



The Connection Between Social Belonging and Classroom Success: A Correlational Study

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Abstract

In an asynchronous online undergraduate statistics course, an intervention was designed and introduced to increase students' feelings of belonging within the class. Students reported their feelings of belonging at the beginning and end of the semester, along with various perceptions about the course. Overall, feelings of belonging significantly increased across the semester, coinciding with the introduction of the social belonging intervention. This was the case even though students reported that they were initially anxious and not excited about the class. Importantly, the change in belonging scores was particularly pronounced for first-generation college students, who began the course with lower initial belonging scores compared to their continuing-generation peers. Additionally, higher social belonging scores were correlated with more knowledge, more confidence, more excitement, more time spent on classwork, and better predicted final grades. These findings suggest that fostering feelings of social belonging is associated with positive outcomes across both academic and social domains.

Keywords: social belonging, student engagement, academic achievement, first-generation, educational intervention

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Students' feelings of belonging in higher education are widely recognized as critical to various social and academic outcomes, including student retention, motivation, academic performance, and subjective feelings of enjoyment (Pedler, Willis, & Nieuwoudt, 2021).

Belonging is particularly important in fostering resilience and engagement among students who may face systemic barriers, such as first-generation college students. For example, research has shown that a strong sense of belonging can mitigate feelings of alienation and improve persistence, especially in challenging or unfamiliar academic settings (Scarf, Moradi, McGraw, Hewitt, & Hunter, 2016; Hausmann, Schofield, & Woods, 2009).

Despite this, much of the existing research focuses on institutional belonging – students' sense of connection to their college or university as a whole – rather than the microlevel experience of belonging within an individual classroom (Walton, Murphy, Logel, Yeager.... & Krol, 2023). Classroom belonging is a particularly critical domain, as it directly impacts students' day-to-day experiences and engagement with coursework. Faculty, through their design of course activities, interactions, and overall pedagogy, play a central role in shaping classroom belonging. This is especially true in asynchronous online courses, where students may struggle to feel connected to their peers, instructors, and course materials due to the lack of in-person interaction.

Additionally, the experiences of first-generation students often differ significantly from those of continuing-generation students, as they may encounter unique challenges, including lower initial confidence, less familiarity with academic norms, and heightened feelings of imposter syndrome (Beattie, 2018). However, less is known about how these differences manifest at the classroom level and whether targeted interventions can reduce these disparities.

Given these gaps in the literature, this study implemented a social belonging intervention designed to foster feelings of connection and inclusion within an asynchronous online undergraduate statistics course. This intervention incorporated evidence-based practices such as small, low-stakes assignments encouraging self-reflection and peer engagement, which have been shown to enhance feelings of belonging (Walton & Cohen, 2011). By focusing on these strategies, this study aims to provide insights into whether such an intervention can support students' sense of belonging and how this might relate to broader academic and social outcomes.

This paper details lessons learned from the classroom-based social belonging intervention. The primary research question addressed in this study is: does implementation of a social belonging intervention positively correlate with beneficial student class outcomes? The primary hypothesis is that higher ratings of social belonging will be positively correlated with other beneficial class outcomes, such as students' self-reported ratings of excitement and confidence in the class.

Method

This study was conducted in a large, asynchronous online undergraduate statistics course at a major university in the Southwest United States. Students complete the course as part of curricular requirements for a Psychology major, typically during their second year. Data were collected across two semesters in one academic year and were combined for data analytic purposes. This research was approved by the university's Institutional Review Board (IRB).

Study Design and Questionnaire

A classic pre/post design was used, in which students completed a questionnaire at the beginning (Time 1) and end (Time 2) of the class to assess changes across time. Throughout the course, a social belonging intervention was employed, as described below. The class

questionnaire, administered at the beginning and end of the term, asked students about their feelings of belonging within the class, their demographic information, and their feelings and attitudes towards the class, in general. Response rate at Time 1 was 82% and at Time 2 was 43%.

The lower response rate at Time 2 is likely attributable to several factors. During the first week of class, students were diligently completing all items on the Week 1 checklist, which may have contributed to the higher response rate at Time 1. By the final week of the term, students were likely prioritizing final exam preparation and other end-of-term obligations. Additionally, the absence of explicit grade-related incentives for completing the survey may have reduced motivation to participate at Time 2. These contextual factors are important to consider when interpreting results.

Social Belonging Scale. To assess social belonging, a modified version of the Social Belonging Scale (SBS) was used. The original scale, developed by Walton and Cohen (2007), was designed to measure students' sense of belonging at an institution. For this study, the scale was adapted to specifically assess belonging within a class context. Modifications included rephrasing items to refer to the classroom environment and interaction with classmates and instructors rather than the broader institutional setting. The changes ensured the scale captured students' perceptions of belonging as they related to the specific course. See Appendix A for complete list of survey items and details on scoring methodology. Internal reliability for the adapted SBS was high, with a Chronbach's alpha (α) of .88 at Time 1 and .80 at Time 2, indicating consistency across items in the modified SPS.

Additional Questions. At Time 1, students answered questions about their general excitement and anxiety about the class. At Time 2, students were asked to rate their level of knowledge, confidence, excitement, time spent on classwork, and expected final grade, in

addition to reflecting back on their excitement and anxiety at the beginning of the term. See Appendix B for questions and response scales. Additionally, students were asked about a variety of demographic information, including whether they are first-generation (defined as having neither parent completed college) or a continuing-generation student.

Social Belonging Intervention

Throughout the course, a social belonging intervention was employed. This intervention consisted of a series of six mini-assignments that students completed as part of course requirements. These mini-assignments combined amounted to 6% of the overall course grade, about half a letter grade. In other words, these assignments did not make up a substantive portion of the course grade, but were worth enough to motivate students to complete them.

The mini-assignments, themselves, fell underneath one of four broad categories: academic coaching, growth mindset, mental health, and transferable skills. Importantly, these mini-assignments do not test students over statistical core concepts within the class. Instead, these mini-assignments were designed to promote feelings of belonging within the class by helping students feel valued as individuals (rather than seen as just a number or an impersonal, faceless entity in a large online class). Because these assignments do not tie directly to course content, they can easily be applied and adopted across disciplines regardless of the subject matter of the course.

The intervention was delivered entirely online through the course's learning management system. Each mini-assignment was provided as a stand-alone with clear instructions, deadlines, and examples to guide students. The instructor played a key role in the intervention by designing the assignments, monitoring student engagement, and providing individualized feedback where applicable. While not all mini-assignments required extensive feedback, the instructor made an

effort to provide encouraging comments and acknowledgement of students' submissions, particularly for assignments that involved personal reflection or self-disclosure.

To ensure that students saw the relevance of these assignments, each assignment included a brief explanation of how the activity could benefit them academically or personally. Additionally, the instructor encouraged students to share takeaways from these assignments in end-of-semester class discussions, fostering a sense of community and peer support.

Academic Coaching. Academic coaching interventions required students to engage in goal setting and self-reflection, developing a study plan for the class. Additionally, it asked students to anticipate how to overcome potential barriers to their learning. Academic coaching has been shown to improve grades and retention rates for at-risk college students (Capstick, Harrell-Williams, Cockrum, & West, 2019). This support may be especially valuable for first-generation college students, who lack a parent with college experience to guide them through the hidden curriculum of academia, such as unwritten rules, norms, customs, and expectations (Delgado, 2020).

Growth Mindset. Growth mindset interventions lean on research about strength-based pedagogy, which focuses on a student's strengths rather than their limitations (Seligman, Ernst, Gillham, Reivich, & Linkins, 2009). This mini-assignment asked students to identify their personal strengths and explain how the strengths benefit them as a student within the course. Additionally, it asked students to reflect on how much they've learned and how well they've done in the class so far. These types of growth mindset-oriented interventions have been associated with development of courage, grit, and confidence (Dweck, 2006; Kosterlitz, 2015; Park, Tsukayama, Yu, & Duckworth, 2020).

Mental Health. These interventions lean on humanistic pedagogy in which a student-centered view of teaching is taken (Tangney, 2013). For instance, a mini-assignment asked students to take a "time out" for mental health and self-care and to explain how the activity they chose helps relieve stress. Researchers have theorized that employing humanistic teaching approaches, ones like this in which the student is viewed as a "whole person", can promote student well-being in higher education (Chong, Francis, Carter, & Baffour, 2022).

Transferable Skills. Finally, the transferable skills intervention helped students with career planning and preparation by asking them to explain how a take-away from class can apply to life outside of academics, and to identify transferable skills that may be beneficial for current or future employment. Past research in the field of Psychology has shown that emphasizing transferable skills with students is associated with higher final course grades (Miller & Favelle, 2024). It is possible that students are more invested when they can see the relevance of course material and assignments to their lives outside of academia.

These mini-assignments were spread throughout the course, starting immediately following the Time 1 pre-survey and concluding immediately prior to the Time 2 post-survey.

Results

Participant Demographics

In total, 249 students completed the questionnaire at Time 1, and 116 students completed the questionnaire at Time 2. The majority of participants identified as white (42%) or Hispanic (33%), and the majority were female (86%). Just over a third of respondents identified as being a first-generation college student (38%). Importantly, although participation was lower at Time 2 relative to Time 1, statistical analysis indicated no significant differences between respondents

due to race/ethnicity, gender, or first-generation status, meaning samples did not vary in any systematic way on key variables of interest.

Anxiety and Excitement

As you can see in Figure 1, most students reported that they were anxious about the class ($M = 3.63$, Median = 4, $SD = 1.19$, $N = 116$) and were not excited about the class ($M = 2.34$, Median = 2, $SD = 1.19$, $N = 116$) at the beginning of the semester.

Social Belonging

Social belonging scores significantly increased from T1 to T2, $t(362) = 4.00$, $p < .01$. As you can see in Table 1, mean belonging scores increased by 11% after implementation of the social belonging intervention from T1 ($M = 4.06$, $SD = .98$, $N = 248$) to T2 ($M = 4.51$, $SD = 1.04$, $N = 116$).

However, this increase was even more pronounced for first-generation students. While social belonging scores significantly increased from Time 1 to Time 2 both for first-generation students, $t = 2.96$ (127), $p < .01$, and continuing generation students, $t = 2.61$ (225), $p < .01$, the magnitude of the effect size was more robust for first-generation students, Cohen's $d = .54$, compared to continuing-generation students, Cohen's $d = .38$. Continuing-generation students' social belonging ratings increased by approximately 9%, while first-generation students' social belonging ratings increased by approximately 15%. See Table 2 for details.

Correlations

A correlation table was created for the key variables of interest collected at Time 2. As you can see in Table 3, higher scores for social belonging were associated with: more knowledge ($r = .64$, $p < .001$), more confidence ($r = .66$, $p < .001$), more excitement ($r = .40$, $p <$

.001), more time spent on classwork ($r = .25, p < .01$), and better expected final grades ($r = .25, p < .01$).

Discussion

Overall, mean social belonging scores increased across the term for the full class, with particularly pronounced gains among first-generation college students, who began the course with lower mean sense of belonging compared to their continuing-generation peers. These findings suggest that the social belonging intervention is associated with increased feelings of belonging over time.

In addition to the observed increase in belonging scores, the implementation of a social belonging intervention was associated with students reporting greater knowledge, confidence, and excitement about the course. Students also reported spending more time on coursework and anticipating higher final grades. These self-report outcomes are noteworthy, given that initial impressions of the course were generally not positive, with the majority of students expressing high anxiety and low excitement at the start of the term.

Limitations

Several limitations of the study should be acknowledged. Survey items were based on self-report data. Additionally, the anonymous nature of the surveys precluded linking responses across time points, preventing analysis of individual-level change in belonging or other outcomes. While increases in mean social belonging are correlated with improvements in students' reported expectations for final grades, we could not link the survey responses to academic performance. Thus, we cannot confirm whether improved social belonging is directly related to better grades.

Grades were updated regularly for students, and the Time 2 questionnaire was completed during the final week of class. As such, students likely had a fairly accurate understanding of their final grades. Nonetheless, future research would benefit from including objective measures of academic success (e.g., final course grades) to complement self-report data and provide stronger evidence of the impact of social belonging interventions on an individual level.

Conclusion

Enhancing students' sense of belonging within a class does not need to be overly complex or difficult. The mini-assignments described in this study require minimal additional effort from the instructor and were designed to be broadly applicable across disciplines and course modalities. By incorporating similar assignments into their teaching, college instructors may support students' sense of belonging within the class. While the present study suggests potential positive associations between social belonging and various academic and social outcomes, caution is warranted when interpreting these findings, as the data do not allow for causal conclusions. Future research should explore these relationships further to build upon these initial insights.

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Tables

Table 1

Social Belonging Means and Standard Deviations for All Students, Combined

	Mean	Standard Deviation	N
Time 1	4.06	.98	248
Time 2	4.51	1.04	116

Table 2

Social Belonging Scores for First-Generation and Continuing-Generation Students

Time 1 First-Gen	Time 2 First-Gen	T-statistic	Cohen's D
$M = 3.92 (SD = 1.05),$ $N = 85$	$M = 4.52 (SD = 1.17),$ $N = 44$	$t = 2.96 (df = 127), p < .01$	$d = .54$
Time 1 Continuing	Time 2 Continuing	T-statistic	Cohen's D
$M = 4.13 (SD = .95),$ $N = 159$	$M = 4.49 (SD = .96),$ $N = 68$	$t = 2.61 (df = 225), p < .01$	$d = .38$

Note. First-generation has been abbreviated "first-gen" and continuing-generation has been shortened to "continuing."

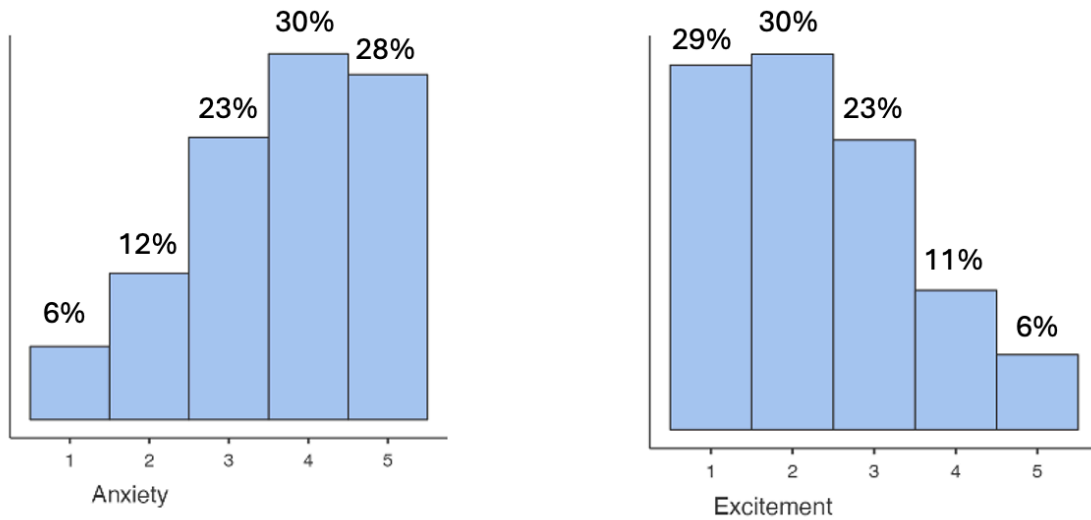
Table 3*Correlations Between Social Belonging and Other Variables of Interest*

	Belonging	Knowledge	Confidence	Excitement	Time Spent
Social Belonging					
Knowledge	.64***				
Confidence	.66***	.65***			
Excitement	.40***	.48***	.50***		
Time Spent	.25**	.23*	.23**	.15	
Expected Grade	.25**	.21*	.27**	.14	.04

Note. * $p < .05$, ** $p < .01$, *** $p < .001$

Figures**Figure 1**

Student anxiety and excitement for the statistics class.



Note. Student responses were on a scale from 1-5, where 1 = not at all anxious/excited, 2 = a little, 3 = a moderate amount, 4 = a lot, and 5 = extremely anxious/excited. $N = 116$

Appendix A

Social Belonging Scale, adapted from Walton & Cohen, 2007

1. I belong in statistics.
2. I feel comfortable in statistics.
3. Other people understand more than I do about what is going on in statistics. (reverse-coded)
4. I think in the same way as do people who do well in statistics.
5. It is a mystery to me how statistics works. (reverse-coded)
6. I feel alienated from statistics. (reverse-coded)
7. I fit in well in statistics
8. Compared with most other statistics students, I am similar to the kind of people who succeed.
9. Compared with most other students, I know how to do well in statistics.
10. Compared with most other statistics students, I get along well with people in statistics.

All questions were answered with a 7-point Likert-style scale indicating level of agreement.

After reverse-coding Questions 3, 5, and 6, a mean social belonging score was calculated for each student. These mean scores were used in subsequent analyses.

Appendix B

Time 2 Survey Questions

- Knowledge: How much do you currently feel like you know about statistics?
 - 5-point scale from not knowledgeable at all (1) to extremely knowledgeable (5)
- Confidence: How confident are you in your ability to learn statistics?
 - 5-point scale from not at all confident (1) to extremely confident (5)
- *Excitement: How excited were you for this class?
 - 5-point scale from not at all excited (1) to extremely excited (5)
- *Anxious: How anxious were you about this class?
 - 5-point scale from not at all anxious (1) to extremely anxious (5)
- Time Spent: How much time did you spend on this course per week (including reading, studying, and completing any class assignments or activities)?
 - Less than 5 hours
 - Between 5-10 hours
 - Between 10-15 hours
 - Between 15-20 hours
 - Over 20 hours
- Expected Grade: What final letter grade do you expect to earn in this class?
 - A
 - B
 - C
 - D
 - F

Note: This was for a 7.5-week course, so students were encouraged to spend 12-15 hours per week on coursework. The expected grade question was coded such that F = 1 and A = 5.

*Students were also asked about their initial excitement and anxiety at Time 1 in addition to being asked to report retrospectively at Time 2.