

An immersive field trip focused on beef production increases the sense of belonging in ethnoracial minority college students

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ABSTRACT

Sense of belonging is a student's sense of feeling accepted, valued, and included by others in their discipline. Imposter syndrome is self-perceived intellectual fraud in areas of success. Sense of belonging and imposter syndrome can influence behavior and well-being and are linked to academic and career outcomes. Our objective was to evaluate if a 5-d tour of the beef cattle industry changed college students' sense of belonging and imposter tendencies with a focus on ethnicity/race. Procedures involving human subjects were approved by the Texas State University (TXST) IRB (#8309). Students from TXST and Texas A&M University (TAMU) attended a beef cattle industry tour in the Texas Panhandle in May 2022. Identical pre- and post-tests were administered immediately before and after the tour. Statistical analyses were conducted with SPSS v.26. Independent sample *t*-tests were used to evaluate the change from pre- to post-survey and one-way ANOVA was used to evaluate the effect of ethnicity/race. Students ($n = 21$) were mostly female (81%); attended TAMU (67%) or TXST (33%); and were White (52%), Hispanic (33%), or Black (14%). "Hispanic" and "Black" were combined as a single variable to analyze differences between White and ethnoracial minority students. Before the tour, there was a difference ($P = 0.05$) in sense of belonging in agriculture between White (4.33 ± 0.16) and ethnoracial minority (3.73 ± 0.23) students such that White students had stronger belonging. There was no change ($P = 0.55$) in White students' sense of belonging as a result of the tour, from 4.33 ± 0.16 to 4.39 ± 0.44 . However, there was a change ($P \leq 0.01$) in ethnoracial minority students' sense of belonging, from 3.73 ± 0.23 to 4.37 ± 0.27 . There was no change ($P = 0.36$) in imposter tendencies from the pre-test (58.76 ± 2.46) to the post-test (60.52 ± 2.79). Ultimately, participating in the tour increased ethnoracial minority, but not White, students' sense of belonging and did not impact imposter syndrome tendencies across or within ethnicity/race. One benefit of implementing experiential learning opportunities in dynamic social environments is the potential to improve students' sense of belonging, especially in disciplines and careers where ethnoracial minority people are underrepresented.

Key words: DEI, ethnicity, higher education, imposter syndrome, underrepresented students

INTRODUCTION

Sense of belonging is the degree to which one perceives they are respected, accepted, valued, and integrated into a particular community (Baumeister and Leary, 1995; Goodenow and Grady, 1993). Sense of belonging has been shown to be positively related to academic performance and retention (Strayhorn, 2019; Thomas 2012). Students who feel a stronger sense of belonging are more likely to be engaged, motivated, and have a higher quality of learning than those who feel they do not belong (Osterman, 2000). In an academic context, the sense of belonging is affected by students' feelings that they are valued by and matter to faculty and peers (Flett et al., 2019; Stachl and Baranger, 2020). Sense of belonging can be difficult to cultivate, especially in large courses, departments, or institutions composed of diverse students. This difficulty may be because students from different backgrounds may hold various identities, especially with respect to feelings of social isolation and imposter syndrome (Ward, 2020).

Imposter syndrome is the pervasive psychological experience of self-perceived intellectual fraud in areas of success and achievement (Clance and Imes, 1978; Hoang, 2013). Students

with the imposter syndrome generally fulfill and often excel in their academic pursuits, but not without psychological distress, including generalized and social anxiety (Kolligian, Jr., and Sternberg, 1991), depressive feelings, and frustration that they cannot meet their self-imposed standards (Clances and Imes, 1978). Imposter tendencies are typical in high-achieving individuals, including generalized students (Chapman, 2017; Kolligian, Jr. and Sternberg, 1991) and ethnoracial minority students (Bernard et al., 2018; Cokley et al., 2013). It was recently demonstrated that students with lower sense of belonging also experienced more imposter tendencies (Pratt, 2020). Ultimately, cultivating an academic environment and implementing learning activities that increases students' sense of belonging and minimizes imposter tendencies could improve students' success and retention in a given discipline, in addition to their general well-being.

College field trips improve students' test performance (Houser et al., 2011) and allow students to contextualize classroom material in an applied setting (Kamen and Leri, 2019).

While the benefits of field trips on learning outcomes are known, there are limited data about the other impacts on students (i.e., social and psychological outcomes).

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College field trips create an environment for informal interactions between faculty and students (Skop, 2009) which reduces barriers found in most classroom teaching situations (Jakubowski, 2003). Interacting in informal settings strengthens the relationships between faculty and students, and among students themselves (Lei, 2010; Switzer, 1995). Achen et al. (2019) demonstrated that a field trip resulted in graduate students feeling more connected to their peers, faculty, and program. Bowhay et al. (2022) demonstrated that this connectedness extends to one's discipline; one college student who attended a field trip of the agriculture industry reported that, as a result of the trip, "I'll take home the reminder that agriculture [...] has a place for me". Student-centered, student-driven learning experiences improve students' confidence working with peers (Boyle et al., 2007) and improves their social skills (Rickinson, 2004). From a students' perspective, two of the benefits of college field trips are to enhance self-confidence and promote interactions with others (Lei, 2010); 91% of architecture college students felt that a field trip improved their self-confidence and 93% felt that it promoted interaction with their peers and faculty (Nazir, 2021). Therefore, the current repository of literature suggests that field trips may enhance college students' perceived social support, feelings of connectedness with others and with their discipline, and build confidence, which could affect other psychological outcomes. Despite this, there has not yet been an investigation into how field trips impact college students' sense of belonging or feelings of imposter syndrome. Accordingly, our objective was to evaluate if an immersive field trip, a 5-d tour of beef production in the Texas Panhandle, changes college students' sense of belonging and imposter tendencies.

MATERIALS AND METHODS

All the procedures involving human subjects were approved by the Texas State University Institutional Review Board (#8309).

Field Trip Design

Students enrolled in the Department of Agricultural Sciences at Texas State University ($n = 7$) or the Department of Animal Science at Texas A&M University ($n = 19$) attended a field trip in the form of a 5-d tour of the beef cattle industry in the Texas Panhandle with faculty from Texas State University ($n = 1$) and Texas A&M University ($n = 2$). Students from the Texas State University were selectively invited to participate in the field trip as a co-curricular offering; these students had been active and engaged participants in classes previously offered by the Texas State faculty member attending the field trip and also identified as an ethnracial minority per funding requirements for the trip. Students from Texas A&M University applied to participate in the field trip through an open-ended questionnaire and, if they were chosen, enrolled in a compressed course. Funds for the field trip were provided through the Jim Theeck'65 Beef Cattle Seminar Endowment held by Texas A&M University and through an USDA HSI Education Grant (2020-01979) held by two of the faculty members leading the field trip. Students attended a faculty-led orientation in the weeks prior to departure and were provided an itinerary of the facilities that would be visited.

Students and faculty members were divided by university among three 15-passenger vans. Each van contained seven to nine students and one faculty member. Vans departed from the respective university campuses on May 15, 2022, and returned on May 20, 2022, after touring the facilities outlined and described in Table 1. The Texas Panhandle, where most of the field trip occurred, is approximately 800 km from both university campuses. Students were encouraged to research the facilities and companies ahead of the field trip and, while on the field trip, were prompted to interact with industry professionals, asking about their facilities, careers, industry, and internship/career opportunities.

Table 1. Itinerary of an immersive field trip in the form of a 5-d beef cattle production tour in the Texas Panhandle that Texas A&M and Texas State University faculty and students took jointly

Date	Location	Host	Activities and impact
May 16, 2022	Guthrie, TX	6666 Ranch	Experience cow/calf operations, the industry segment responsible for calf production
	Lubbock, TX	Ranching Heritage Center	Gain historical perspective of ranching and beef production
May 17, 2022	Lubbock, TX	PYCO	Learn about cotton byproducts and their placement in livestock feeds
	Tulia, TX	Cactus Cattle Feeders – Wrangler Feedyard	Explore the feedlot segment of beef production at a corporate feedlot and their approach to research
	Canyon, TX	Merck Animal Health	Interact with professionals from the pharmaceuticals industry
May 18, 2022	Friona, TX	Cargill Meat Solutions	Gain knowledge about safe and humane harvesting of cattle from a commercial packer
	Hereford, TX	Diamond Cattle Feeders	Attain perspective on how a family-owned feedlot operates
May 19, 2022	Hereford, TX	F2 Feeders	Experience a cattle backgrounding operation
	Dalhart, TX	Morning Star Dairy	Experience at-scale dairy production and comprehend dairy's role in beef production
	Hartley, TX	Five Rivers – Hartley Feedyard	Explore the feedlot segment of beef production at a corporate feedlot
May 20, 2022	Amarillo, TX	Elanco	Interact with professionals from the pharmaceutical industry
	Throckmorton, TX	R.A. Brown Ranch	Learn about seedstock operations, genetics, and reproduction

Students were also encouraged to interact with each other and the faculty members on the trip; whole group briefings occurred every morning prior to leaving the hotel, meals were consumed as a common group, and faculty/students spent at least five hours in the vans together each day. Furthermore, students were allowed to interact and explore with each other or on their own for certain activities (e.g., shopping at 6666 Ranch, hiking at Palo Duro Canyon State Park before dinner with Merck).

Data Collection

To evaluate the impact of the field trip on student's sense of belonging and imposter tendencies, we developed electronic survey-based questionnaires containing three sections derived and adapted from previously validated instruments (Supplementary Material). Section 1 consisted of seven demographic questions, Section 2 consisted of three questions about sense of belonging, and Section 3 consisted of 20 questions about imposter syndrome. Questionnaires were distributed as a pre-test 5 d before the field trip and as a post-test three days after the field trip.

Questions for Section 2 of the pre- and post-test surveys were adapted from a sense of belonging scale employed by Stout et al. (2013). Questions were: "I feel I belong in agriculture", "People in agriculture accept me", and "I feel like an outsider in agriculture" (reverse scored). Questions for Section 3 of the pre- and post-test were from The Clance Imposter Phenomenon Scale (Clance, 1985), a 20-item inventory that measures levels of imposter syndrome in respondents. Questions for Sections 2 and 3 were scored on a 5-point Likert scale where 1 = Strongly disagree and 5 = Strongly agree; for reverse scored questions, 1 = Strongly agree and 5 = Strongly disagree. Data from the sense of belonging scale were averaged into a single metric as in Dugan and Komives (2007). Data from the Imposter Phenomenon scale were summed and interpreted as <40 = "few imposter characteristics", 41–60 = "moderate imposter characteristics", 61–80 = "frequent imposter feelings", and >80="often intense imposter phenomenon experiences".

Within the current sample, Cronbach's Alpha was $\alpha = 0.78$ for Section 2 of the pre-test, $\alpha = 0.90$ for Section 3 of the pre-test, $\alpha = 0.77$ for Section 2 of the post-test, and $\alpha = 0.90$ for Section 3 of the post-test. According to George and Mallery (2003), these reliability coefficients are acceptable (>0.70) or excellent (>0.90), indicating adequate internal consistency of our survey instruments.

Data Analysis

Data were analyzed with SPSS 26.0 (Chicago, IL) using descriptive statistics and measures of central tendency. Mean score differences for our dependent variables (i.e., imposter syndrome, sense of belonging) were compared across three independent variables: 1) university, 2) ethnicity/race, and 3) the interaction between university and ethnicity/race (university \times ethnicity/race) for the pre- and post-test. For ethnicity/race, we combined students who were Hispanic ($n = 7$) and Black ($n = 3$) into one category, "ethnoracial minority", based on data that these ethnic/racial groups are both underrepresented in degrees and careers in Biological and Agricultural Sciences compared to White students (NSF, 2019) and generally lack sense of belonging relative to White students (Hurtado and Carter, 1997; Johnson et al., 2007; Walton and Cohen, 2007). We did not conduct analyses to determine

the effect of gender or gender intersectionality (i.e., gender \times ethnicity/race) due to the sample skewing heavily towards female. To measure change in the dependent variables from the pre- to post-test, we conducted paired sample *t*-tests between independent variables.

RESULTS

We received 24 responses to our pre-test survey and 21 responses to our post-test survey. Data were analyzed only from respondents who completed both a pre- and post-test survey ($n = 21$). Respondents were college students enrolled at the Texas A&M University (67%) or the Texas State University (33%), Table 2. Respondents were predominantly female (81%) and were White or Caucasian (52%) or an ethnoracial minority (48%). Of the ethnoracial students, 70% were Hispanic or Latinx and 30% were Black or African American. For ethnicity/race \times university, 52% of students were White and enrolled at the Texas A&M University, 14% were ethnoracial minorities and enrolled at the Texas A&M University, and 33% were ethnoracial minorities and enrolled at the Texas State University. Educational level ranged from lower-level undergraduate to Doctoral.

Sense of Belonging

The overall pre-test mean for sense of belonging was 4.05 ($SEM = 0.18$). There was not a significant university \times ethnicity/race interaction ($P = 0.26$) or university effect ($P = 0.28$) on pre-test sense of belonging; however, there was an effect of ethnicity/race ($P = 0.05$). The overall post-test mean for sense of belonging was 4.38 ($SEM = 0.14$). There was not a significant university \times ethnicity/race interaction ($P = 0.49$) or effect of ethnicity/race ($P = 0.93$) or university ($P = 0.49$) on post-test sense of belonging. The change in sense of belonging as a result of the tour (0.33, $SEM = 0.12$) was significant (P

Table 2. Demographics of college students taking an immersive 5-d field trip in the Texas Panhandle, $n = 21$

Gender	%
Female	81
Male	19
Ethnicity/race	
White or Caucasian	52
Hispanic or Latinx	33
Black or African American	14
University	
Texas A&M University (TAMU)	67
Texas State University (TXST)	33
Ethnicity/race \times University	
Ethnoracial minority \times TAMU	14
White \times TAMU	52
Ethnoracial minority \times TXST	33
White \times TXST	0
Educational level	
Freshman or Sophomore	10
Junior or Senior	71
Masters	14
Doctoral	5

= 0.01). The correlation between pre- and post-test sense of belonging was $r = 0.73$ ($P \leq 0.01$).

As there was a significant effect of ethnicity/race on the pre-test but not post-test sense of belonging and, due to the significant change ($P = 0.01$) in sense of belonging we observed for the overall group, we analyzed group differences between White students and ethnoracial minority (i.e., Hispanic or Black) students. The pre-test mean for sense of belonging was 4.33 ($SEM = 0.16$) for White students and 3.73 ($SEM = 0.23$) for Hispanic and Black students which was, as presented earlier, significantly different ($P = 0.05$; [Table 3](#)). The post-test mean for sense of belonging was 4.39 ($SEM = 0.44$) for White students and 4.37 ($SEM = 0.27$) for Hispanic and Black students ($P = 0.93$). The change in sense of belonging as a result of the tour (0.06, $SEM = 0.10$) was not significant for White students ($P = 0.55$) but was significant for Hispanic and Black students (0.64, $SEM = 0.20$, $P \leq 0.01$). The correlation between the pre-test and post-test for sense of belonging

was $r = 0.79$ ($P \leq 0.01$) for White students and $r = 0.78$ ($P \leq 0.01$) for ethnoracial minority, Hispanic and Black, students.

The sense of belonging scale employed was based on three questions adapted from [Stout et al. \(2013\)](#): “I feel I belong in agriculture”, “People in agriculture accept me”, and “I feel like an outsider in agriculture” (reverse scored). Observed differences between ethnoracial groups for pre-test sense of belonging ($P = 0.05$) before the field trip led to analysis of White vs. Hispanic and Black students’ responses to individual questions ([Figure 1](#)). For the pre-test, there was a difference ($P \leq 0.01$) in White vs. Hispanic or Black students’ response to “I feel I belong in agriculture” such that the mean for White students was 4.91 ($SEM = 0.09$) and for Hispanic or Black students was 4.00 ($SEM = 0.30$). This drove the significance between groups for the sense of belonging scale as there was no difference between groups for “People in agriculture accept me” (White: 4.27, $SEM = 0.19$; Hispanic or Black: 3.70, $SEM = 0.30$; $P = 0.12$) or “I feel like an outsider in agriculture” (White: 3.81, $SEM = 1.17$, Hispanic or Black: 3.50, $SEM = 1.43$; $P = 0.58$). For the post-test, there was not an overall difference in sense of belonging between ethnoracial groups ($P = 0.93$). Accordingly, for individual questions on the post-test, there was no difference between White and Hispanic or Black students for “I feel I belong in agriculture” (White: 4.81, $SEM = 0.12$; Hispanic or Black: 4.60, $SEM = 0.22$; $P = 0.39$), “People in agriculture accept me” (White: 4.18, $SEM = 0.18$; Hispanic or Black: 4.40, $SEM = 0.22$; $P = 0.45$), or “I feel like an outsider in agriculture” (White: 1.82, $SEM = 0.26$; Hispanic or Black: 1.90, $SEM = 0.41$; $P = 0.87$).

As we observed a change ($P \leq 0.01$) in sense of belonging for Hispanic and Black students from the pre- to post-test, we investigated which individual questions caused this change. Hispanic and Black students’ response to “I feel I belong in agriculture” significantly changed as a result of the tour (0.60,

Table 3. Change in college students’ sense of belonging before and after an immersive 5-d field trip in the Texas Panhandle focused on beef production¹

	White students, $n=11$			Hispanic + Black students, $n=10$		
	Before	After	P	Before	After	P
Sense of belonging ²	4.33 (0.16)	4.39 (0.44)	0.55	3.73 (0.23)	4.37 (0.27)	<0.01

¹Data are presented: Mean (SEM); “before” = pre-test administered immediately before the field trip, “after” = identical post-test administered immediately after the field trip

²Mean of three questions, one which was reverse scored, on a Likert scale where 1=Strongly disagree, 3=Neither agree nor disagree, 5=Strongly agree; higher scores indicate greater sense of belonging

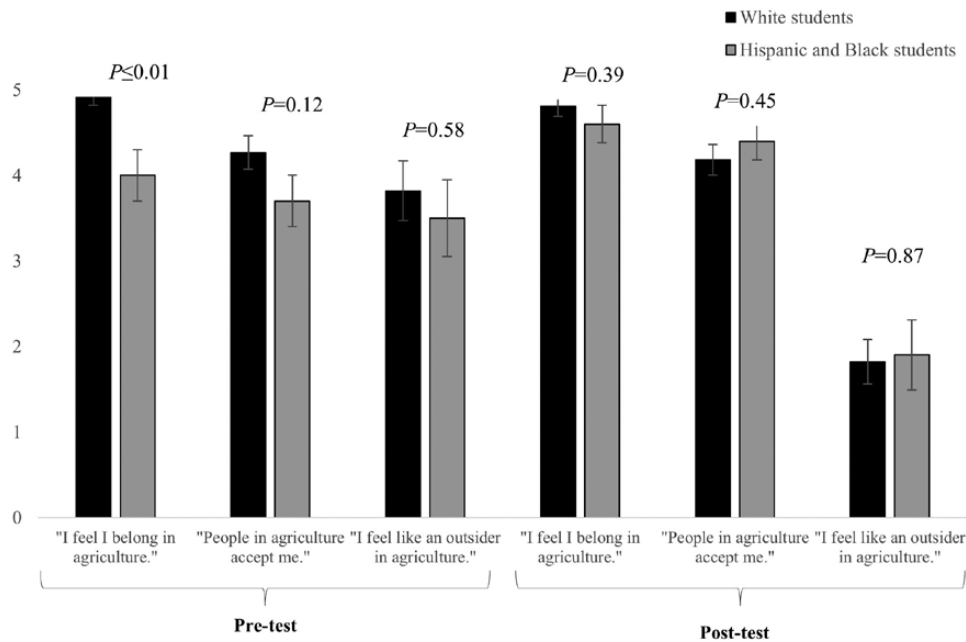


Figure 1. Individual metrics of college students’ sense of belonging before and after an immersive 5-d field trip in the Texas Panhandle focused on beef production¹. ¹Items are scored on a 5-point Likert scale where 1 = Strongly disagree and 5 = Strongly agree expect “I feel like an outsider in agriculture” which was reverse scored; “before” = pre-test administered immediately before the field trip, “after” = identical post-test administered immediately after the field trip.

$SEM = 0.16, P \leq 0.01$) as did their response to “People in agriculture accept me” (0.70, $SEM = 0.26, P = 0.03$). There was not a significant change in “I feel like an outsider in agriculture” (0.60, $SEM = 0.34, P = 0.11$). We did not investigate the change in response to individual questions on the sense of belonging scale for White students because there was no change in the overall scale ($P = 0.55$) from the pre- to post-test, as presented earlier.

Imposter Syndrome

The overall pre-test survey mean for the imposter syndrome inventory was 58.76 ($SEM = 2.46$), [Table 4](#). There was not a significant university \times ethnicity/race ($P = 0.41$) interaction or effect of ethnicity/race ($P = 0.19$) or university ($P = 0.46$) on pre-test imposter syndrome. The overall post-test mean for the imposter syndrome inventory was 60.52 ($SEM = 2.79$). There was not a significant university \times ethnicity/race interaction ($P = 0.98$) or effect of ethnicity/race ($P = 0.88$) or university ($P = 0.96$) on post-test imposter syndrome. The change in imposter syndrome as a result of the field trip (1.76, $SEM = 1.90$) was not significant ($P = 0.36$). The correlation between pre- and post-test imposter syndrome means was $r = 0.75$ ($P \leq 0.01$).

DISCUSSION

In this study, we administered pre- and post-tests before and after an immersive 5-d field trip, a tour of beef cattle production, in the Texas Panhandle. Trip attendees were college students and faculty from the Texas A&M University and Texas State University. Students ranged across educational levels, with most being Juniors or Seniors, and were predominantly female. Furthermore, students were either White or ethnoracial minorities, which included both Black and Hispanic students. Our sample was not reflective of departmental demographics at the respective universities. For example, females are 79% of enrolled students in the Department of Animal Science at Texas A&M University but represented 93% of Texas A&M University students in our sample. This discrepancy reflects the lack of males (<10%) that applied for the trip and one male who attended but did not respond to both the pre- and post-test and was, thus, excluded from the final sample. Furthermore, students enrolled in the Department of Agricultural Sciences at Texas State University are 41% White, 46% Hispanic, and 8% Black; however, 100% of students who attended the trip were an ethnoracial minority. This ethnic/racial discrepancy was due to the field trip being specifically funded for ethnoracial minority students and, thus, selective recruiting.

Table 4. Change in college students' ($n=21$) imposter syndrome before and after an immersive 5-d field trip in the Texas Panhandle focused on beef production¹

	Before	After	P
Imposter syndrome ²	58.76 (2.46)	60.52 (2.79)	0.36

¹Data are presented: Mean (SEM); “before” = pre-test administered immediately before the field trip, “after” = identical post-test administered immediately after the field trip

²Summed from a 20-item scale where >40 = few imposter characteristics, 41 to 60 = moderate imposter characteristics, 61 to 80 = frequent imposter characteristics, 80+ = often intense phenomenon experiences

Our findings demonstrate that ethnoracial (i.e., Hispanic or Black) college students had lower sense of belonging than White students before participating in the field trip. The effect of ethnicity/race was present despite university – i.e., whether the student was enrolled at the Texas State University, a public R2 Hispanic Serving Institution, or the Texas A&M University, a public R1 Land-Grant and Hispanic Serving Institution. These data agree with previous research that indicates ethnoracial minority students generally feel less “at home” in their discipline and have lower sense of belonging in college than their majority (i.e., White) peers ([Hurtado and Carter, 1997](#); [Johnson et al., 2007](#); [Walton and Cohen, 2007](#)). These data also complement recently published “best practices” for involving undergraduate students in research ([Miller et al., 2023](#)), as these practices differ depending whether the student is an ethnoracial minority or not.

Hispanic and Black students increased their sense of belonging as a result of the field trip although White students did not, resulting in similar belongingness between groups after the field trip. It is likely that sense of belonging did not change for White students as a result of the field trip because their pre-test belonging was relatively high (4.33 on a 5.00 scale) as compared to that of the ethnoracial students (3.73) in our sample. Ultimately, this validates our educational intervention – a field trip rooted in experiential learning and social integration – as an effective pedagogical tool to increase Hispanic and Black college students' sense of belonging in their discipline.

For imposter syndrome, the mean pre-test score was 58.76 and the mean post-test score was 60.52; there was not a significant change for the overall group or specific ethnoracial groups. These scores fall in the upper tier of “moderate” imposter syndrome, which is assigned to scores from 41 to 60 and the lower tier of “frequent” imposter syndrome, which is assigned to scores from 61 to 80. The degree to which students in our study had imposter tendencies parallels that of [Houseknecht et al. \(2019\)](#), who assessed imposter syndrome in medical students. [Feenstra et al. \(2020\)](#) recommended that research be conducted on interventions which aim to directly increase sense of belonging and test if the intervention also reduces imposter tendencies. In our study, the field trip increased college students' sense of belonging but did not impact imposter syndrome, suggesting that interventions that increase belonging may not also have a benefit on imposter syndrome.

[Choron et al. \(2023\)](#) demonstrated that a “boot camp” where medical students received surgical training improved their knowledge and confidence but did not change their imposter tendencies. As there are data suggesting that field trips increase college students' confidence ([Nazir, 2021](#)), we hypothesized that field trips may also improve imposter syndrome; however, based on our findings and those of [Choron et al. \(2023\)](#), addressing imposter syndrome seems to be more complex than simply building students' confidence through interventions. In our research and that of others, imposter syndrome has been approached as an individualized issue. However, [Feenstra et al. \(2020\)](#) identified limitations that arise from the tendency to over-individualize imposter syndrome and proposed that, instead of framing the insecurities of individuals – especially those belonging to marginalized groups (e.g., women, ethnoracial minority), we should consider how the environment and social structure create imposter tendencies. Therefore, as it seems imposter syndrome

is context-dependent, future research should examine contextual factors at the societal, institutional, and interpersonal levels that shape one's imposter tendencies (Feenstra et al., 2020). As large-scale field trips cannot be institutionalized and do not reflect systemic and structural changes at the departmental, institutional, disciplinary, or societal levels, they are likely not an effective approach to reduce students' imposter tendencies.

Shehab et al. (2007) highlighted possible reasons why minority students do not persist in STEM disciplines and described "feelings of isolation" as a top struggle; specifically, Hispanic and Black students feel isolated in the classroom and are intimidated by peers and faculty. These feelings could be especially pronounced in our discipline, agricultural sciences, as ethnoracial minority students lack agriculture exposure, experience, and familiarity from secondary education (Talbert and Larke, Jr., 1995a, 1995b). For example, majority student involvement far outweighs ethnoracial minority student involvement in co-curricular agricultural activities, such as Future Farmers of America (FFA) and 4-H, in secondary school (Foreman et al., 2018; Roberts et al., 2009).

The field trip evaluated in this study was immersive and characterized by a dynamic social environment emphasizing education through experiential learning. Social integration increases students' sense of belonging and perceived social support (Hurtado and Carter, 1997; Wilcox et al., 2005; Strayhorn, 2008); this integration can be fostered through field trips that involves interaction with peers, as demonstrated by Caligiuri et al. (2020). Furthermore, there is a positive relationship between supportive faculty interactions in academic and social environments and students' sense of belonging (Hoffman et al., 2003). Meeuwisse et al. (2010) demonstrated that ethnoracial minority students feel they belong in their educational program if they have positive formal relationships with both faculty and peers while majority students require only informal relationships with peers (Meeuwisse et al., 2010). As ethnoracial minority students lack social and cultural integration in college (Ladson-Billings, 2006) and sense of belonging is rooted in social integration, we posit that the ethnoracial minority students in our study felt more belongingness after the field trip due to concentrated access to faculty and peers, who may have been perceived as more approachable and/or less intimidating when placed in an academic environment outside of the formal classroom.

Given logistics and cost of taking students on a field trip in college, our study is limited in sample size. Future research should attempt to replicate the current findings and explore if these data are applicable to disciplines outside of agriculture and the related life sciences. It would also be interesting to incorporate a qualitative component into this research to further investigate which specific component of field trips (e.g., access to faculty, access to peers, exposure to new places) contribute to changing students' sense of belonging.

We recognize the field trip described here may not be practical given time and funding constraints, especially for non-Land Grant and primarily undergraduate institutions. Therefore, our recommendations for practice are to integrate experiential learning that emphasizes peer-to-peer and student-to-faculty social interactions into the classroom to enhance students' sense of belonging. For example, service-learning may be implemented in the classroom to enhance college students' sense of belonging (Ribera et al., 2017; York

and Fernandez, 2018), especially for students from lower-class and working-class backgrounds (Soria et al., 2019). Furthermore, participating in a learning community can also increase students' sense of peer belonging and feelings of institutional acceptance (Ribera et al., 2017). In diverse groups, efforts should be made to match peers with unlike backgrounds (e.g., ethnoracial minority and majority; domestic and international). To combat and potentially prevent imposter syndrome, we also recommend institutions and departments in higher education to consider initiatives to tackle increase diversity and representation across hierarchical levels and ensure all students receive equal treatment and equitable opportunities.

CONCLUSION

We demonstrated that a multi-day field trip characterized by a dynamic social environment emphasizing experiential learning increased sense of belonging, but did not change imposter tendencies, for ethnoracial minority college students. There was no change in sense of belonging or imposter tendencies for White students. These data add a psychosocial component to the existing repository of literature that demonstrates benefits for taking field trips in college. Based on our findings, we make recommendations for practice and suggest further research to advance our knowledge of educational interventions that support college students. We also hope these findings generate discussion about how to cultivate inclusive environments that ensure all students, especially those historically marginalized in STEM and agricultural sciences, feel at home in their discipline, departments, and institutions.

SUPPLEMENTARY DATA

Supplementary data are available at *Translational Animal Science* online.

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Conflict of interest statement

None declared.

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