*	*n=163*	*n=397*	*n=180*	*n=217*
Freshman	37.7	31.3	40.8	57.2	27.2
Sophomore	19.2	19.6	17.9	17.2	18.4
Junior	22.2	22.1	21.9	13.3	29.0
Senior	20.9	27.0	19.4	12.2	25.3
Race[a]	*n=464*	*n=163*	*n=397*	*n=180*	*n=217*
White/Caucasian	90.3	92.0	89.4	85.0	93.1
Asian	3.7	3.7	4.0	5.6	2.8
Black/African American	1.7	1.2	2.0	2.8	1.4
Hispanic/Latino	3.0	2.5	3.3	4.4	2.3
Other/prefer not to answer	1.3	0.6	1.3	2.2	0.5
Residency	*n=487*	*n=170*	*n=413*	*n=186*	*n=227*
In-state student	79.3	83.5	78.7	73.7	82.8
International student	1.6	2.9	1.2	1.6	0.9
Type	*n=487*	*n=170*	*n=413*	*n=186*	*n=227*
Full-time student	90.1	86.5	91.0	92.5	89.9
Changed major at least once	37.6	44.7	37.0	19.4	51.5

Note. Response rate among all students was ≥ 95%

Across class level, freshmen students comprised the largest percent of survey participants, while sophomores, juniors, and seniors participated at similar rates. Of those reporting majoring in ANSC, 45% selected pre-veterinary curriculum as their sole current area of study; this subset of ANSC students, hereby PREVET, predominantly consisted of female freshmen. Respondents studying in the department of AGEC were most often majoring in agribusiness (42.9%) or undecided (32.9%).

Rural backgrounds were reported by the majority of AGEC students and by the majority of ANSC students not exclusively in the pre-veterinary curriculum track (non-PREVET; Table 2). PREVET students reported an urban background environment at twice the rate of non-PREVET students. PREVET students were distinguished by having the most youth engagement with companion animals but consistently had the lowest involvement in agronomic production, meat animal husbandry, and animal product related activities relative to non-PREVET and AGEC students. The highest percentage of 1st generation college attendance was reported among PREVET students as well as the most international exposure (data not shown), possibly associated with this subset of students also having the most ethnic diversity.

Table 2

Background and Educational Experiences of Respondents

Characteristic	% of all respondents (*N*=487)	% of AGEC major (*N*=170)	% of ANSC major (*N*=413)	% of ANSC PREVET (*N*=186)	% of ANSC non-PREVET (*N*=227)
Background environment [a]	*n=459*	*n=160*	*n=392*	*n=178*	*n=214*
Urban	7.8	8.8	8.2	11.2	5.6
Non-urban	92.2	91.2	91.8	88.8	94.4
Suburban	28.3	21.3	31.1	42.1	22.0
Rural	63.8	70.0	60.7	46.6	72.4
Rural, farm/ranch	38.6	48.8	35.7	23.0	46.3
Rural, non-farm/ranch	25.3	21.3	25.0	23.6	26.2
Youth ag involvement	*n=487*	*n=170*	*n=413*	*n=186*	*n=227*
Agronomic production	34.9	45.3	31.0	21.5	38.8
Animal husbandry					
Companion animals	58.9	45.3	64.2	72.6	57.3
Horses	25.9	22.4	28.8	28.5	29.1
Meat animal	30.6	37.6	28.6	18.8	36.6
Animal products					
Meat processing	13.3	15.9	12.6	7.0	17.2
Non-meat production	26.3	29.4	25.9	21.5	29.5
Husbandry &/or products	73.3	68.8	75.8	76.3	75.3
Education	*n=487*	*n=170*	*n=413*	*n=186*	*n=227*
High school ag courses					
Available	48.9	53.5	46.2	40.9	50.7
Enrolled	44.8	49.4	42.1	33.3	49.3
College 1st generation	23.0	20.6	25.2	26.9	23.8
Typical grades[a]	*n=463*	*n=163*	*n=396*	*n=180*	*n=216*
A's	33.3	32.5	32.1	41.7	24.1
B's	55.5	55.2	56.3	52.2	59.7
C's	10.6	12.3	10.9	6.1	14.8
D's	0.6	0	0.8	0	1.4
Non-university college credit	*n=487*	*n=170*	*n=413*	*n=186*	*n=227*
High school AP	67.1	66.5	68.3	71.0	66.1
Community college	38.8	38.8	39.0	32.8	44.1
Other	9.7	8.8	10.4	14.5	7.0

[a] Response rate among all students was ≥ 94%.

Regarding coursework, over 84% of respondents self-reported typically obtaining A or B grades. Across major and academic year, B grades were reported more frequently than A grades with the sole exception of PREVET students. Non-PREVET students were more similar to AGEC students than PREVET students who reported the greatest frequencies of having earned high school advanced placement (AP) but the fewest community college credits. The majority of students indicated they perceived departmental course content (82.3%), timing and scheduling (71.0%), and class size (68.2%) to be generally sufficient.

BWS Model Results for Student Perception of Collegiate Experience Attributes

The results of the RPL model showed that respondents ranked relevant work experience as the most important attribute when considering their anticipated career success (Table 3). There was a tie between coursework and professional networking for second in terms of size of preference share. Advising/mentorship ranked 3rd, and club participation ranked 4th with preference shares of less than 5% each. Statistically, there was a tie for last (5th) between international experience and college life.

Based on BIC and class size, a four class model was determined to be the most appropriate for the LCM. The first class had a large preference share for relevant work experience and coursework so it was named "Work and Study" (Table 3 and Figure 2). The second class had a large preference share for relevant work experience and professional networking so the class was named "Outside the Classroom." The third class was characterized by its large preference share for relevant work experience, coursework, and professional networking so it was named "Classic Collegiate" in consideration of the traditional collegiate marketing themes of scholarship, workforce preparation, student clubs, professional networking, and study abroad. Class 4 had fairly equal preference shares for all attributes, so it was named "Everything/Nothing" because it is indeterminable whether the respondents had high preference for all of the attributes or simply did not care for any of the attribute.

Table 3
Analysis of Students' Best-Worst Rankings of Attributes for Career Success. (n=405)

	Random Parameters Logit				Latent Class Model – Coefficients [a]				Latent Class Model - Preference shares			
	Coefficient	Standard deviation	Shares of preference	Rank [b]	Class 1	Class 2	Class 3	Class 4	Class 1 "Work and Study"	Class 2 "Outside the Classroom"	Class 3 "Classic Collegiate"	Class 4 "Everything/Nothing"
Coursework	-0.279***	1.490***	14%	2	1.252***	-2.377***	0.2824	0.081	34%	3%	20%	20%
	0.098	0.109	[0.121, 0.175]		0.331	0.232	0.212	0.179				
Club participation	-1.967***	0.989***	3%	4	-2.40***	-2.644***	-1.615***	-0.429***	1%	2%	3%	12%
	0.096	0.103	[0.022, 0.032]		0.330	0.257	0.216	0.151				
Relevant work experience	1.090***	1.111***	57%	1	1.677***	0.480***	1.133***	0.145	52%	55%	47%	21%
	0.111	0.137	[0.514, 0.621]		0.236	0.183	0.200	0.151				
International experience	-2.588***	1.624***	1%	5	-3.164***	-3.660***	-0.372*	-0.915***	0%	1%	10%	7%
	0.129	0.128	[0.011, 0.019]		0.391	0.272	0.198	0.178				
Advising/mentorship	-1.496***	0.752***	4%	3	-1.163***	-2.089***	-1.603***	-0.788***	3%	4%	3%	8%
	0.084	0.114	[0.036, 0.051]		0.238	0.226	0.200	0.156				
College life	-2.891***	1.692***	1%	5	-2.886***	-3.796***	-2.707***	-0.296*	1%	1%	1%	14%
	0.133	0.137	[0.008, 0.014]		0.327	0.270	0.271	0.160				
Professional networking	-	-	19%	2	-	-	-	-	10%	34%	15%	18%
	-	-	[0.164, 0.220]		-	-	-	-				
Avg. class probability constant					-0.326	0.420	-1.458**		0.291	0.332	0.209	0.168
Student is pre-vet					0.597	-0.906**	0.876*					
Student is female					0.816*	0.792*	1.545**					

Note. *** indicates significance at 0.001 level, ** significance at 0.05 level, * significance at 0.10 level.
[a] To prevent multicollinearity, the category "Professional Networking" was dropped from the model. All coefficients are in reference to this dropped variable. [b] Ranks were determined by examining overlapping confidence intervals established using the Krinsky-Robb method (1986).

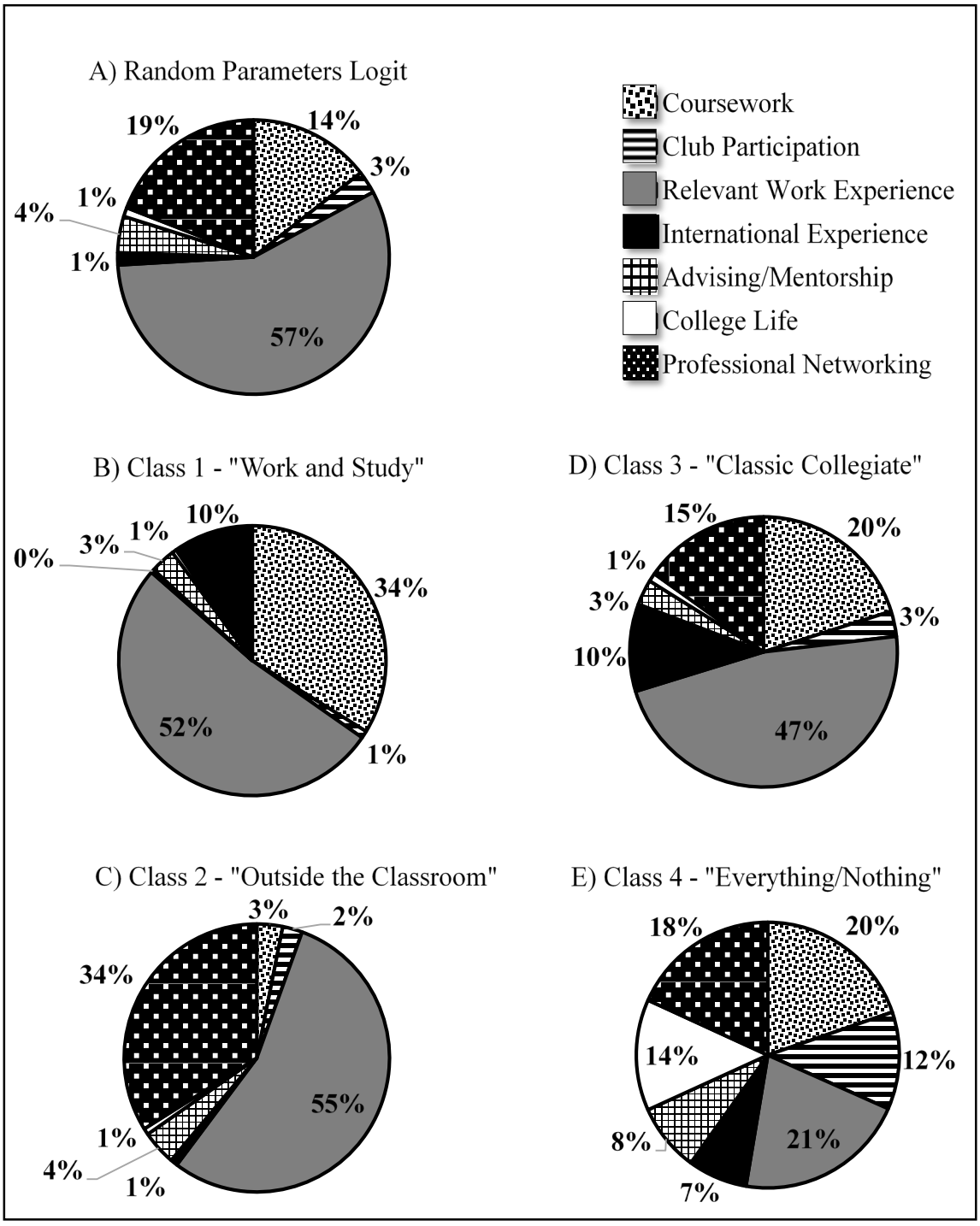

Figure 2. Preference shares of attributes students believe are the most important to their career success as determined by (A) Random Parameters Logit, n=405, and by (B – E) Latent Class Model, individual classes, n=405.

Relationships Between Respondent Career Aspirations, Demographics, and Experiences

When asked directly, 75.3% of students claimed professional networking was necessary for helping them obtain their desired jobs. The majority of AGEC students anticipated working in the agriculture/animal industry post-graduation but only about half as many ANSC students planned to do the same (Table 4).

Table 4
Career Aspirations of Respondents (% of Respondents)

Characteristic	% of all respon-dents *N=487*	% of AGEC major *N=170*	% of ANSC major *N=413*	% of Fresh. *N=174*	% of Soph. *N=89*	% of Juniors *N=103*	% of Seniors *N=97*
Post-grad plan (Response rate of all students = 95%)							
Work	*n=464*	*n=163*	*n=397*	*n=174*	*n=89*	*n=103*	*n=97*
Work in ag or animal industry	43.8	68.1	35.8	28.0	48.3	54.4	56.7
Family operation	5.4	12.9	2.5	2.9	7.9	7.8	5.2
Ag/animal sci. industry	38.4	55.2	33.2	25.1	40.4	46.6	51.5
Work in non-ag industry	3.4	3.7	3.3	2.3	2.2	6.8	3.1
Continue education	50.4	26.4	58.4	67.4	47.2	36.9	37.1
Veterinary school	39.4	19.0	46.1	53.7	41.6	28.2	23.7
Graduate school	11.0	7.4	12.3	13.7	5.6	8.7	13.4
Other	2.4	1.8	2.5	2.3	2.2	1.9	3.1
Career intention(s)							
Veterinary medicine	43.7	22.9	51.3	60.3	48.3	34.0	30.9
Nutritional research/sales/service	17.2	14.1	20.1	17.2	22.5	15.5	18.6
Genetics research/sales/service	13.8	15.3	14.8	15.5	11.2	12.6	17.5
Animal health research/sales	27.1	22.4	31.2	25.3	22.5	32.0	36.1
Agronomic research/sale/service	7.8	21.2	2.9	5.7	13.5	6.8	9.3
Crop farm production	8.0	20.0	2.7	6.3	12.4	5.8	11.3
Live animal husbandry	21.4	18.8	24.2	16.1	18.0	34.0	25.8
Farm business management	13.6	28.2	9.7	9.8	18.0	16.5	16.5
Ag business management	19.9	44.7	11.6	12.6	24.7	21.4	32.0
Dairy/egg industry sales/service	7.0	7.6	7.3	3.4	9.0	9.7	10.3
Meat industry sales/service	9.0	8.2	9.7	8.6	5.6	15.5	8.2
Academia	5.3	4.1	5.3	2.3	6.7	7.8	8.2
Other	11.1	11.2	10.2	7.5	11.2	16.5	14.4
Undecided	8.8	5.9	9.9	11.5	6.7	11.7	5.2

Rather, the majority of ANSC majors planned to continue their education post-baccalaureate by either attending veterinary school or graduate school. When asked to indicate career area(s) they were preparing for, over 50% of all ANSC students indicated they were targeting veterinary medicine; for AGEC students, the most common career area was agriculture business management. Meat industry sales/service

was reported as an area of career interest by a small but similar share of AGEC and ANSC respondents and over 20% of all respondents expressed interest in a career involving live animal husbandry.

Table 5

Cross Tabulations of Respondent Career Salary Influence and Class to Career Goal, Other Factors of Influence, and Work (% of Respondents)

	Starting salary influence		Grade level			
	High	Low	Fr.	Soph.	Jr.	Sr.
Career choice	*n=415*		*n=463*			
Ag industry inc. family ag	42.8$_{a}$	44.8$_{a}$	28.2$_{a}$	48.3$_{b}$	54.4$_{b}$	56.7$_{b}$
Non-ag industry/other	6.2$_{a}$	4.4$_{a}$	4.6$_{a}$	4.5$_{a}$	8.7$_{a}$	6.2$_{a}$
Graduate school	9.7$_{a}$	11.9$_{a}$	13.8$_{a}$	5.6$_{b}$	8.7$_{ab}$	13.4$_{ab}$
Veterinary medicine	41.4$_{a}$	38.9$_{a}$	53.4$_{a}$	41.6$_{ab}$	28.2$_{bc}$	23.7$_{c}$
Continue education	*n=413*		*n=463*			
No	49.0$_{a}$	49.3$_{a}$	32.8$_{a}$	52.8$_{b}$	63.1$_{b}$	62.9$_{b}$
Yes	51.0$_{a}$	50.7$_{a}$	67.2$_{a}$	47.7$_{b}$	36.9$_{b}$	37.1$_{b}$
% of respondents reporting:[a]						
Career highly influenced by:	*n=359 - 411*		*n=385 - 435*			
College course(s)	82.0$_{a}$	72.9$_{b}$	69.2$_{a}$	73.2$_{ab}$	78.6$_{ab}$	85.2$_{b}$
Previous job	69.0$_{a}$	70.9$_{a}$	68.8$_{a}$	71.2$_{a}$	70.9$_{a}$	74.4$_{a}$
Volunteer work	73.9$_{a}$	63.9$_{b}$	77.4$_{a}$	59.3$_{b}$	60.9$_{b}$	65.9$_{ab}$
Starting salary	---	---	35.8$_{a}$	35.0$_{a}$	31.2$_{a}$	37.3$_{a}$
Salary potential	95.1$_{a}$	17.2$_{b}$	46.3$_{a}$	44.4$_{a}$	37.5$_{a}$	48.8$_{a}$
Parent(s)	79.3$_{a}$	67.7$_{b}$	80.1$_{a}$	71.1$_{ab}$	60.8$_{b}$	70.5$_{ab}$
Desire to work with animals	87.1$_{a}$	88.3$_{a}$	92.9$_{a}$	86.4$_{ab}$	84.8$_{b}$	84.9$_{b}$
Engagement in:	*n=415*		*n=463*			
Work during college	76.6$_{a}$	75.6$_{a}$	59.8$_{a}$	77.5$_{c}$	92.2$_{b}$	88.7$_{b}$
Work, major related	57.9$_{a}$	63.0$_{a}$	40.8$_{a}$	66.3$_{b}$	75.7$_{bc}$	79.4$_{c}$
Work, major unrelated	50.3$_{a}$	44.8$_{a}$	36.2$_{a}$	39.3$_{a}$	63.1$_{b}$	59.8$_{b}$
Related work &/or internship	63.4$_{a}$	67.8$_{a}$	43.7$_{a}$	73.0$_{b}$	80.6$_{bc}$	88.7$_{c}$
Internship, paid	24.1$_{a}$	20.0$_{a}$	2.9$_{a}$	20.2$_{b}$	31.1$_{b}$	47.4$_{c}$
Internship, unpaid	7.6$_{a}$	12.6$_{a}$	6.9$_{a}$	6.7$_{a}$	10.7$_{a}$	22.7$_{b}$
Internship, any	28.3$_{a}$	30.7$_{a}$	9.8$_{a}$	27.0$_{b}$	37.9$_{b}$	61.9$_{c}$
Career fair attendance	89.0$_{a}$	88.5$_{a}$	91.4$_{a}$	87.6$_{a}$	85.4$_{a}$	85.6$_{a}$

Note. For a specific variable, percentages within a row lacking a common subscript significantly differ from each other.

[a] "Reporting" means an affirmation was given; absence of affirmation does not necessarily mean no (responses to questions were not forced).

Across academic grade level, there was a reduction in the percentage of students planning to attend veterinary school post-graduation (Table 5). Correspondingly, the percent of freshmen intending to enter the agriculture/animal industry post-graduation was smaller than the percent of sophomores, juniors, and seniors who had the same intention. We surmise this phenomenon to be the consequence of veterinary career minded freshmen changing their career intention during their undergraduate education. Results also showed that the percentage of students with high career commitment who indicated a veterinary medicine career aspiration was greater than the percentage of those with low career commitment who aspired to a veterinary career. This may indicate a strong allegiance to the veterinary profession among PREVET

curriculum students and corroborates with their self-reported lack of major change. Alternatively, since PREVET students were more often freshman, the lack of major change could simply be due to shorter time in college at the time of data collection.

As discussed by Kogan and colleagues, advisers are challenged to assist pre-veterinary students with a preparatory curriculum that gives students a successful dossier for the highly competitive veterinary school admission process (Kogan, Stewart, Schoenfeld-Tacher, & Janke, 2011). Simultaneously, advisers must also help students be cognizant of the value in preparing themselves for an alternate career path. The percent of ANSC graduates actually involved in some aspect of the veterinary profession is far less than the percentage of interested students (Dodson & Benson, 2010) and many students experience a delay between undergraduate graduation and veterinary school (Kedrowicz, Fish, & Hammond, 2015). Alignment of student initiative with a curriculum which facilitates noncognitive outcomes without neglecting technical training could be augmented by further investigation of the impact of high career commitment on narrowness of approach when electing co-curricular activities.

Encouragingly, 71.5% of respondents indicated they considered animal product study a necessary component of their college education and 28% of them reported they had completed an ANSC meat science course at Purdue University. Analysis showed that students who indicated they had taken a meat science course and/or meat science laboratory were more interested in a meats career area of focus than those who had not. Moreover, the percent of freshmen who were highly influenced in their career choice by college courses was smaller than the percent of seniors also highly influenced by college courses, which is perhaps not surprising as freshmen respondents were only in their second semester (Table 5). Including a variety of applied courses in curriculum coursework may be a strategy to stimulate career interests and goals among students with limited background exposure to agriculture (Swan & De Lay, 2014). With broadened interests and identification of alternative opportunities, graduates might also be advantaged in navigating short term labor market entry barriers within a particular field such as veterinary medicine.

To investigate factors influencing the career choices of students enrolled in the agricultural curriculum, respondents were asked to categorize certain factors for having a "high," "low," or "non-applicable" level of influence on their career choice. Passion for career area was the factor most frequently considered highly influential among all students and AGEC students (Table 6), with desire to work with animals only slightly surpassing it as the top influence among ANSC students. Passion for career area and financial considerations have previously been reported as highly influential factors (Hegerfeld-Baker, Anand, Droke, & Chang, 2015), yet respondents appeared to be relatively uninfluenced by monetary consideration as a relatively low number of respondents reported starting salary was a high influence. Notably, almost all respondents who said starting salary was a high influence also indicated that salary potential was a highly influential factor (Table 5). Participation in youth programs such as 4-H and FFA was not directly assessed in the present study; however, the majority of AGEC students and over 25% of ANSC PREVET considered 4-H involvement highly influential to their career aspiration (Table 6). This finding is notable because previous involvement in 4-H/FFA programming seems to be declining among collegiate agricultural students (Russell, 1993; Swan & De Lay, 2014) despite the success of 4-H programs in preparing participants for the workforce (Nash & Sant, 2005; Rusk, Martin, Talbert, & Balschweid, 2002). The percent of freshmen who were highly influenced in their career choice by volunteer work was greater than the percent of sophomores and juniors, which may be an artifact of the high interest in veterinary medicine among freshmen. Veterinary school admissions staff value animal exposure experiences, which the American Veterinary Medical Association (2018) suggests can be acquired through volunteer work at animal shelters or veterinary clinics.

Table 6

Factors Influencing Career Aspirations of Respondents (% of Respondents)

Highly influential factor	% of all respon-dents (*N*=487)	% of AGEC major (*N*=170)	% of ANSC major (*N*=413)	% of ANSC PREVET (*N*=186)
High school courses	39.8	35.9	40.7	45.7
High school teacher	41.7	41.2	42.9	41.4
National Honors Society	16.2	18.8	16.9	18.3
Student Council	7.2	7.1	8.2	9.7
College visit	46.6	43.5	48.2	52.7
College courses	66.1	60.0	67.6	68.8
College professor	34.1	34.7	34.6	25.3
4-H involvement	45.6	55.9	43.1	26.3
FFA involvement	31.4	38.2	29.3	18.8
Previous job	56.1	57.6	56.7	54.3
Volunteer work	58.5	41.2	65.9	78.0
Previous or current employer	50.7	53.5	50.1	48.4
Friends	49.5	52.9	49.2	51.6
Parents	64.3	65.3	63.4	66.7
Relatives other than parents	48.3	53.5	47.5	46.2
Similarity to parent career	18.5	31.2	14.3	9.7
Starting salary	29.8	32.9	29.5	30.1
Salary potential	38.2	40.0	37.8	43.5
Graduation placement rate	35.7	40.0	33.2	33.9
Job security	49.1	50.6	47.9	52.7
Employment opp. & demand	58.3	60.0	57.9	60.2
Geographic location	46.0	52.9	39.4	44.6
Long-term professional goals	75.2	70.0	76.5	82.8
Competency & proficiency	63.2	58.8	63.9	71.0
Passion for career area	85.4	80.0	86.2	88.7
Desire to work with animals	78.9	60.6	87.9	89.2
Desire to work with plants	13.6	30.0	8.2	3.8

Note. Students were asked to rank each factor of influence as having a low influence, high influence, or as non-applicable to their career choice; for brevity, only the percentages of respondents ranking the factor as a high influence are shown here.

A considerable majority (85.5%) of PREVET students considered animal handling and management a necessary component of their college education while 63.5% of AGEC students thought it necessary. Concerning the delivery method of animal handling and management education, 82.5% of respondents indicated they thought hands-on experience as the best format (over lecture-based discussion). Given the option of obtaining skills important for success through either computer simulation or via on-farm visits, almost all students (82.8%) chose on-farm experiences. Intensifying pressures on university resources have driven educators towards increasingly creative mechanisms to expose students to on-farm and out-of-classroom experiences. It is recognized that funding and staffing challenges have strained many Land Grant Universities in these endeavors (R. M. Roberts et al., 2009). Consequently, conserving the ability to provide students with on-farm animal experiences while developing industry partnerships to provide students with networking opportunities, exposure to various work and career options, and employer values in settings outside the classroom may be a desirable approach**.**

Relevant work experience was perceived by students as highly beneficial for future career success, and many students reported working a college job either related or unrelated to their major. As expected due to compounding experiences, the number of students having obtained work experience increased with academic grade level (Table 5). Although a large number of both AGEC and non-PREVET students reported relevant work experience, an internship, or both, a smaller number of PREVET students indicated the same (Table 7).

Table 7

Financial Security of Respondents (% of Respondents)

Characteristic	% of all respon-dents (*N*=487)	% of AGEC major (*N*=170)	% of ANSC major (*N*=413)	% of ANSC PREVET (*N*=186)	% of ANSC non-PREVET (*N*=227)
Financial stress					
Level of stress [1 low to 5 hi]	3.1 (1.31 SD)	2.9 (1.30 SD)	3.2 (1.29 SD)	3.2 (1.30 SD)	3.3 (1.28 SD)
College funding sources					
Parental/family	59.3	55.9	60.0	64.5	56.4
Personal savings	38.6	42.9	36.8	34.4	38.8
Student loan	39.2	34.1	42.4	40.9	43.6
Working a job	61.6	61.8	61.5	54.8	67.0
Work between sessions	53.2	55.3	51.8	47.3	55.5
Work during sessions	33.9	36.5	34.1	25.3	41.4
Part-time	32.6	33.5	32.7	24.2	39.6
Full-time	1.4	2.9	1.7	1.1	2.2
Work during sessions + loan	17.9	20.0	18.4	12.9	22.9
Financial aid/grant	49.5	47.1	51.1	50.0	52.0
Scholarship	67.8	67.6	67.3	64.5	69.6
Scholarships					
Scholarship recipient	71.0	72.4	70.2	70.5	69.9
Need-based scholarship	45.8	47.1	46.2	44.6	47.6
Merit-based scholarship	59.3	62.9	57.1	55.9	58.1
Departmental opportunities to apply					
Sufficient	70.4	75.3	69.2	65.6	72.2
Insufficient	9.4	5.3	10.7	11.8	9.7
Work experience					
Internship	28.7	37.6	24.9	18.8	30.0
Paid	20.7	31.8	16.2	7.0	23.8
Unpaid	10.5	7.6	11.1	14.0	8.8
Work a college job	72.7	78.8	72.6	64.5	79.3
Related to major	58.5	67.6	57.4	50.0	63.4
Unrelated to major	45.4	47.6	45.8	39.8	50.7
Relevant work &/or internship	63.7	72.9	62.5	53.8	69.6
Attended a career fair	83.8	80.0	83.5	81.7	85.0
Attended fair & did internship	25.5	32.9	21.5	14.0	27.8

Over 71% of upperclassmen reported funding college through working a job. Although a majority of non-PREVET students reported working a job to fund their college experience, a considerably smaller percentage of PREVET students indicated so and only a quarter of PREVET students reported working while school was in session (Table 7). The PREVET students had the lowest percent of respondents indicating they were funding college via personal savings, working a job, or scholarship receipt, but the largest percentage of respondents funding college via familial support. Perhaps this financial situation makes PREVET students less inclined to pursue (paid) internships and relevant work experience than their peers. This is a potentially concerning situation because PREVET students are prone to changing their career intention during their undergraduate years and because of the importance of gaining relevant work experience during this period (Blau et al., 2014, 2017; Robinson & Mulvaney, 2018).

Over 20% of the agricultural students responding to the survey reported participation in at least one collegiate study abroad experience; yet overall, international experience was not highly ranked in the BWS experiment. Further investigation suggested study abroad participation may be related to financial outlook as has been previously observed (Whatley, 2017). The percentage of students studying abroad at least once who indicated high financial stress (4 or 5 on 1 – 5 Likert scale) was smaller than the percent of highly stressed students never studying abroad (Table 8). Of students having studied abroad, there were greater percentages of students who were upperclassmen, who reported working a job in college, who were obtaining relevant work experience and/or internship, and a smaller percentage of PREVET students than among students who had never studied abroad. Regarding coursework, of students who had studied abroad there was a larger percent of A-grade students and a smaller percent of B-grade students than among students who had not studied abroad.

Table 8

Cross-Tabulations of Respondents' Collegiate Activities and Living Environment with Academic and Financial Factors (% of Respondents)

	No. active extracurricular			Study abroad		Housing			
	0	1	>1	Never	At least 1x	Res. hall	Greek	Apartm't	Other
Gender		*n=461*			*n=451*			*n=457*	
Female	75.0_{a}	82.7_{a}	78.1_{a}	77.5_{a}	81.1_{a}	84.3_{a}	31.4_{b}	80.2_{a}	78.1_{a}
Male	25.0_{a}	17.3_{a}	21.9_{a}	22.5_{a}	18.9_{a}	15.7_{a}	68.6_{b}	19.8_{a}	21.9_{a}
Grade level		*n=463*			*n=453*			*n=459*	
Freshman	23.2_{a}	46.0_{b}	46.9_{b}	45.1_{a}	11.5_{b}	65.6_{a}	17.1_{b}	5.4_{c}	33.3_{b}
Sophomore	20.9_{a}	13.7_{a}	22.4_{a}	20.7_{a}	13.5_{a}	19.6_{a}	14.3_{a}	21.0_{a}	12.1_{a}
Junior	28.2_{a}	20.9_{ab}	16.3_{b}	19.6_{a}	31.3_{b}	9.8_{a}	37.1_{b}	35.9_{b}	21.2_{ab}
Senior	27.7_{a}	19.4_{ab}	14.3_{b}	14.6_{a}	43.8_{b}	4.9_{a}	31.4_{b}	37.7_{b}	33.3_{b}
ANSC major		*n=487*			*n=453*			*n=459*	
No	19.9_{a}	15.1_{ab}	8.8_{b}	13.2_{a}	19.8_{a}	6.3_{a}	45.7_{c}	17.4_{b}	24.2_{bc}
Yes	80.1_{a}	84.9_{ab}	91.2_{b}	86.8_{a}	80.2_{a}	93.8_{a}	54.3_{c}	82.6_{b}	75.8_{bc}
ANSC curriculum		*n=413*			*n=387*			*n=392*	
Non pre-vet	62.7_{a}	52.5_{ab}	47.8_{b}	51.6_{a}	66.2_{b}	38.1_{a}	68.4_{b}	73.2_{b}	80.0_{b}
Pre-vet	37.3_{a}	47.5_{ab}	52.2_{b}	48.4_{a}	33.8_{b}	61.9_{a}	31.6_{b}	26.8_{b}	20.0_{b}
Financial stress level [a]		*n=458*			*n=448*			*n=454*	
High	43.4_{a}	34.1_{a}	41.4_{a}	42.0_{a}	29.7_{b}	38.8_{a}	28.6_{a}	43.9_{a}	35.5_{a}
Intermediate	25.1_{a}	26.8_{a}	29.7_{a}	28.6_{a}	24.2_{a}	30.4_{a}	22.9_{a}	24.4_{a}	25.8_{a}

Low	31.4$_{a}$	39.1$_{a}$	29.0$_{a}$	29.4$_{a}$	46.2$_{b}$	30.8$_{a}$	48.6$_{b}$	31.7$_{ab}$	38.7$_{ab}$
Related work &/or internship	*n=487*			*n=453*		*n=459*			
No	37.3$_{a}$	36.0$_{a}$	35.4$_{a}$	38.7$_{a}$	13.5$_{b}$	48.2$_{a}$	20.0$_{b}$	19.2$_{b}$	15.2$_{b}$
Yes	62.7$_{a}$	64.0$_{a}$	64.6$_{a}$	61.3$_{a}$	86.5$_{b}$	51.8$_{a}$	80.0$_{b}$	80.8$_{b}$	84.8$_{b}$
Working while in college[b]	*n=487*			*n=453*					
No	29.4$_{a}$	25.9$_{a}$	25.9$_{a}$	27.5$_{a}$	10.4$_{b}$				
Yes	70.6$_{a}$	74.1$_{a}$	74.1$_{a}$	72.5$_{a}$	89.6$_{b}$				
Grades	*n=459*			*n=449*					
A	28.9$_{a}$	36.0$_{a}$	36.7$_{a}$	30.2$_{a}$	45.3$_{b}$				
B	57.2$_{a}$	51.1$_{a}$	58.5$_{a}$	58.5$_{a}$	46.3$_{b}$				
C	13.9$_{a}$	12.9$_{a}$	4.8$_{b}$	11.3$_{a}$	8.4$_{a}$				

Note. For a specific variable, percentages within a row lacking a common superscript significantly differ.

[a] Likert scale selections of 1 or 2 were classified as "low," 3 as "intermediate," and 4 or 5 as "high." [b] Students were asked if they had worked during their time in college. When asked specifically if they had worked during the semester to fund their college experience, no differences existed among No. active extracurricular nor among study abroad participation for those indicating that they had.

Over 55% of respondents indicated they were actively engaged in at least one collegiate club or organization and financial stress did not appear to be associated with involvement in extracurricular activities. Participation in more than one extracurricular activity was greater among freshmen and lower among upperclassmen compared to non-involvement within each grade level (Table 8).

Table 9
Pearson Correlations (p-values) of Preference Shares for Attributes Students Believe are Important for Their Anticipated Career Success and Student Demographics (n=405)

	Coursework preference share	Club participation preference share	Relevant work experience preference share	International experience preference share	Advising/ mentorship preference share	College life preference share	Professional networking preference share
Share of preference							
Club participation	-0.1703***	1					
Relevant work experience	-0.7197****	-0.2667****	1				
International experience	-0.0707	0.0885	-0.2756****	1			
Advising/mentorship	-0.1814***	0.2162****	-0.2661****	0.0009	1		
College life	0.0435	0.0663	-0.3126****	0.0159	0.1144*	1	
Professional networking	-0.2517****	0.4039****	-0.3817****	0.1463**	0.5655****	0.1695***	1
Student is upper classman	-0.1045*	-0.0271	0.1438**	-0.0275	-0.0210	-0.0111	-0.0909
Student lives on campus	0.1454**	0.0102	-0.1753***	0.1067*	-0.0220	-0.0047	0.0561
Student is planning on grad or vet school	0.2337****	-0.0957	-0.1092*	0.0722	-0.1677***	-0.1134*	-0.1401**

Note. * indicates significance at 0.05 level, ** at 0.01 level, *** at 0.001 level, **** at 0.0001 level.

However, while only 10.3% of freshmen reported leadership in a club or activity, 45.4% of seniors reported having provided leadership in a club or organization. Of the students involved in more than one extracurricular activity, there was a greater percentage of PREVET students and a smaller percentage of C-grade students than among those students not involved in any extracurricular (Table 8). These observations suggest that although students do not consider

extracurricular activities a high contributor to their career success, nevertheless the activities provide opportunities for the development of leadership skills which are highly valued by employers (NACE, 2017).

Linking Perceptions of Success Factors and Respondent Demographics

To inform curriculum development and advising endeavors, correlations were assessed to further establish how perceptions vary among agricultural students according to personal characteristics, values, and experiences. The size of preference share for relevant work experience was negatively correlated with all other shares of preference (Table 9). Also, the size of preference share for relevant work experience was positively correlated with a student being an upper classman and negatively correlated with a student living on campus and with a student planning on going to graduate school/veterinary school. Rather, living on campus and planning on going to graduate school/veterinary school were both positively correlated with the coursework share of preference. Corroborating with the cross-tabulation results, being an upper classman was negatively correlated with the share of preference for coursework.

The share of preference for professional networking was positively correlated with that for college life. Not surprisingly, the student believing class content offerings are sufficient, and the student believing the timing/scheduling options of departmental course offerings are sufficient were negatively correlated with the size of preference share for advising/mentorship (data not shown). However, the student planning on going to graduate school or veterinary school was curiously negatively correlated with the advising/mentorship share of preference (Table 9). Furthermore, the student planning on going to graduate school or veterinary school was negatively correlated with the size of preference shares for college life and professional networking.

Club participation share of preference was positively correlated with that for advising/mentorship, international experience, and professional networking; the size of preference share for these latter two were positively correlated with each other (Table 9). The size of preference share for professional networking was also positively correlated with the student living on campus. Forty-six percent of respondents indicated they were living on campus in a dormitory/residence hall, yet college life did not rate among the highest preference shares. Of students reporting living in residence halls, an overwhelming percent were ANSC major (Table 8). The percentage of residence hall students who reported relevant work and/or internship experience was smaller than the percentages in the other housing arrangements. These observations may be due in part to the housing distribution of lower and upper classmen as percentage of students living in a residence hall consisted of a larger percent freshmen and smaller percent upperclassmen relative to the percentages inhabiting other housing types.

As the level of stress created by paying for college increased, the size of the preference share for international experience decreased ($r = -0.1320$, $p = 0.0079$), consistent with the cross-tabulation findings. Level of financial stress was not correlated to any preference shares other than that for international experience.

When evaluating the demographics of the four identified LCM classes, a high percentage of students who indicated their major was in AGEC were members of Class 2 “Outside the Classroom” (Table 10). Students who indicated they were female were more likely to be members of Class 1 “Work and Study” and Class 2. Seniors were more likely to be members of Class 2 which had a very small preference share for coursework. Given the decreasing focus on coursework as grade level of respondents increased, this class membership is particularly revealing. Respondents who reported earning mostly A’s were more likely to be members of Class 1 and Class

2. While A students probabilistically belonging to Class 1 is expected, membership in Class 2 with the small preference share for coursework is less anticipated.

Students who completed a paid internship were more likely to be members of Class 1 as were students who attended a career fair within the last two years. Respondents with the intention of attending veterinary school or graduate school after graduation had a higher probability of being members of Class 1, which had the highest focus on coursework. If the respondent intends to work for the family's agricultural business/farm after graduation they were more likely to be members of Class 4 "Everything/Nothing" while those with predominant home environment of rural on a farm/ranch were more likely to be members of Class 2.

Table 10

Demographic Analysis of the Latent Class Model (LCM) Estimated Class Members (n = 316)

	Class 1 (*n*=93)	Class 2 (*n*=103)	Class 3 (*n*=65)	Class 4 (*n*=55)
Department, n=377 (number of selections)				
Agricultural Economics	21%	45%	13%	21%
Animal Sciences	32%	28%	23%	16%
Gender, n=316				
Female	31%	31%	25%	13%
Male	23%	39%	5%	33%
Class, n=313				
Freshman	28%	29%	25%	18%
Sophomore	37%	31%	15%	18%
Junior	33%	30%	15%	22%
Senior	18%	45%	25%	11%
Grades, n=315				
A's	35%	29%	22%	14%
B's	27%	34%	21%	18%
C's	20%	40%	17%	23%
Ways respondent was funding their college education, n=1114 (number of selections)				
Parental or family member monetary support	27%	34%	23%	16%
Scholarship	30%	34%	19%	17%
Financial aid/grant(s)	31%	37%	19%	13%
Student loan(s)	31%	35%	20%	14%
Part time work while classes are in session	31%	36%	17%	17%
Full time work while classes are in session	17%	33%	17%	33%
Summer or between semester work/job	26%	36%	21%	17%
Personal savings	32%	34%	17%	17%
Ways respondent has worked during college, n=728 (number of selections)				
Worked in a field related to my major	29%	33%	22%	16%
Worked in an unrelated field to my major	30%	32%	19%	19%
Completed a paid internship	20%	46%	14%	20%
Completed an unpaid internship	32%	24%	22%	22%
Attended a career fair within the last 2 years	27%	35%	22%	16%
Primary intention following graduation, n=457 (number of selections)				
Work for family's agricultural business/farm	25%	25%	8%	42%
Work in the agriculture or ANSC industry	18%	56%	11%	15%
Work in a non-ag industry	25%	38%	13%	25%

Attend veterinary school	42%	13%	31%	15%
Attend graduate school	32%	25%	21%	21%
Other	22%	22%	28%	28%
Predominant home environment before the age of 18, n=312				
Rural, on a farm/ranch	24%	42%	15%	19%
Rural, NOT on a farm/ranch	31%	37%	18%	13%
Suburban	34%	19%	33%	14%
Urban	25%	25%	17%	33%

Note. Latent class modeling was used to estimate the probability of class membership for each individual respondent (Class 1 "Work and Study," Class 2 "Outside the Classroom," Class 3 "Classic Collegiate," or Class 4 "Everything/Nothing"). The table shows the percentage of respondents in each left hand sub-category who answered the best-worst question and whose probability of being in a class was at least 0.5 greater than the probability of being in their next highest class.

Perception of Career Success Factors for Self Versus Others

In the final question of the survey, respondents were asked to choose which two attributes (of the seven BWS attributes) they thought contributed most to their peers' career success. Their directly stated selection for peers was compared to their top two largest estimated preference shares for themselves, which had been discreetly obtained through BWS. As shown in Figure 3, relevant work experience and professional networking were more frequently ranked in the top two for self than considered in the top two for others; conversely, club participation, college life, international experience, and advising/mentoring were more frequently considered expedient for others than for self. On an individual respondent basis, the percentage of students who selected at least one of their own top two preference shares as one of the top two factors for others as well (% match) was over 50% for relevant work experience, coursework, international experience and club participation. Interestingly, the factors that had a high percent match can all be characterized as having a rather objectively tangible, social nature, i.e. could be included on a résumé and serve as an interview point of discussion, while those factors which had the low percent match have rather subjective intangible, personalistic outcomes.

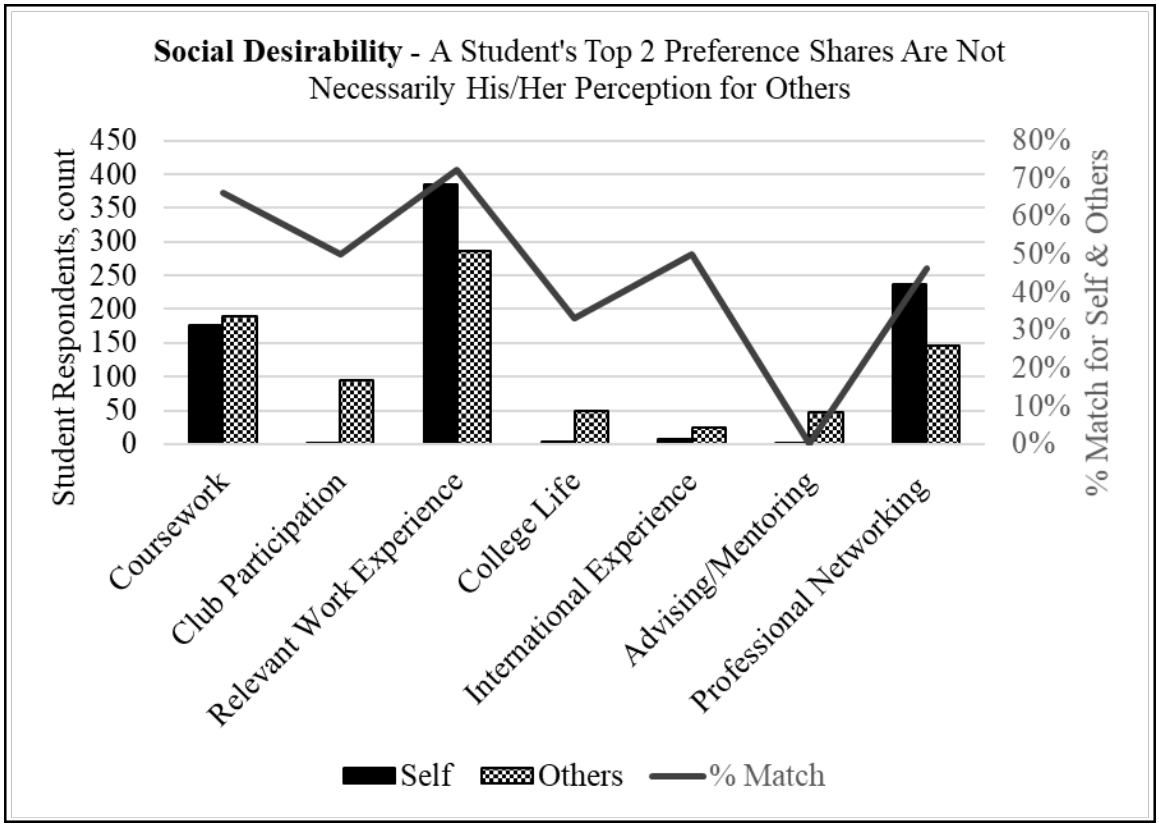

Figure 3. Students were asked which attributes they thought contributed most to their peers' career success and responses were compared on an individual basis to the attributes a student indicated as most important for self (% Match, percent of students who selected at least 1 of self's top 2 for others as well).

Conclusions and Recommendations

The surveyed student body is a sample of agricultural students from a large Land Grant agricultural institution. The demographics of these students are predominantly female and nearly one-half are focused on veterinary careers with limited agricultural backgrounds and experiences. Special attention should be given to students enrolled exclusively in the pre-veterinary curriculum due to their unique demographic, tendency to change career intention during their undergraduate years, and lessened proclivity to pursue internships and relevant work experiences. Educators and advisers need to be especially cognizant of novel ways to provide PREVET students the experiences needed for success in their eventual career regardless of whether that is the student's currently intended career. Since the career interest in veterinary medicine is highest among Freshmen and the largest proportion of Freshmen live on-campus, developing college life related activities and opportunities through approaches such as living-learning communities may be an especially valuable strategy.

When asked indirectly, students ranked obtaining relevant work experience more valuable to their career success than even coursework; international experience and college life were deemed least important. However, over 75% of students agreed professional networking was necessary and students were overwhelmingly motivated by passion for their career area. Further analysis of the student demographics illustrates the importance of maintaining extracurricular activities and club

opportunities for students to develop leadership skills, and the importance of continued efforts to make study abroad opportunities more affordable for students.

Educators should beware of the variation that exists among individuals as highlighted by the RPL and latent class modeling. Furthermore, student beliefs for themselves did not closely match their beliefs for peers when their opinion was directly solicited. The degree to which students' career preparation activities are influenced by the expectations their peers have for them warrants further study as this may provide career advisers insight to effectively convey guidance.

The emphasis which students placed on obtaining relevant work experience appears to align with the changing priorities of employers (NACE, 2017; Robinson & Mulvaney, 2018) and is a signal to educators to ensure all students have access to networking and relevant work opportunities. With over 70% of the upperclassmen in the present study already working to fund their college education, departments should support internship or on-campus work opportunities so students can pursue work that is relevant to their anticipated career. Additional research should be conducted to investigate how students are obtaining work experience and what barriers exist, and also address whether student perceptions are realistic and actually predictive of career success. Although, regardless of whether perceptions are predictive of future success, perceptions of students drive their behaviors and allocation of efforts, and thus are valuable to further understand.

Understanding students' perceptions and demographics benefits effective curriculum design. The current findings suggest that coursework can influence career interests so providing young students exposure to a variety of major-specific courses early may assist them in identifying their final career goal and efficiently focusing their career preparation efforts. The responses of the present study also very clearly demonstrate a reduction in the perceived value of coursework among upper classmen. Consequently, structuring the curriculum to facilitate more internship/relevant work i.e. undergraduate research, and networking activities at this point in the undergraduate program may behoove all parties involved – students, educators, and employers.

More work is also needed to investigate how closely academic administration, industry employers, and student perceptions align or are disconnected. As curriculum designers collaborate with employers regarding competencies and success factors for program graduates, students' perceptions should not be overlooked. This study is a single example of what represents a possible disconnect between student perceptions and reality in higher education. Once recognized, potential gaps and opportunities to rectify or foster accurate student beliefs can inform allocation of scarce stakeholder resources.

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