**The Short-term Benefits of Difference-Education Interventions in Lower-Resourced Institutions**

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Because of the need to preserve participants’ anonymity, the data are not available. The study materials can be made available upon request.

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**Abstract**

*Difference-education* is an intervention that addresses the psychological barriers that undermine the academic performance of first-generation college students (i.e., those who have parents without four-year degrees). Difference-education improves first-generation students’ academic performance by empowering them to more effectively navigate their environments. It also improves students’ comfort with their own and others’ social group differences*.* However, these benefits have only been documented in two institutions. The present research asks whether these benefits extend to *lower-resourced* institutions—i.e., institutions with fewer resources to invest in students than the institutions where prior difference-education interventions were delivered. First, is difference-education effective in improving first-generation students’ academic performance in lower-resourced institutions, and does it do so by increasing their empowerment? Second, does difference-education improve comfort with social group difference in lower-resourced institutions, and is it unique in its ability to do so? With students from four relatively lower-resourced institutions, we answered these questions by comparing the results of a difference-education intervention to a control condition and *social-belonging*intervention. Overall, we found some benefits of difference-education extend to lower-resourced institutions and some do not. First, like prior interventions, difference-education improves first-generation students’ academic performance. Unlike prior interventions, these effects on academic performance did not persist beyond the first term and were not explained by empowerment. Second, like prior interventions, difference-education increased comfort with social group difference. Unlike prior interventions, these benefits were short-lived and did not persist beyond the first term. We also found partial evidence that these benefits were unique compared to a social-belonging intervention.

*Keywords*: social class, achievement gap, intervention, difference-education

**The Short-term Benefits of Difference-Education Interventions in Lower-resourced Institutions**

For students from diverse social class backgrounds, the playing field at U.S. colleges and universities is far from level (Sirin, 2005 ). Compared to students who have one or more parents with a four-year college degree (i.e., *continuing-generation students*), students who do not have parents with a four-year degree (i.e., *first-generation students*) often face greater psychological barriers. For example, they often confront cultural mismatches between their working-class backgrounds and the middle- and upper-class culture of universities (Dittmann et al., 2020; Goudeau & Croizet, 2017; Phillips et al., 2020; Stephens, Fryberg, et al., 2012; Stephens, Townsend, et al., 2012; Stephens, Townsend, et al., 2019). These mismatches can undermine first-generation students’ sense of fit or belonging and also reduce their sense of efficacy or empowerment in college (e.g., Housel & Harvey, 2009; Ostrove & Long, 2007; Reay et al., 2009; Stephens, Brannon, et al., 2015). These psychological barriers work alongside disparities in resources and precollege preparation to fuel social class gaps in students’ academic performance (e.g., grades; Reardon, 2011).

One effective way to address these types of psychological barriers and thereby reduce social class gaps in academic performance is through a social-psychological intervention called *difference-education*. Difference-education has been shown to improve first-generation students’ academic performance by increasing students’ empowerment in college (Stephens et al., 2014; Townsend et al., 2019). It also has been shown to improve first- and continuing-generation students’ comfort with social group difference (e.g., an ease and/or willingness to engage with difference; Stephens, Townsend, et al., 2015; Townsend et al., 2021).

Like the social-psychological intervention literature more broadly, research on difference-education interventions has mostly focused on demonstrating effects (Stephens et al., 2014; Townsend et al., 2019). However, in this next phase of research, it is important to understand the contextual conditions (e.g., financial resources) that are necessary for difference-education to yield benefits. Specifically, the benefits of difference-education have only been documented in elite institutionsthat have a high level of financial resources to invest in students[[1]](#footnote-2) (i.e., based on endowments and tuition dollars; see supplemental materials Table A1). We therefore do not know if difference-education is only effective in these *higher-resourced* contexts. That is, are high levels of financial resources—and the opportunities that they afford for students—necessary for difference-education to yield benefits?

To begin to address this question, the current research examines whether difference-education’s benefits extend to *lower-resourced* institutions. Importantly, these are the types of institutions most first-generation college students attend (Fry & Cilluffo, 2019). We define lower-resourced institutions as those that have fewer resources to invest in supporting students than the institutions where previous difference-education interventions were delivered (i.e., see supplemental materials Table A1). Specifically, we ask two key questions. First, is difference-education effective in improving first-generation students’ academic performance in lower-resourced institutions, and if so, does it do so by increasing their empowerment? Second, does difference-education improve comfort with social group difference in these institutions, and does it uniquely do so compared to other social-psychological interventions? With a sample of four lower-resourced institutions, we seek to answer these questions by comparing the results of a difference-education intervention to a control condition and another common social-psychological intervention (i.e., a *social-belonging* intervention).

In the sections below, we first provide an overview of our theorizing about how difference-education interventions improve students’ outcomes, as well as the research in higher-resourced institutions that supports this theorizing. Then, we discuss how fewer resources in an educational context could impact the effectiveness of difference-education interventions.

**The Benefits of Difference-Education in Higher-resourced Institutions**

Like other social-psychological interventions, difference-education improves students’ academic outcomes by targeting psychological barriers. In particular, it seeks to change students’ *lay theories*, or ways of making sense of their experiences(Walton & Wilson, 2018)*.* Changing their lay theories can, in turn, improve students’ academic outcomes by reducing psychological barriers—in this case, by empowering them to change their behavior.

More specifically, difference-education leverages stories from students’ senior peers to teach them a *contextual theory of difference*—an understanding that their diverse life experiences and backgrounds are likely to give rise to different experiences in college (Stephens, Hamedani, & Townsend, 2019). By teaching them this new lay theory, theintervention can normalize the unique challenges that students experience in college and can help them to see that their differences need not be negative or isolating, but can also be positive and serve as an asset (Stephens, Hamedani, & Townsend, 2019). Previous research in elite, higher-resourced institutions has found that difference-education improves two key outcomes. First, it improves the academic performance of first-generation students by increasing their empowerment (i.e., both the psychological experience and behavioral tendency to seek out campus resources). Second, it improves students’ comfort with social group difference (e.g., Townsend et al., 2021).

First, by normalizing students’ different experiences in college, a contextual theory of difference can help to improve first-generation students’ academic performance by empowering them. Indeed, supporting this theorizing, previous evaluations of difference-education in higher-resourced settings have been shown to improve first-generation students’ GPAs and their likelihood of attaining academic honors (Townsend et al., 2021). Difference-education improves academic performance by increasing students’ *empowerment*, which includes the psychological sense of feeling prepared, in control, and efficacious, as well as the behavioral tendency to seek campus resources (e.g., help-seeking; Stephens, Hamedani, & Townsend 2019).

Second, by conveying that students’ differences can be positive assets, a contextual theory can lead students to experience greater *comfort with social group difference*: that is, an ease and/or willingness to engage with their own and others’ social group differences. Indeed, previous evaluations of difference-education in higher-resourced institutions have shown that it improves students’ appreciation of the significance and value of diversity, fosters higher levels of perspective-taking, and increases participation in identity-relevant activities (Stephens et al., 2014; Stephens, Townsend, et al., 2015; Townsend et al., 2021).

**Does Difference-Education Improve First-generation Students’ Academic Performance in Lower-Resourced Institutions, and Does it do so by Increasing Their Empowerment?**

To what extent are the benefits of difference-education—an intervention that targets psychological barriers—likely to extend to relatively lower-resourced institutions? To answer this question, it is important to consider how differences in structural and psychological barriers in lower-resourced institutions may affect the processes through which difference-education benefits students.

***Difference-Education Could be Less Effective in Lower-Resourced Institutions***

Difference-education could be less effective because lower-resourced institutions present additional structural barriers compared to higher-resourced institutions (Goldrick-Rab et al., 2014; Scott-Clayton, 2018), which may disrupt the processes through which difference-education benefits students. Difference-education improves academic outcomes by reducing the common psychological barrier of not feeling fully empowered to seek out resources (e.g., Stephens et al., 2014). However, students in lower-resourced institutions often face additional structural barriers, such as less financial support from their institution (e.g., fewer scholarships) and less access to the types of programs that support student success (e.g., tutoring; Yuen, 2020). Since lower-resourced institutions have fewer resources to invest in supporting students, students’ experiences of feeling more empowered to seek out (less available) resources from their institution are unlikely to improve their academic outcomes.[[2]](#footnote-3)

Another reason why difference-education could be less effective is because lower-resourced institutions tend to present first-generation students with fewer psychological barriers than higher-resourced institutions (Murphy et al., 2020; Stephens, Fryberg, et al., 2012; Tibbetts et al., 2018). If first-generation students confront fewer psychological barriers, difference-education may be less effective because there would be less room for difference-education to improve first-generation students’ experiences and outcomes. One reason lower-resourced institutions may have reduced psychological barriers is that these institutions often have greater social class diversity (Cataldi et al., 2018; Fry & Cillufo, 2019; Redford & Hoyer, 2018). When there is greater social class diversity, first-generation students should feel more comfortable in the college environment and therefore more empowered to seek out resources. Consistent with this theorizing, but not discussed in our pre-registration, the presence of fewer psychological barriers in lower-resourced institutions may mean that difference-education would also be less effective in improving comfort with social group difference. For example, greater social class diversity may lead to more comfort with social group difference, leading to less room for improvement.

 Despite greater structural barriers and fewer psychological barriers for first-generation students at lower-resourced institutions, we hypothesize that difference-education will still be effective in improving both first-generation students’ academic performance and comfort with social group difference. We describe our reasoning for why the benefits of difference-education are likely to extend to lower-resourced institutions in the sections below.

***Difference-Education Could be Effective in Lower-Resourced Institutions***

As indicated in our pre-registration, in lower-resourced institutions, we hypothesize that difference-education will be effective in improving first-generation students’ academic performance, and that it will do so by increasing their empowerment. Although we expect that students face more structural barriers and fewer psychological barriers, we nevertheless expect that first-generation students will still face significant psychological barriers (e.g., feeling disempowered) that can undermine their academic performance. To the extent that this is the case, difference-education is likely to still be effective in addressing these psychological barriers, and, in turn, improving students’ academic performance. For example, even if there are smaller social class gaps to reduce, first-generation students may still face unique challenges due to their backgrounds (e.g., family achievement guilt; Covarrubias & Fryberg, 2015) and not feel fully empowered with the “rules of the game” to effectively navigate the college environment. Given that first-generation students are likely to confront these common challenges across contexts, the message conveyed by difference-education may still be helpful. That is, by understanding that their different backgrounds impact their experiences in college, students may be better able to make sense of their experiences and learn how to better navigate the college environment. We therefore hypothesize that the academic performance benefits of difference-education will extend to lower-resourced institutions, and that these benefits will be due to increased empowerment.

**Does Difference-Education Improve Comfort with Social Group Difference in Lower-resourced** **Institutions and is it Unique in its Ability to do so?**

We also expect that difference-education will be effective in improving comfort with social group difference in lower-resourced institutions and that it will be unique in its ability to do so compared to other social-psychological interventions. Although lower- and higher-resourced institutions differ in important ways (e.g., socioeconomic diversity), we still expect that students will have room to improve their comfort with social group difference. Indeed, just as a contextual theory conveys that social group difference can be potentially positive in higher-resourced institutions, so too do we expect it to change the meaning of difference through the same process in lower-resourced institutions. We therefore expect the provision of a contextual theory to have similar effects across institutional contexts.

To answer the second question of whether difference-education *uniquely* affords these benefits, it is necessary to compare difference-education to a similar social-psychological intervention that benefits first-generation students, but that does not provide a contextual theory of difference. In this case, we compare difference-education to a social-belonging intervention. Difference-education and social-belonging interventions are well suited for comparison because they both address the types of psychological barriers that can undermine first-generation students (e.g., lack of fit or empowerment), but they do so by providing distinct lay theories.

Based on the different lay theories they provide, we expect that difference-education will improve students’ comfort with social group difference compared to the control condition and social-belonging intervention. In contrast, we do not expect that a social-belonging intervention will improve comfort with social group difference compared to the control condition.

***Social-Belonging Interventions***

Like difference-education, a social-belonging intervention is a social-psychological intervention that changes students lay theories or ways of making sense of their experiences.

It has been shown to produce both psychological and academic benefits for college students. In both higher- and lower-resourced institutions, social-belonging interventions have been shown to produce academic performance benefits (e.g., improved grades) for students from structurally disadvantaged backgrounds—that is, students from underrepresented racial and ethnic minority groups and first-generation college students (see Murphy et al., 2020; Yeager et al., 2016). Building on this prior research, we expect the academic benefits for first-generation college students from social-belonging interventions to extend to lower-resourced institutions.[[3]](#footnote-4)

Although difference-education and social-belonging interventions share some similarities, they provide distinct lay theories. Difference-education interventions teach participants why their experiences are different from each other (i.e., a contextual theory). In contrast, social-belonging interventions teach participants that their challenges are similar or *shared in common with other students*. Walton and Cohen (2007) described the learning as follows: “Students learned that hardship and doubt were unique neither to them nor to members of their racial group but rather were common to all 1st-year students regardless of race.” Thus, when first-generation students confront a challenge, this lay theory can help them to understand that their experiences are normal and shared with other students irrespective of their particular backgrounds or identities. Given that a social-belonging intervention does not provide a contextual theory of difference, we do not expect it to improve students’ comfort with social group difference.

In sum, as noted in detail in our hypotheses below, although we expect difference-education and social-belonging interventions to produce similar academic performance benefits in lower-resourced institutions, we also expect them to produce distinct benefits in terms of students’ comfort with social group difference.

As stated in our preregistration (<https://osf.io/wfzbr/?view_only=ef615f4e50de4becb08f2121b15a3e86>), we have the following two primary hypotheses and one secondary hypothesis:

***Hypothesis 1***: The academic benefits of difference-education and social-belonging will extend to lower-resourced institutions. Specifically, we predict that the academic performance of first-generation students will be better in the two intervention conditions (difference-education and social-belonging) compared to the control condition.

***Hypothesis 1A***: We expect that empowerment will function as a mediator of difference-education’s benefits in lower-resourced institutions. Specifically, we predict that the academic performance benefits among first-generation students in the difference-education intervention will be mediated by increased empowerment.

***Hypothesis 2***:The benefits of difference-education on comfort with social group difference[[4]](#footnote-5) will extend to lower-resourced institutions. Specifically, difference-education will uniquely have this impact, such that it will improve students’ comfort with social group difference compared to the control condition and social-belonging intervention.[[5]](#footnote-6)

**Methods**

**Participants and Procedure**

Participants were recruited from four lower-resourced institutions. Specifically, compared to the institutions where previous difference-education interventions were delivered, all four institutions in the current study have fewer financial resources to invest in students (i.e., based on lower endowments and tuition dollars; see supplemental materials Appendix A).[[6]](#footnote-7) Because of the need to preserve participants’ anonymity, the data are not available. The study materials can be made available upon request.

We kept the recruitment as similar as possible across the sites, but with slight variations, given different university policies about sharing data. Students at Institution 3 were recruited through a voluntary first-year university transition course. These students were asked to participate for extra credit in their course or $10. For the remaining three sites, students were recruited via email. Institution 1 provided students’ email addresses, but would not provide their demographic information. We therefore emailed all incoming students at the Institution 1 to ask them to complete a brief pre-screen survey, including questions about their generation status, gender, race or ethnicity, year in school, and whether they were born in the U.S. We then used this pre-screen survey data to determine students’ eligibility for the study. For the remaining two institutions (i.e., 2 and 4), the registrar’s office provided first year students’ email addresses and demographic information (e.g., generation status, gender, race). After obtaining this information for all three sites, we invited students from these three universities via email to participate in the study in exchange for up to $20. As with previous interventions, we described the study as an opportunity to (a) learn from the experiences of successful, senior peers at their university and (b) provide input on the materials that our research team was developing for incoming students at their university.

In the first few weeks of the fall term (Time 1), participants were randomly assigned to complete one of the three conditions (difference-education, social-belonging, or control). After completing the materials, they then answered a series of questions about their anticipated experiences and behaviors in college and demographic information. At the end of the spring term (Time 2), participants then completed a second follow-up survey to assess their end-of-year outcomes. They received a $10 gift card for each of the two surveys.

Based on our power analysis, our goal was to recruit 400 participants at each school, with a comparable number of first- and continuing-generation students at each university. We based this power analysis on the effect size for the interaction effect on grades that we observed in our previous online difference-education intervention (*p2*= .042). Assuming a small to medium effect, if the study were powered at 90%, we would need a sample of 307 participants at each university. However, given that only about 80% of participants in our previous research completed Time 2 end-of-year surveys, we rounded up to a target of 400 to allow for attrition. We recruited as many students as we could at each school (up to the goal of 400), and achieved a sample of 1,249 students across the four locations. For the three sites where students were recruited via email, we recruited as many first-generation students as possible and did our best to match the number and demographics (i.e., race, gender) of continuing-generation students to the first-generation group.

***Random Assignment to Condition***

Among the 1249 participants recruited, there were 411 participants randomly assigned to the difference-education intervention, 408 to the social-belonging intervention, and 429 to the control condition. We conducted a series of chi-square analyses to ensure that participants did not differ across the three conditions based on any of the following six demographic factors (i.e., race, gender, generation status, receipt of a Pell grant, high school GPA, and SAT/ACT scores). Based on these analyses, we found no differences in any of these factors comparing across the three conditions. See Appendix B in the supplemental materials for the distribution of participant demographics across the three conditions and across the four intervention sites.

***Protocol Compliance Check***

A common issue in randomized control trials in real-world settings is that participants do not always follow the instructions—i.e., they do not always comply with the research protocol (Gupta, 2011). In the present research, we considered participants as “complying” with the research protocol if they read the intervention materials for enough time to receive the intervention treatment. Unexpectedly, suggesting there was less compliance in the present research than in prior studies, participants in this study spent far less time reading the intervention materials (i.e., mean time spent = 4.8 minutes; median time spent = 3.1 minutes) than in the most comparable previous online difference-education intervention (i.e., mean time spent = 6.7 minutes; median = 4.5 minutes).[[7]](#footnote-8) Given the relatively small amount of time spent, we were concerned that some participants (i.e., those fell substantially below the mean and/or median in terms of time spent) who were assigned to receive the intervention treatment did not actually comply.

To address this issue, we used a standard “per-protocol” approach to estimate the effects of the interventions (Gupta, 2011; Tripepi et al., 2020). Using this approach, we only analyzed the outcomes of students who complied with the research protocol.[[8]](#footnote-9) We used the amount of time that participants spent on study materials as our criterion to indicate compliance, and we expected that students would have to spend at least one minute on the materials to have a chance of receiving the key messages conveyed in the intervention treatment.[[9]](#footnote-10) Because students in the control condition were also required to read materials, we were able to apply this same criterion to both of the intervention conditions and the control. Accordingly, the rest of the analyses in this article report data only from these 962 participants who spent at least 1 minute reading the stories and exclude the remaining 287 students who spent less than 1 minute. Moreover, we administered the Time 2 survey only to these 962 participants. Importantly, this decision (i.e., to rely on 1 minute as the criterion for compliance) was pre-registered and made before we collected or analyzed our end-of-year data.

Examination of participants’ manipulation check data supports the use of this criterion of 1 minute. Compared to students who spent 1 minute or more on the intervention materials, those who spent less than 1 minute were less likely to accurately identify the specific intervention messages (difference-education: *b* = -.58, *t* = -2.98, *p* = .002, *d* = .47; social-belonging: *b* = -.52, *t* = -4.41, *p* < .001, *d* = .49); less likely to relate to the stories, *b* = -.54, *t* = -5.38, *p* < .001, *d* = .41; and less likely to report paying attention to the materials, *OR* = .07, *z* = -8.41, *p* < .001.

**Compliance Differences by Condition and Student Characteristics.** Using the criterion of spending at least 1 minute, we next examined whether compliance with the research protocol differed by condition or by other student characteristics. As shown in Appendix C, Table C1 of the supplemental materials, these analyses revealed that participants were less likely to comply with the protocol if they were male or if they had lower high school GPAs and SAT/ACT scores. They were also less likely to comply with the protocol in the social-belonging intervention compared to the difference-education intervention or control condition.

Given the different rates of compliance, we conducted additional analyses to examine whether these exclusions led to differences across conditions on the six key demographic factors we examined above (i.e., gender, race, generation status, receipt of a Pell grant, high school GPA, and SAT/ACT scores). These analyses showed that, although participants who did not comply were different from those who did (i.e., based on gender, grades, SAT scores, and social-belonging condition), the participants who complied in each of the three conditions still did not systematically differ from each other based on these six demographic factors (i.e., gender, race, generation status, receipt of a Pell grant, high school GPA, and SAT/ACT scores). In other words, participants across the three conditions were still similar based on these six demographic factors (See Table C2 in the supplemental materials). Nonetheless, given that more participants were excluded from the social-belonging intervention (*n* = 145) than the difference-education intervention (*n* = 70) and control condition (*n* = 71), it is important to interpret the results from the social-belonging condition with caution.

***Additional Exclusions and Final Sample Characteristics***

From all analyses reported in this article, we also excluded participants who did not complete any of the survey measures (*n* = 24) and participants who were not enrolled in the spring term and consequently did not have complete GPA information (*n* = 45).[[10]](#footnote-11) After excluding these participants, participants across the three conditions were still similar based on the six demographic factors noted above.

This yielded a final sample of 893 students at Time 1. This was the population of students with whom we followed up for the Time 2 survey. Of these 893 students, 667 completed the survey at Time 2 for a 74.7% response rate. Only one student was dropped from this sample for failing to fully complete the Time 2 survey, yielding a final sample of 666 students at Time 2.[[11]](#footnote-12) Given our reduced sample size, we did not have enough statistical power to look at each intervention site separately. We therefore combined the samples across the four intervention sites. Considering our expected effect size (*p2*= .042), this yielded a more than adequate level of power for our analysis (99% power at Time 1 and 98% power at Time 2).

The mean age of the sample was 19.25 years (*SD* = 4.83) at Time 1 and 18.88 years (*SD* = 3.65) at Time 2. The sample at Time 1 included 452 first-generation college students and 433 continuing-generation college students; 49% White students, 28% Asian students, 6% Black students, 21% Latinx students, 1% Native American students, 2% Middle-Eastern or North African students, and 2% students of an unidentified race/ethnicity[[12]](#footnote-13); 32% men, 66% women, 1% gender-nonconforming students and 1% students of an unidentified gender identity. The composition of the sample did not change significantly from Time 1 to Time 2, *p*’s > .37.

**Intervention Materials**

To ensure that the materials were comparable to previous interventions, we used the same intervention materials as in previous studies at higher-resourced institutions. We modified them only slightly whenever necessary given the different institutional contexts (e.g., by changing specific names of clubs, organizations, or activities on each campus). To ensure that the stories accurately and proportionately represented the diversity of the student body at each school, we adapted the racial composition of the pictures that accompanied the stories. In other words, the racial and ethnic composition was roughly proportional to the student body at each school.

In each of the three conditions, participants first read six stories that were ostensibly told by senior, successful students at that university. A picture of a student (three women and three men), and written text (i.e., student’s name and college major) accompanied each story. The written labels did not include generation status, race, or gender. However, the pictures subtly conveyed race and gender. Through these pictures, we balanced the stories in terms of the students’ gender and race. At least two of the six students were portrayed as White, and at least one was Latinx, East Asian, and Black. Generation status was conveyed through the text of the stories as described below. We sought to ensure that the six stories were similar length across conditions: on average, the stories were 239 words in the difference-education intervention, 213 words in the social-belongingness intervention, and 234 words in the control condition.

***Difference-Education Stories***

As noted above, the goal of the difference-education stories was to convey a contextual theory. The intervention materials we used in this study were nearly identical to the online materials used by Townsend and colleagues (2019), which conveyed a contextual theory using the contrasting stories of college students from diverse social class backgrounds.

These stories are designed to show how students’ backgrounds can shape their experiences in college in both positive and negative ways. Specifically, each story typically began by mentioning students’ backgrounds (i.e., as first-generation or continuing-generation) and linked their particular backgrounds to their experiences in college—both in terms of challenges and strengths. After describing a challenge or a strength, the story then described some lessons that the student learned (for example, how the student overcame a challenge or leveraged a strength).

For example, one story from a first-generation student started by mentioning his background: “Ending up in college made me and my parents proud since my parents didn’t have that opportunity.” The student then linked his background to his experience (in this case, a challenge): “But as a business major, I felt overwhelmed with the expectations and I felt like I didn’t know as much as other students because they had better opportunities than I did in high school.” Finally, the student described how he overcame that challenge: “I realized though that there are other students from backgrounds like mine that felt this way, and that I could figure out some of these things out along the way. I started going to my professors’ office hours, reaching out to other students, and just trying to get advice about how I could do better.”

The stories of first-generation students were contrasted with those of continuing-generation students, who had their own set of background-specific challenges and strategies for success. For example, one story from a continuing-generation student started by mentioning her background: “For me there was just sort of the expectation that I would go to college, because my mom had gone.” The student then linked her background to her experience (in this case, a strength): “Even though education was always a focus in my house, my mom also helped me to understand that college is about more than academics.” Finally, the student described what she learned from this experience: “What I’ve learned from her and my experiences is that attending college is really about creating opportunities for yourself as well as really getting to know who you are and what you really like. It’s important to try out some different classes before you commit to an area of study. I was interested in psychology and took some psychology classes my first year in school. But even though I was drawn to psychology from the beginning, I still tried out some other classes just to get a broad sense of my interests.”

***Social-Belonging Stories***

The goal of the social-belonging intervention was to convey that the challenges participants experience in college are shared in common with other students. To maintain the fidelity of the intervention, our materials were nearly identical to the materials in the “social-belonging intervention” guide provided by Walton, Murphy, Logel, Yeager, and The College Transition Collaborative (2017). We made minor changes to adapt the materials to a given context, e.g., the race or gender of students pictured in the stories, as well as the names of activities, locations, and organizations on campus. The goal in doing so was to ensure that any effects we observed from the social-belonging intervention were representative of social-belonging interventions more generally and could be compared to the difference-education intervention.

As with all social-belonging interventions, the stories did not mention students’ backgrounds nor their social group memberships, and likewise, the content of the stories did not vary based on students’ social group membership (i.e., generation status, race, gender). Each story began mentioning a challenge or obstacle that a student faced, which could be interpreted as a signal of not belonging. The stories then concluded with a description of the student overcoming that obstacle and gaining a sense of belonging. For example, one student said: “The transition to college can be difficult, and it was for me. During my freshman year, I sometimes didn’t know what I was doing—I made a lot of casual friends in my dorm and other places and I avoided interacting with professors in class and office hours. I think I was intimidated by them. I got some low grades early on, which stressed me out, and sometimes I worried I wouldn’t make close friends like I had in high school.” The student then described how she overcame these challenges and found a sense of belonging over time: “But these things all got better over time. I began to make friends through classes and lab and sophomore year I started to get involved in research with one of my professors. My grades also got better as I started working in study groups and asked for help from my teaching assistants. Now I am happier than I have ever been at [school]. It is really rewarding for me to feel like I belong in the academic community here.”

***Control Stories***

The goal of the control condition was to mirror the content (i.e., challenges, strengths, and strategies for success) of the difference-education intervention as much as possible, but without providing a contextual theory of difference. The main difference between the difference-education and control condition was that the control condition did not link students’ backgrounds to their current experiences in college (adapted from Townsend et al., 2019). Notably, because this control condition mentions academic challenges and how to overcome them, it could also have some benefit for students. As a result, this control condition provided a somewhat conservative test of the effectiveness of the interventions, particularly relative to the control condition that are often used as a comparison with social-belonging interventions (e.g., adjustment to the physical environment on campus, Yeager et al., 2016).

Each story began with a student describing a challenge (e.g., finding college hard). The stories then described how the student overcame that challenge (e.g., visiting a tutoring center on campus). For example, one student described his challenges as follows: “When I first got to [school name] I thought I wanted to study some area of business. One reason I was so interested in this major was because you can have a great career after graduating. My parents liked that plan and are proud of me for pursuing this area of study. However, once I took some business classes during my first semester, I quickly realized that the classes here were much harder than my classes in high school, and that I was having a hard time keeping up with the quarter system and all of the quizzes and midterms. For this reason, sometimes I just felt overwhelmed with the expectations and with figuring out how to fit everything into my schedule. And, I also didn’t feel like I had enough time to do all the classwork required by my professors.” The student then went on to describe how he overcame that challenge: “I realized though that I could figure some things out along the way, and that I could also get advice about how I could do better. And so, I started looking for people to help me out and to get the advice that I needed. For example, I started going to my professors’ office hours and reaching out to other students. Realizing this and seeking the advice I needed helped me figure out how to study efficiently and do well in class without feeling overwhelmed.”

**Academic Performance**

At the end of the first year, we obtained students’ official grades from the university registrar at each school.[[13]](#footnote-14) We examined two indicators of academic performance. First, we examined students’ grade-point averages (GPA) and tested whether mean GPAs were higher in the intervention conditions compared to the control condition. Second, based on these GPA scores, we examined whether students qualified for academic honors at their institution, and tested whether students in the intervention conditions were more likely to meet the criteria for academic honors (at their specific institution) than those in the control condition.

**Post-Intervention Surveys**

We conducted two surveys after the intervention. The first survey (Time 1) was administered in conjunction with the intervention. Participants completed it immediately after reading the intervention materials. The primary purpose of this survey was to capture participants’ attention to, perceptions of, and reactions to the intervention message. This survey contained (a) questions designed to encourage participants to internalize the intervention message, (b) manipulation checks, and (c) various measures to capture feelings of empowerment (as a potential mediator)[[14]](#footnote-15) and experience of comfort with social group difference.[[15]](#footnote-16)

The second survey (Time 2) occurred a few weeks before the end of students’ first year. The primary purpose of the Time 2 survey was to test the hypothesized effects of the intervention conditions over time. With the exception of measures that were specific to Time 1 (noted below), the two surveys contained nearly identical measures of empowerment and comfort with social group difference. The only difference was that Time 1 measures asked students to report on anticipated experiences in the next year, whereas the Time 2 measures asked students to reflect on their experiences during the previous year. See Appendix E in the supplemental materials for a complete list of Time 1 and Time 2 measures.

**Measures Specific to Time 1**

***Internalizing the Message***

After reading intervention materials, participants responded to questions designed to encourage them to internalize the intervention messages (Yeager & Walton, 2011). In the difference-education and control conditions, we used the same questions used in previous difference-education interventions. Students first summarized three key messages from the stories and then answered open-ended questions that were identical to those used in previous difference-education interventions (see supplemental materials, Appendix E).

To maintain the fidelity of previous social-belonging interventions, our social-belonging condition asked the exact questions listed in the “social-belonging intervention” guide (Walton, Murphy, Logel, Yeager, and The College Transition Collaborative, 2017). Although these questions differed from the questions we used in the difference-education and control conditions, this was necessary to ensure that the results for the social-belonging intervention would be fully comparable to previous social-belonging interventions. In the social-belonging condition, after reading the stories, participants were first asked to write an essay on their transition to university. They then answered open-ended questions that were identical to those used in previous social-belonging interventions (see supplemental materials, Appendix E).

***Manipulation Checks***

 To assess whether the difference-education intervention communicated a contextual theory, participants indicated to what extent (1 = *not at all*, 7 = *a lot*) the stories communicated the following themes: “Students' backgrounds matter in college”; “Students' backgrounds can lead to unique challenges in college”; and “Students' backgrounds can help them to succeed in college” ( = .76). To assess whether the social-belonging intervention communicated that challenges are similar or shared with other students, participants indicated to what extent (1 = *not at all*, 7 = *a lot*) the stories communicated the following themes: “Students worry initially that they don’t belong in college but come to feel at home in college with time”; “No matter where students come from, they have the same experiences in college”; and “When students face obstacles in college, things generally work out with time” ( = .60).

Moreover, to ensure that the interventions and control were equally engaging, students responded to the following three questions: “Overall, to what extent did the student stories reflect your own experiences?” (1 = *not at all*, 7 = *a lot*); “How similar were the student stories to your own?” (1 = *not at all*, 7 = *a lot*); and “Did you pay attention to the content of the student stories you read?” (Yes/No).

**Measures at Time 1 and 2: Empowerment and Comfort with Social Group Difference**

***Empowerment***

The only formal pre-registered hypothesis about mediation was that empowerment would serve as a mediator for the academic performance benefits of difference-education. We captured empowerment with two measures: learning empowerment and resource-seeking behavior. These measures have been theorized to reflect psychological and behavioral elements of empowerment, respectively (Stephens, Hamedani, & Townsend, 2019). Using a scale from 1(*strongly disagree*) to 7(*strongly agree*), we measured *learning empowerment* using seven items ( = .86) assessing the extent to which students felt academically empowered (Midgley et al., 2000). A sample item was “I have the power to influence my college experience.” Adapted from the campus-resource seeking scale used in Stephens et al., 2014, *resource-seeking* included12 resource-seeking actions ( = .86) assessing students’ frequency of seeking academic help. Students reported how many times a month they expected to engage in (T1) or had previously engaged (T2) in these actions. A sample item was “Email a professor to ask a question.”

The preregistration also included an exploratory hypothesis that social fit may serve as a mediator for difference-education. This measure and analyses are therefore reported in the supplemental materials (see Appendix E for measure and Appendix G for analyses).

We did not have an apriori prediction for a mediator for the social-belonging intervention. However, in the supplemental materials we reported analyses examining whether social fit or empowerment could help to explain the intervention’s benefits (see Appendices G and H). To summarize these findings, neither empowerment, nor social fit, mediated the academic performance benefits for the difference-education or social-belonging intervention.

***Comfort With Social Group Difference***

 To capture *comfort with social group difference*, we used five measures that captured students’ ease and/or willingness to engage with their own and others’ membership in different social groups: *intergroup comfort*, *bridging differences*, *intergroup warmth and respect*, *intragroup warmth and respect*, and *social class pride*. For each of these five measures, we created composites. We then standardized each composite and averaged these five composites together to create an overall composite measure of *comfort with social group difference*. All analyses reported below use this overall composite measure.

Using a scale from 1(*not comfortable at all*) to 7(*very comfortable*), we measured *intergroup comfort* with 4 items ( = .89). We created these to capture students comfort interacting with others from different backgrounds. A sample item was “How comfortable would you be interacting with someone from a different social class background than you?”

Using a scale from 1(*strongly disagree*) to 7(*strongly agree*), we measured *bridging differences* with two items ( = .78), assessing how motivated students were to engage with members of different social groups. A sample item was “In college, I look forward to learning about social groups different from my own” (Nagda et al., 2004; Nagda & Zuniga, 2003).

Using a scale from 1(*not at all)* to 7(*very*), we measured *intergroup warmth and respect* with two items ( = .77) adapted from existing measures of warmth toward different groups (e.g., Nosek & Hansen, 2008). We asked students (1) “how warmly…” and (2) “how much respect and admiration do you feel toward” people who are members of a different social class. Students indicated their warmth and respect for multiple social class groups. For first-generation students, we used their feelings towards people who are “wealthy/upper class” as the measure of intergroup warmth and respect. For continuing-generation students, we used their feelings towards people who are “low-income/working-class” to indicate intergroup warmth and respect.

The measure of *intragroup* *warmth and respect* was identical to the measure of intergroup warmth and respect measure except that the latter measure focused on students’ evaluations of their own groups instead of outgroups ( = .81). For first-generation students, we used their feelings towards people who are “low-income/working-class” to capture intragroup warmth and respect. For continuing-generation students, we used their feelings towards people who are “wealthy/upper class” to capture intragroup warmth and respect. Given that both first-generation and continuing-generation students may identify as middle-class, we also asked students to report warmth and respect toward people who are middle-income/middle-class. Although we report results without including feelings of warmth and respect for middle-income/middle-class groups, results for both first-generation and continuing-generation students do not change when these feeling are included.

Using a scale from 1(*strongly disagree*) to 7(*strongly agree*), we measured *social class pride* with three items ( = .76; Phinney, 1992) assessing pride toward one’s social class background. A sample item was “I feel good about my social class background.”

**Results**

**Manipulation Checks**

Manipulation checks revealed that the two intervention conditions effectively communicated their intended messages compared to each other and the control condition. Overall, using the items described above, participants rated the difference-education intervention (*M* = 5.49) as communicating a contextual theory of difference more than the social-belonging intervention (*M* = 4.69), *b* = .80, *t* = 7.72, *p* < .001, *d* = .64, and control condition (*M* = 4.72), *b* = .76, *t* = 8.20, *p* < .001, *d* = .61. Participants rated the social-belonging intervention (*M* = 5.34) as communicating that students have similar or shared challenges more than the difference-education intervention (*M* = 4.77), *b* = .57, *t* = 6.61, *p* < .001, *d* = .54, and control condition (*M* = 4.53), *b* = .78, *t* = 9.63, *p* < .001, *d* = .64.

Across the three conditions, participants were comparably engaged with the intervention materials. Specifically, participants across conditions were equally likely to report paying attention to the materials, χ2= 2.78, *p* = .25. They also did not differ in the degree to which they reported that the stories in each condition reflected their own experiences, *F* (2, 879) = .26, *p* = .77, or were similar to their own experiences, *F* (2, 879) = .03, *p* = .97.

**Does Difference-Education Improve First-generation Students’ Academic Performance in Lower-resourced Institutions, and Does it do so by Increasing their Empowerment?**

***Academic Performance***

We hypothesized thattheacademic performance benefits of difference-education and social-belonging would extend to lower-resourced institutions: in particular, that the academic performance of first-generation students would be better in the two intervention conditions (difference-education and social-belonging) compared to the control condition. As noted above, we assessed academic performance using two measures—students’ cumulative GPAs and whether they qualified for academic honors.[[16]](#footnote-17)

**Cumulative GPA.** To examine the effects of intervention condition on cumulative GPA, we tested a linear regression model in which GPA was predicted by intervention condition (difference-education vs. social-belonging vs. control), generation status (first-generation vs. continuing-generation), and the interaction between intervention condition and generation status. GPA scores were standardized within schools so that scores reflected academic performance relative to other students at the same school.[[17]](#footnote-18)

Consistent with previous difference-education studies (Stephens et al., 2014; Townsend et al., 2019) and to ensure that the academic performance effects were due to the intervention, rather than demographic characteristics, we controlled for race and ethnicity (-1 = disadvantaged, 1 = advantaged), gender (-1 = male, 1 = female), high school GPA, SAT/ACT scores, and Pell grant status (-1 = does not receive Pell Grants, 1 = receives Pell Grants). In addition, we also included a covariate for each of the four institutions included in the sample.[[18]](#footnote-19) For the sake of consistency, we used this same standard set of covariates for all analyses in this article.

To examine the effects of the intervention condition for first-generation students, we conducted planned contrasts in which we dummy coded generation status (first-generation = 0, continuing-generation = 1) and intervention condition (difference-education vs. control: difference-education = 1, social-belonging = 0, control = 0; social-belonging vs. control: difference-education = 0, social-belonging = 1, control = 0). This allowed us to examine the simple effect for first-generation students in (1) the difference-education intervention versus the control and (2) the social-belonging intervention versus the control. To examine the effects of the intervention condition for continuing-generation students, we recoded the dummy coding of generation status (first-generation = 1, continuing-generation = 0). To determine whether the effects of the intervention condition were significantly different for first-generation versus continuing-generation students, we used a univariate analysis of variance to test the interaction effect in the regression model controlling for the standard set of covariates. A full report of statistics for these regression models (including descriptive statistics and the models without covariates) can be found in Appendix F of the supplemental materials.

Hypothesis 1 predicted that the academic performance benefits of the difference-education and the social-belonging interventions would extend to lower-resourced institutions. We therefore examined whether the difference-education and social-belonging interventions improved first-generation students’ GPAs compared to the control condition. Although first-generation students in both intervention conditions had higher GPAs than first-generation students in the control condition, this difference did not reach significance for difference-education, *b* = .12, *t* = 1.27, *p* = .21, *d* = .12, and was only marginally significant for social-belonging, *b* = .19, *t* = 1.76, *p* = .08, *d* = .18. There were also no differences for continuing-generation students in the difference-education intervention versus the control, *b* = .03, *t* = .31, *p* = .75, *d* = .04, or in the social-belonging intervention versus the control, *b* = -.04, *t* = -.36, *p* = .72, *d* = .05. Consequently, the interaction between intervention condition and generation status was not significant, *F* (2, 843) = 1.13, *p* = .32, ηp2 = .003.

To further understand these null effects, we examined students’ GPAs by term and noticed a drop in GPA for all students in the spring term. This finding suggested that the effects of the intervention may have differed by academic term. Consequently, we entered time (i.e., academic term) into our model as an interactive effect.[[19]](#footnote-20) We found a significant three-way interaction between intervention condition, generation status, and academic term on GPA, *F*(2, 667.04)= 5.14, *p* = .01, suggesting that the effects of the interventions on first-generation versus continuing-generation students depended on the academic term. We therefore examined fall and spring GPAs in separate regression models.[[20]](#footnote-21)

***GPA by Term.*** For the fall term, first-generation students in both the difference-education and social-belonging intervention had significantly higher GPAs than students in the control condition (see Figure 1); difference-education: *b* = .22, *t* = 2.23, *p* = .03, *d* = .22; social-belonging: *b* = .38, *t* = 3.52, *p* < .001, *d* = .40. However, continuing-generation students in the difference-education and social-belonging intervention did not differ from those in the control condition; difference-education: *b* = .07, *t* = .66, *p* = .51, *d* = .08; social-belonging: *b* = -.05, *t* = -.42, *p* = .67, *d* = .04. The interaction between intervention condition and generation status on fall term GPA was statistically significant, *F*(2, 847)= 3.91, *p* = .02, ηp2 = .01.

For the spring term, first-generation students in the difference-education intervention and the social-belonging intervention did not significantly differ in GPA from students in the control

condition; difference-education: *b* = .06, *t* = .58, *p* = .56, *d* = .06; social-belonging: *b* = -.02, *t* = -.22, *p* = .83, *d* = .02. Similarly, continuing-generation students in the difference-education and the social-belonging intervention did not differ from continuing-generation students in the control condition; difference-education: *b* = .01, *t* = .07, *p* = .94, *d* = .01; social-belonging: *b* = -.01, *t* = -.06, *p* = .96, *d* = .00. The interaction between intervention condition and generation status on spring term GPA was not significant, *F*(2, 817)= .11, *p* = .90, ηp2 = .00.

As noted earlier, for all students—regardless of generation status—there was a decrease in GPA from the fall to the spring term (from 3.26 to 3.20; for similar results, see Grove & Wasserman, 2004). To better understand how term (fall vs. spring) related to first- and continuing-generation students’ GPAs, we examined the extent to which there were social class gaps in each term across the three study conditions. In the fall term, as expected, there was a significant GPA gap between first-generation and continuing-generation students in the control condition, *b* = -.29, *t* = -2.81, *p* = .005, *d* = .30. The academic benefits of both the difference-education and social-belonging interventions consequently served to eliminate these gaps; difference-education: *b* = -.14, *t* = -1.31, *p* = .19, *d* = .15; social-belonging: *b* = .13, *t* = 1.04, *p* = .30, *d* = .14.

In the spring term, however, there was no evidence of a GPA gap between first-generation and continuing-generation students in the any of the three conditions; control:



**Figure 1**. Fall GPA scores for first-generation (FG) and continuing-generation (CG) students in the difference-education intervention, social-belonging intervention, and control condition. Conditional means are displayed, error bars represent +/- 1 SE of the mean.

*b* = -.17, *t* = -1.60, *p* = .11, *d* = .18; difference-education: *b* = -.12, *t* = -1.08, *p* = .28, *d* = .13; social-belonging: *b* = -.19, *t* = -1.45, *p* = .15, *d* = .20. This finding is consistent with our theorizing from our pre-registration that the academic performance benefits of difference-education might not emerge in lower-resourced institutions if there are smaller social class gaps to reduce.

**Academic Honors.** To further test Hypothesis 1—that the academic benefits of the difference-education and social-belonging interventions would extend to lower-resourced institutions, we next focused on a second indicator of academic performance: whether students qualified for academic honors. In particular, we examined whether students in the difference-education and social-belonging intervention conditions were more likely to meet the criteria for academic honors than those in the control condition. To do this, we assigned each student a score depending on whether their GPA met the criterion for receiving academic honors at their specific institution. For two of the institutions, there was only one criterion for the entire institution. However, for the other two institutions, there were multiple criteria set by each school within the university. For these institutions with multiple criteria, we used the average minimum criterion across all the schools. Each student was assigned either a 0 (GPA did not meet criterion for academic honors) or a 1 (GPA met criterion for academic honors). We then submitted this score to a logistic regression analysis with model predictors, standard covariates, and planned contrasts identical to our analysis of GPA score.

Using cumulative GPA to determine who qualified for honors, our results revealed that first-generation students in the difference-education intervention (37%) and social-belonging intervention (39%) were more likely to qualify for academic honors than first-generation students in the control condition (25%), although these differences only reached marginal levels of statistical significance; difference-education: *OR* = 1.80, *z* = 1.87, *p* = .06; social-belonging: *OR* = 1.93, *z* = 1.87, *p* = .06. Continuing-generation students in the difference-education (36%) and social-belonging (34%) interventions did not differ in their rates of qualifying for academic honors compared to those in the control condition (36%): difference-education: *OR* = .97, *z* = -.12, *p* = .91; social-belonging: *OR* = .89, *z* = -.21, *p* = .68. The interaction between intervention condition and generation status did not reach statistical significance, χ2= 3.69, *p* = .16. Following our analyses for GPAs, which varied by term, we next examined qualification for academic honors in fall and spring in separate regression models.

***Honors by Term.*** For fall term, first-generation students in both the difference-education (50%) and social-belonging (52%) interventions were significantly more likely to qualify for academic honors than those in the control condition (29%; see Figure 2); difference-education: *OR* = 2.41, *z* = 2.95, *p* = .003; social-belonging: *OR* = 2.62, *z* = 2.97, *p* = .003. Continuing-generation students in the difference-education (46%) and social-belonging (52%) intervention conditions did not differ in their rates of qualifying for academic honors compared to those in the control condition (55%), difference-education: *OR* = .71, *z* = -1.31, *p* = .17; social-belonging: *OR* = .91, *z* = -.35, *p* = .73. There was a significant interaction between intervention condition and generation status, 2 = 11.35, *p* = .003.

For spring term, first-generation students in the difference-education intervention (34%) were more likely to qualify for academic honors than those in the control condition (24%), however this difference did not reach statistical significance, *OR* = 1.63, *z* = 1.64, *p* = .10. First-generation students in the social-belonging intervention (27%) and control condition (24%) did not differ in their rates of qualifying for academic honors, *OR* = 1.18, *z* = .50, *p* = .62. Furthermore, continuing-generation students in the intervention conditions (difference-education = 25%; social-belonging = 27%) did not differ in their rates of qualifying for academic honors compared to those in the control (28%); difference-education: *OR* = .83, *z* = -.68, *p* = .49; social-belonging: *OR* = .92, *z* = -.30, *p* = .76 (see Figure 2). The interaction between intervention condition and generation status was not statistically significant, 2 = 2.84, *p* = .24.

Across two indicators of academic performance, the results provide partial support for Hypothesis 1: the academic benefits of difference-education and social-belonging interventions extend to lower-resourced institutions. Specifically, for the results focused on the fall term (i.e., GPA and fall qualification for honors), we found that first-generation students in the difference-education and social-belonging interventions had higher GPAs and were more likely to qualify for academic honors than first-generation students in the control condition.



**Figure 2.** Percentage of first-generation and continuing-generation students by condition whose fall GPA met the criteria for academic honors. Conditional values are displayed.

These results suggest that the academic benefits of these two interventions do indeed extend to lower-resourced institutions. However, unlike higher-resourced institutions, these results do not persist beyond the fall term when the intervention was administered. This lack of academic performance benefits in the spring may have been due to the lack of a social class gap in academic performance in the spring term, which meant that first-generation students may have had less room to improve their academic performance. This finding is consistent with our theorizing in the pre-registration that the intervention would only benefit students to the extent that the academic setting creates social class gaps in students’ outcomes.

***Empowerment as a Mediator of Difference-Education***

Hypothesis 1A predicted that difference-education would improve first-generation students’ academic performance in lower-resourced institutions by increasing their empowerment. To test this hypothesis, we first examined whether students in the difference-education intervention reported higher values on two measurements of empowerment (i.e., learning empowerment, resource-seeking) at both Time 1 and Time 2. Specifically, we tested two regression models for each respective outcome with model predictors, standard covariates, and planned contrasts identical to our analyses of GPA. Given that our pre-registered hypothesis only pertained to empowerment as a mediator of difference-education, we reported all additional exploratory mediation analyses for difference-education and social-belonging in supplemental materials (see Appendices G and H). A full report of statistics for these regression models (including descriptive statistics and the models without covariates) can be found in Appendix F of the supplemental materials.

 We hypothesized that, for first-generation students, the difference-education intervention would lead to more empowerment (i.e., captured through measures of *learning empowerment* and *resource-seeking*) compared to the control. However, at Time 1, first-generation students in the difference-education intervention and control did not differ in their anticipated learning-empowerment, *b* = .08, *t* = .81, *p* = .42, *d* = .08, or resource-seeking, *b* = .10, *t* = .89, *p* = .38, *d* = .10. Similarly, at Time 2, first-generation students in the difference-education intervention and control did not differ in their experiences of learning-empowerment, *b* = .02, *t* = .16, *p* = .88, *d* = .02, or resource-seeking, *b* = -.08, *t* = -.62, *p* = .53, *d* = .08. The same pattern was evident for continuing-generation students: those in the difference-education intervention and control did not differ in empowerment at Time 1 (learning empowerment: *b* = -.08, *t* = -.77, *p* = .44, *d* = .09; resource-seeking: *b* = .04, *t* = .39, *p* = .69, *d* = .04) or Time 2 (learning empowerment: *b* = -.19, *t* = -1.38, *p* = .17, *d* = .20; resource-seeking: *b* = .04, *t* = .27, *p* = .79, *d* = .04). Across Time 1 and Time 2, there were no significant interactions between the intervention condition and generation status for learning empowerment, (Time 1: *F*[2, 853]= .82, *p* = .44, ηp2 = .002; Time 2: *F*[2, 639]= .78, *p* = .46, ηp2 = .002), or resource-seeking, (Time 1: *F*[2, 854]= .78, *p* = .46, ηp2 = .002; Time 2: *F*[2, 639]= .21, *p* = .81, ηp2 = .00).

In our pre-registration, we suggested that difference-education might not improve first-generation students’ empowerment if there were small or nonexistent social class gaps in empowerment. To explore whether this was the case, we conducted post-hoc analyses comparing first-generation and continuing-generation students in the control condition on the two measures of empowerment. Using linear regression models and controlling for the standard set of covariates, at both Time 1 and Time 2, we found no differences between first- and continuing-generation students in either learning empowerment, Time 1: *b* = -.18, *t* = -1.64, *p* = .10, *d* = .20, Time 2: *b* = -.22, *t* = -1.59, *p* = .11, *d* = .22, or help-seeking, Time 1: *b* = -.03, *t* = -.29, *p* = .77, *d* = .03, Time 2: *b* = -.05, *t* = -.37, *p* = .71, *d* = .05. This finding suggests that the intervention may not have improved empowerment for first-generation students because, in the absence of the intervention in these lower-resourced institutions, they did not experience less empowerment than their continuing-generation peers.

**Does Difference-Education Improve Comfort with Social Group Difference in Lower-resourced Institutions and is it Unique in its Ability to do so?**

Hypothesis 2 predicted that the benefits of difference-education for comfort with social group difference would extend to lower-resourced institutions. In particular, we expected it would have unique effects, such that difference-education would improve students’ comfort with social group difference compared to the control condition and social-belonging intervention. We did not expect that the social-belonging condition would differ from the control condition.

To test this hypothesis, we tested two regression models (at Time 1 and Time 2) for each outcome with model predictors and the standard set of covariates. Generation status was also dummy coded in a manner identical to our previous analyses. However, we dummy coded intervention condition to contrast difference-education versus the control (difference education = 0, social-belonging = 0, control = 1) and difference-education versus social-belonging (difference education = 0, social-belonging = 1, control = 0). A full report of statistics for these regression models (including descriptive statistics and the models without covariates) can be found in Appendix F of the supplemental materials.

At Time 1, supporting Hypothesis 2, first-generation students in the difference-education intervention reported significantly more comfort with social group difference compared to those in the control condition, *b* = .16, *t* = 2.35, *p* = .02, *d* = .23 (see Figure 3). Contrary to Hypothesis 2, although the pattern was in the predicted direction, first-generation students in the difference-education intervention did not report more comfort with social group difference compared to the social-belonging intervention, *b* = .09, *t* = 1.20, *p* = .23, *d* = .15. Also consistent with our expectations, first-generation students in the social-belonging intervention did not differ in comfort with social group difference compared to those in the control, *b* = .07, *t* = .90, *p* = .37, *d* = .10.[[21]](#footnote-22) In contrast, continuing-generation students in the difference-education intervention did not report more comfort with social group difference than those in the control, *b* = -.02, *t* = -.22, *p* = .83, *d* = .03, or those in the social-belonging condition, *b* = .04, *t* = .59, *p* = .55, *d* = .07. The interaction between intervention condition and generation status did not reach statistical significance, *F* (2, 852)= .1.70, *p* = .18, ηp2 = .004.



**Figure 3**. Mean of first-generation and continuing-generation students’ comfort with social group difference across conditions at Time 1. Conditional means are displayed, error bars represent +/- 1 SE of the mean.

At Time 2, first-generation students in the difference-education intervention did not differ in their comfort with social group difference compared to those in the control condition, *b* = .08, *t* = 1.00, *p* = .32, *d* = .13, or social-belonging intervention, *b* = -.02, *t* = -.21, *p* = .83, *d* = .03. The

same pattern was evident for continuing-generation students (difference-education vs. control: *b*

= -.05, *t* = -.61, *p* = .54, *d* = .08; difference-education vs. social-belonging: *b* = .07, *t* = .76, *p* = .45, *d* = .11). The interaction between the intervention condition and generation status was not significant, *F* (2, 638)= .1.62, *p* = .20, ηp2 = .01.

**Discussion**

**Summary**

The present research asked two key questions about whether difference-education’s benefits extend to lower-resourced institutions. First, is difference-education effective in improving first-generation students’ academic performance in lower-resourced institutions, and does it do so by increasing their empowerment? Second, does difference-education improve comfort with social group difference in lower-resourced institutions, and is it unique in its ability to do so? Across four lower-resourced institutions, overall, we found that some of the benefits of difference-education extend to lower-resourced institutions, and some do not. Moreover, we found partial evidence that difference-education uniquely improves comfort with social group difference compared to a social-belonging condition.

Hypothesis 1 predicted that the academic performance benefits of the difference-education and social-belonging interventions would extend to lower-resourced institutions. Supporting Hypothesis 1, we found that both interventions improved first-generation students’ academic performance (i.e., GPAs and qualification for academic honors) compared to the control condition. However, they only did so for the fall term of the first year (i.e., soon after the intervention) and did not persist through the spring term. These results are similar to findings of Murphy and colleagues (2020) who tested the effects of a social-belonging intervention in broad access institutions and found that GPA benefits only occurred for the semester immediately following the intervention. Together, these findings show that social-psychological interventions can be beneficial for students in lower-resourced institutions. At the same time, they also suggest that the academic performance benefits in lower-resourced (vs. higher-resourced) institutions are less robust and more susceptible to “intervention fadeout” (Bailey et al., 2017; Bailey et al., 2020). In lower-resourced institutions, these types of one-time social-psychological interventions may therefore require “booster interventions,” as well as more university-supported efforts to sustain them.

We hypothesized that the academic performance benefits of difference-education among first-generation students would be due to an increase in empowerment. Contrary to this hypothesis, we found no evidence that this was the case. In previous studies in higher-resourced institutions, research found that empowerment (e.g., efficacy, resource-seeking; Stephens et al., 2014; Townsend et al., 2019) helped to explain how difference-education produced academic performance benefits for first-generation students. However, in this study, the intervention did not improve first-generation students’ empowerment, and thus did not play a mediating role. One possible reason why we did not find effects on empowerment is that psychological barriers (e.g., a lack of empowerment) may be less likely to occur among first-generation students in lower-resourced compared to higher-resourced institutions. For example, as we explained in the introduction, the presence of greater socioeconomic diversity in lower-resourced institutions may lead first-generation students to feel more at ease or comfortable in the college environment and therefore more empowered to take advantage of the resources available to them. Our data supports this idea: in contrast to previous findings in higher-resourced institutions, in the control condition, we did not find the typical social class gap in empowerment.

Hypothesis 2 predicted that the benefits of difference-education on comfort with social group difference would extend to lower-resourced institutions and that difference-education would uniquely improve this outcome compared to a social belonging intervention. Supporting Hypothesis 2, we found that the difference-education intervention, but not the social-belonging intervention, significantly improved comfort with social group difference compared to the control condition. The social-belonging intervention did trend towards increasing comfort with social group difference relative to the control, but this effect was not statistically significant and was half the size of the effect of the difference-education intervention (*b* = .16 vs. *b* = .07). However, as with GPA, the difference-education intervention only improved this outcome for the fall term of the first year and did not persist through to the spring term. Altogether, these results provide partial evidence that the benefits of difference-education for comfort with social group difference extend to lower-resourced institutions.

**Theoretical Contribution**

The partial support we found for our hypotheses provides important and novel theoretical insights about the potential to extend social-psychological interventions to lower-resourced institutions. The first phase of research on social-psychological interventions focused on establishing that these interventions *can* benefit students academically (Walton & Wilson, 2018). Now that the benefits of social-psychological interventions have been documented, in the second phase, it is critical to uncover the contextual factors that facilitate or hinder their efficacy. The current study is the first to examine whether the previously observed benefits of difference-education in higher-resourced institutions extend to institutions that have fewer resources. It is important to understand how effective these interventions are in lower-resourced institutions because these institutions are likely to have both more structural barriers and fewer psychological barriers compared to higher-resourced institutions. Examining difference-education in lower-resourced institutions can therefore help to begin to uncover how and to what extent these contextual differences impact the intervention’s efficacy.

Our findings suggest that the context of the intervention (i.e., financial resources available) matters. Consider the different effects that we found for academic performance and comfort with social group difference in higher-resourced compared to lower-resourced institutions. In higher-resourced institutions, previous research has found that difference-education’s benefits for academic performance and comfort with social group difference persist until the end of college (Townsend et al., 2021). In contrast, we found that in lower-resourced institutions, the effects for both of these outcomes did not persist beyond the first term. This finding is theoretically important because it suggests that difference-education’s benefits persist less in lower-resourced compared to higher-resourced institutions. Consistent with the literature on “intervention fade-out,” which highlights the key role of institutional constraints and opportunities in the educational context (Bailey et al., 2017, 2020), we suggest that one reason fade-out is more likely to occur in lower-resourced compared to higher-resourced institutions is because first-generation students face far more structural barriers (e.g., financial constraints) in these settings. Our findings suggest that social-psychological interventions in lower-resourced institutions may need “booster” interventions to help maintain the message in the face of these structural barriers. Alternatively, social-psychological interventions in these contexts may be most effective when delivered in tandem with other types of structural interventions (e.g., providing money for meeting basic needs and/or paying for tuition; see Stephens, Markus, & Fryberg, 2012).

Next, consider the different effects that we found for empowerment in higher-resourced compared to lower-resourced institutions. In higher-resourced institutions, previous research has found consistent evidence that first-generation students who participate in difference-education improve their academic performance, in part, because the intervention increases their sense of empowerment. In lower-resourced institutions, on the other hand, we found no evidence of any empowerment benefits either immediately after the intervention or at the end of the first year. As noted in the discussion above, these results suggest that psychological barriers such as empowerment may play less of a role in these lower-resourced institutions, or that a different type of empowerment may occur.

Beyond the new intervention context, another major theoretical advance is that this study is one of the first to directly compare the effects of two similar social-psychological interventions that provide distinct lay theories. By comparing these interventions, we were able to examine whether providing a contextual theory of difference produces different outcomes than the lay theory conveyed by a social-belonging intervention. Because a difference-education intervention—but not a social-belonging intervention—provides a contextual theory, we theorized that difference-education would improve students’ comfort with social group difference more than the control condition and the social-belonging intervention. Our results provided some initial support for this hypothesis: at Time 1, the difference-education intervention—but not the social-belonging intervention—improved comfort with social group difference compared to the control condition. This suggests that the content of the intervention’s particular lay theory may indeed impact the intervention’s effects on comfort with social group difference. However, the unique effects of difference-education on comfort with social group difference did not persist through the end of the year.

**Limitations and Future Directions**

One limitation of the current study is that we had a large number of participants (i.e., 287 of 1249 [23.0%]) who spent less than 1 minute reading the intervention materials. Based on previous studies in higher-resourced institutions, we did not anticipate this issue. Indeed, in the most comparable previous difference-education intervention delivered online (Townsend et al., 2019), only 11 of the 133 (8.3%) participants spent less than 1 minute engaging with the materials. Thus, compared to prior interventions in higher-resourced contexts, we found that participants in lower-resourced contexts spent less time engaging with the intervention materials. Although this finding was unexpected, it is an important contribution to the literature on intervention science, as it suggests that participants’ engagement with intervention materials differs across institutional contexts.

Losing a significant portion of our sample meant that we no longer had the statistical power to compare intervention effects across the four different lower-resourced institutions. Moreover, we were not able to examine other possible moderators of the interventions’ effects (e.g., full or part-time student status). However, by considering the data across all four sites together, we still had an adequately powered sample size (*nT1* = 893; nT2 = 667) to detect the overall effects of the interventions in lower-resourced institutions. In fact, this sample size was over three times larger than any other difference-education study to date.

Beyond the question of statistical power, one potential concern that we mentioned earlier is that more participants were excluded from the social-belonging condition than from the other two conditions. Thus, although our effects in the social-belonging intervention were quite consistent with the findings of Murphy and colleagues (2020), we suggest results from the social-belonging intervention should be interpreted with caution. Another potential concern is the impact of these exclusions on the representativeness of our sample. Most notably, students excluded from our sample seemed to have lower academic performance (e.g., lower high school GPAs and standardized test scores before college) than those included. Because the intervention materials were not able to effectively engage these lower performing students, it is unclear whether the benefits of difference-education would extend to these students. It is possible that difference-education may only be effective among the higher performing students at lower-resourced institutions. Despite this potential limitation, we still believe that the results are important as they clearly demonstrate that difference-education can benefit some students in lower-resourced institutions.

This unexpected finding—i.e., that students engaged less with the intervention materials in lower-resourced (vs. higher-resourced) universities—also has important practical implications. Specifically, this finding suggests that researchers and practitioners may need to take additional steps (e.g., convey stories via video or on social media) to ensure that students in lower-resourced institutions more thoroughly attend to and engage with the intervention materials. Indeed, if students in lower-resourced institutions confront more structural constraints (e.g., less need-based financial support) than those in higher-resourced institutions, they may have additional demands on their time and interruptions (e.g., family to care for) that could limit their ability to focus on the intervention materials. Future research should explore this possibility and also test strategies for creating higher levels of engagement with intervention materials in lower-resourced university contexts.

Future research is also needed to compare the benefits of difference-education across different types of lower-resourced institutions, such as community colleges versus less selective state colleges. In this future work, it will be important to more precisely identify which contextual features impact the effectiveness of difference-education. For example, research should consider the specific impact of an institution’s amount of socioeconomic diversity and also consider how having fewer university-level resources (e.g., less access to tutoring) may limit students’ opportunities to change their behavior (e.g., resource-seeking). It will also be critical to better understand how the institutional context shapes the mechanism through which difference-education benefits students. For example, in lower-resourced settings, does a different type of empowerment play a mediating role, or does another process explain the intervention’s benefits?

**Conclusion**

Most first-generation students in the U.S. obtain higher education in lower-resourced institutions, yet this important context has been notably absent from the research on interventions designed to benefit them. This lack of understanding of lower-resourced university contexts may limit the development of theories of how interventions produce their benefits, as well as reduce our understanding of when such benefits are likely to occur. The present research asked whether difference-education’s two key benefits—academic performance and comfort with social group difference—extend to lower-resourced institutions. Overall, we found that difference-education’s benefits do indeed extend to lower-resourced institutions, but they are far more short-lived than in higher-resourced settings. This represents a significant theoretical advance in our understanding of how the context of an intervention can facilitate or hinder its impact. To date research on social-psychological interventions has shown that they can benefit students in important and lasting ways. In the next phase, researchers and practitioners must move beyond these questions of *whether* they can work to more fully examine *when and how* these interventions work in different types of contexts.

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1. We had initially hoped to compare our results across the different institutions in our sample (e.g., community college compared to four-year university). However, due to the problems with sample size noted below, we collapsed across the four institutions. All four institutions had fewer resources than the contexts where prior difference-education interventions have been delivered, i.e., they were *relatively* lower-resourced. Future research could also compare institutions based on more objective standards for “low levels” of resources. [↑](#footnote-ref-2)
2. Our pre-registration also included exploratory hypotheses for the different types of institutions (i.e., community college vs. four-year university). However, due to our smaller than expected sample of participants who engaged with the intervention materials, we were not able to compare students’ outcomes by university type. [↑](#footnote-ref-3)
3. We did not pre-register an apriori hypothesis regarding the mechanism through which the social-belonging intervention would improve first-generation students’ academic performance in lower-resourced institutions. However, given previous results and theorizing about social-belonging, our analyses test social fit and empowerment as potential mediators. See supplemental materials Appendix G (social fit) and H (empowerment). [↑](#footnote-ref-4)
4. The current article uses the newer term *comfort with* *social group difference* (Townsend et al., 2021), rather than the older term from our pre-registration, *intergroup outcomes*. The term *comfort with social group difference* refers to the same set of measures that we conceptualized as intergroup outcomes in the pre-registration. [↑](#footnote-ref-5)
5. Our pre-registration did not explicitly state that there would be no difference in comfort with social group difference between the social-belonging and control condition, but finding no difference is consistent with our theorizing that difference-education will have a unique effect. [↑](#footnote-ref-6)
6. Given one university in our sample (Institution 1) was relatively higher-resourced than the other three, we examined whether results differed between the universities based on their relative amount of resources (i.e., higher-resourced university vs. lower-resourced universities). We found no evidence of moderation based on this variation (see Appendix A in the supplemental materials). [↑](#footnote-ref-7)
7. These numbers for the previous research exclude two outliers who spent a very long time (e.g., days) reading the stories and thus skewed the data. When including these outliers, the mean time spent was 59.6 minutes and the median time spent was 4.6 minutes. [↑](#footnote-ref-8)
8. We also calculated effects using an “intent-to-treat” approach, which included all participants in the analyses, and “complier average causal effect” approach (Peugh et al., 2017; Schochet & Chiang, 2009). See supplemental materials, Appendix D. [↑](#footnote-ref-9)
9. The intervention materials (i.e., the stories) were approximately 1371 words on average across conditions. Since the average adult reads 228 words per minute (Trauzettel-Klosinski & Dietz, 2012; see also Rayner, 1998), it would take an average of 5 minutes to read all the stories. The median amount of time participants spent reading the intervention materials was 3.1 minutes. We reasoned, however, that participants only had to read a few stories to receive the message of the interventions. This lenient cutoff provides a conservative test of our hypotheses, as the intervention benefits should be less likely to occur among participants who spent relatively less time reading the stories. Our results were robust to different choices of cutoff criteria (i.e., at least 10, 20, or 30 seconds on two stories; at least 10, 20, or 30 seconds on three stories; at least 10 seconds on each story). [↑](#footnote-ref-10)
10. Results for fall GPA did not differ when including the 45 participants who were enrolled in the fall term but were not enrolled in the spring term. [↑](#footnote-ref-11)
11. At Time 1, there were 148 from the Institution 4; 444 participants from Institution 1; 62 from Institution 3; and 239 from Institution 2. At Time 2, there were 93 from Institution 4; 352 participants from the Institution 1; 36 from Institution 3; and 185 from Institution 2. [↑](#footnote-ref-12)
12. These numbers did not add up to 100% because participants could select more than one race or ethnicity. [↑](#footnote-ref-13)
13. Some schools were on the quarter system and therefore had three quarters of GPA data: fall, winter, and spring. Since the winter and spring quarters covered a time frame similar to that covered by the spring semester, the spring term GPA included the combined GPA for both winter and spring quarters. [↑](#footnote-ref-14)
14. We also measured social fit as a potential mediator. The measure of social fit is reported in Appendix E and analyses of this measure are reported in Appendix G in the supplemental materials. [↑](#footnote-ref-15)
15. In addition to the measures reported here, we also measured *perceived diversity*, *appreciation of differences* in the university, and *self-construal overlap* with family and friends from home. *Perceived diversity* and *appreciation of differences* captured students’ perceptions of how their universities handle diversity, and thus, were conceptually distinct from the measures of comfort with social group difference. None of these measures yielded significant differences across conditions. Findings for these measures are reported in Appendix I. [↑](#footnote-ref-16)
16. We could not include analyses of dropout in this study for two reasons. First, the rates of dropout were very low in three of four sites. Second, in the site with the highest rates of missing students (i.e., the community college), we could not distinguish between students who had dropped out and those who had transferred to another institution. [↑](#footnote-ref-17)
17. Results were identical when analyzing scores that were not standardized within school. [↑](#footnote-ref-18)
18. An alternative approach to analyzing this data is to conduct multilevel models with school assigned as an intercept-only random effect. However, because outcomes were standardized within schools, there was minimal variation in the intercept of each outcome across schools. Consequently, the results from these multilevel models were largely identical to the models we reported. [↑](#footnote-ref-19)
19. To look at the interaction between intervention condition and term, we simultaneously examined each student’s fall and spring GPA score. We then used a linear mixed model and assigned student as a random effect to account for the dependency between fall and spring GPAs. Degrees of freedom and p-values were estimated using the Satterthwaite approximation (Luke, 2017). [↑](#footnote-ref-20)
20. As noted above, for schools on a quarter system, the “spring term” included the combined GPA for both winter and spring quarters. [↑](#footnote-ref-21)
21. This contrast was not planned as part of our main analyses, but was an additional contrast that we conducted to explore the differences between conditions (social-belonging = 1; difference-education = 0; control = 0). [↑](#footnote-ref-22)