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Exposure to peers' pro-diversity attitudes increases inclusion and reduces the achievement gap

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There is a dearth of empirically validated pro-diversity methods that effectively create a more inclusive social climate. We developed two scalable interventions that target people's perceptions of social norms by communicating to them that their peers hold pro-diversity attitudes and engage in inclusive behaviours. We tested the interventions in six randomized controlled trials at a large public university in the United States (total $n = 2{,}490$). Non-marginalized students exposed to our interventions reported more positive attitudes toward outgroups and greater appreciation of diversity, whereas marginalized students had an increased sense of belonging, reported being treated more inclusively by their peers and earned better grades. While many current pro-diversity initiatives focus on raising awareness about the fact that implicit bias and subtle discrimination are widespread, our findings spotlight the importance of drawing people's attention to their peers' pro-diversity values and attitudes to create positive and lasting effects on the social climate.

Fostering positive relationships between members of different social groups is a major challenge of the twenty-first century. Global warming, growing populations and the depletion of natural resources will increase the number of migrants across the globe, increasing diversity in many countries[1]. In the United States, White Americans will soon be a numerical minority[2]. Despite increasing in number, members of marginalized groups still suffer poorer life outcomes. For example, many intelligent and motivated individuals belonging to these groups perform poorly at, and drop out of, educational institutions[3]. The social climate seems to play a key role in this: the more inclusive the climate, the higher the retention and persistence among marginalized college students[4,5]. In fact, students' sense of belonging has been tied to key educational outcomes such as academic self-concept, self-efficacy, intrinsic motivation and academic success[5–7]. Creating an inclusive climate in universities—that is, getting students to get along with, reach out to, work in teams with, and behave in a welcoming and respectful manner towards individuals from different social backgrounds—is one of the most pressing issues of our time.

Despite this urgency, researchers have come up with few methods that reliably create a more inclusive climate. Diversity workshops appear to be ineffective[8], with some researchers reporting backlash effects[9]. Implicit bias training generally does not have effects that last for more than a day[10] and seems to have little or no impact on discriminatory behaviours[11]. Many pro-diversity initiatives have been implemented in schools, colleges and organizational settings, but few have been systematically tested[12]. In a field that is dominated by 'best practices' and ideological discussions, few heed the call for rigorous evaluation of methods to promote inclusion[6].

In light of this situation, it is surprising that diversity scientists and practitioners have given little attention to an approach that has been proposed by several researchers: social norms messaging[13,14]. This approach consists of communicating to people that most of their peers hold certain pro-social attitudes or tend to engage in certain pro-social behaviours, that is, that these attitudes or behaviours are 'descriptively normative'. Such communications shape people's perceptions of what is common and socially acceptable, which in turn influences their own attitudes and behaviours[15].

Social norms are customary standards or guides for behaviour, attitudes and beliefs that are shared by a group[16]. They have a powerful impact because people want to fit in with their peers and will modify their own attitudes and behaviours to align with what they perceive to be socially normative[17,18]. Research has found that simply perceiving a behaviour to be descriptively normative (common) predicts the extent to which people engage in that behaviour, regardless of how many people actually engage in the behaviour[15]. Social norms messaging entails providing individuals with information about their peers or relevant others. Relying on the power of perceived norms, such messaging has the potential to change people's understanding of group norms, their place in the group and the evaluative significance of the content of a persuasive message[19].

Social norms messaging can effectively reduce the abuse of alcohol and tobacco among college and high school students[20–22]. It also has been used to enhance environmental conservation by increasing towel reuse in hotels[23], reducing residential energy use[24] and decreasing residential water use[25]. Although social norms messaging has been shown to be effective in a variety of domains, it has yet to be shown whether such an approach can be leveraged to promote inclusion in real-world settings.

Some research suggests that being told one's peers endorse non-stereotypical views of Black Americans can lead to less stereotyping of Black Americans[26] and overhearing a peer condemn racism can reduce the expression of racist opinions[27]. The public expression of prejudice toward social groups is highly correlated with social approval of that expression[28]. By simply describing the attitudes and behaviours of people's peers, social norms messages emphasize autonomy and personal choice and such a framing has been shown to be more effective than messages that present non-discrimination as a moral and legal obligation that people must comply with[29]. Furthermore, some researchers have attempted to leverage social norms to reduce bullying in schools by training well-connected students to publicly speak up against conflict at school[30]. Although these researchers found no differences in social

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norms between treatment and control schools, the training led to fewer disciplinary reports of student conflict at treatment schools.

Distinct from past research, the research described below focuses on the effects of making salient pro-diversity descriptive norms, which characterize normative practices and values of individuals within an institution rather than presenting an institutional practice[31]. In the present paper, we propose that social norms messaging can be used to create a more inclusive climate and reduce the 'achievement gap', that is, the difference in academic performance between individuals with privileged versus marginalized social identities. Using social marketing principles[32], we developed two interventions designed to promote positive attitudes towards social outgroups, increase commitment to diversity, strengthen feelings of social belonging and facilitate interactions in which people of all backgrounds feel welcome and respected. We tested our interventions in a series of six randomized controlled trials conducted in a university setting. About one-third of the student participants were from 'marginalized' groups (part of an ethnic or religious minority).

Experiment 1 was a proof-of-concept study. We created a professional-quality poster conveying the social norm that most students at the university where the research was conducted endorse diversity and try to behave in an inclusive way (the numbers reported on the poster were based on real data; Supplementary Information). Participants were exposed to either our poster or a neutral control poster in an experimental waiting room. After a short filler task, they were asked to complete an ostensibly unrelated survey with several scales assessing constructs related to climate and intergroup attitudes.

In experiment 2, we randomly assigned university classrooms to experimental conditions by putting up several of our social norms posters (social norms condition) or no poster (control condition) during the first 5 weeks of the semester. Students completed a survey assessing a variety of climate-related outcomes in weeks 10–12 of the semester.

For experiments 3–6, we created a 5-min video (Supplementary Information). About half of the scenes in the video were unscripted interviews with students who expressed how much they appreciated the diversity on campus and that they enjoyed getting to know people from other social groups. The other half of the video consisted of short scenes with local scientists and diversity specialists who reported research showing that most students on campus attempt to behave in a non-prejudiced and inclusive manner. They acknowledged that blatant acts of discrimination undoubtedly occur on campus, but cited data suggesting that these acts seemed to be attributable to a numerical minority of students, whose values were fundamentally at odds with those of most members of the campus community.

In experiment 3, students in classrooms were exposed to our social norms video on the first day of the semester (or not) and completed the outcome survey 10–12 weeks later.

In experiment 4, we wanted to see if the beneficial effects of the social norms video generalize to a different setting, verify if the effects were actually due to a change in perceived social norms and assess behavioural intentions. The study took place online and participants were randomly assigned to watch either our social norms video or a control video about cranberry production. Watching a video on diversity may have multiple effects: it may change participants' perceptions of peer norms and it may change their impression of how committed the university is to diversity. Our theoretical analysis suggests that the effect of the social norms video on attitudes and behaviours should be due to a shift in perceived peer norms. We thus included, in addition to the standard outcomes used in experiments 2 and 3, the following two process measures: participants' perceptions of peer norms and of the university's commitment to diversity. We expected the beneficial effects of the social norms video on the standard outcome measures to be mediated by the former but not by the latter process measure. Finally, to better understand whether the intervention affected behavioural intentions, we asked participants to indicate their interest in a number of campus programmes. One of these was a social justice course, the others were unrelated to intergroup relations. We expected participants in the social norms condition to report greater intention to participate in the social justice course than in the control condition.

Experiment 5 had multiple purposes. First, we wanted to ensure that the beneficial effects of our social norms video were not driven by the fact that instructors showed a video on diversity in their classrooms, so we included a third condition in which students viewed a different video on bias and micro-aggressions. Second, we wanted to see if the effects generalized to a larger set of outcomes. We thus included several additional scales measuring various intergroup constructs, some of which were indicative of an inclusive climate (for example, intergroup anxiety) and some of which were not (for example, support for pro-diversity policies). Third, we wanted to provide more direct evidence for the idea that students from non-marginalized groups actually changed their behaviours toward their marginalized peers as a result of the social norms video being shown in their classrooms. We thus asked participants to rate their peers' behaviours. We also included a much larger sample so that we could conduct analyses in which we included only the responses of students from marginalized groups—defined as racial/ethnic and religious minorities—and examine the effect of our intervention on these students' sense of belonging and well-being. Fourth, we wanted to see if perceived social norms played an equally important role in a more natural setting and we therefore included the above-mentioned process measures in the outcome survey. As in the previous experiment, we expected the beneficial effects of the social norms video on the outcome measures to be mediated by participants' perceptions of peer norms but not by their perceptions of the university's commitment to diversity.

In experiment 6, we sought to determine whether the beneficial effects of the social norms video on classroom climate had downstream effects on a consequential outcome for marginalized students: the academic achievement gap. We recruited instructors of STEM (science, technology, engineering and mathematics) courses that had multiple sections but in which all students in the course took the same exams. We limited ourselves to courses that historically had achievement gaps. In half of the sections, the instructors showed our social norms video on the first day of class, whereas the other half of the sections served as control (the syllabus included a short statement about diversity). We obtained student grade information at the end of the semester.

Results

Experiment 1. We computed outcome scores by combining the items belonging to the same scales. We also formed an 'attitudes toward minorities score' by averaging across the feeling thermometer ratings for Blacks, Hispanics, Arabs and gay men (see Methods). Supplementary Information Table 1 shows the descriptive statistics, Cronbach's alphas and correlations for all the outcome scores. For this and all subsequent experiments, normality and equal variance of outcome scores were examined visually but not formally tested (Figs. 1, 3 and 4). The six inclusive climate variables—positive traits, modern racism, internal motivation to respond without prejudice, rejection of racism, rejection of discrimination and attitudes toward minorities—clustered tightly together. We submitted these variables to an exploratory factor analysis. The scree plot suggested a one-factor solution and all outcome scores loaded highly (>0.491) on the first unrotated factor. We formed an 'inclusive climate score' by standardizing the six outcome scores and then averaging across them (Cronbach's $\alpha = 0.85$). If participants had missing values on any of the six variables, the remaining variables were averaged (and unless otherwise mentioned the same is true for all experiments

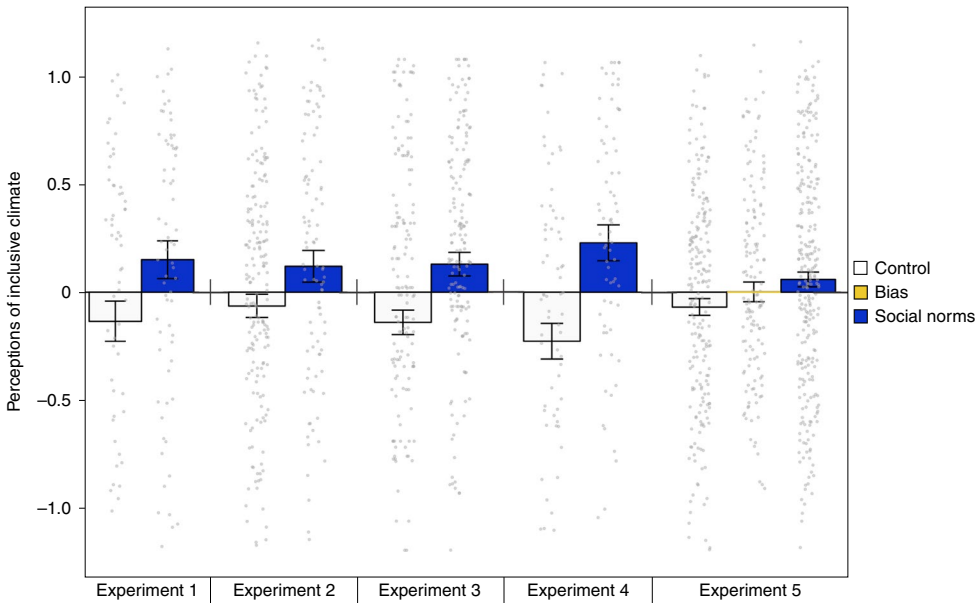

Fig. 1 | Perceptions of inclusive climate as a function of experimental condition in experiments 1–5. Participants who were exposed to information about their peers' pro-diversity attitudes and inclusive behaviours (social norms condition) scored higher on a variety of indicators related to the inclusiveness of the climate than participants in the control condition or, in experiment 5, than participants who saw a video about bias. The inclusive climate score plotted on the *y* axis was computed by first standardizing the scores of the individual indicators and then averaging them. We plotted the data for a range −1.2 to +1.2. As a result, 98 of the 1,543 data points (6.4%) with extreme values are not represented. The effect sizes are: $d=0.381$ (experiment 1, $n=139$), $d=0.230$ (experiment 2, $n=300$), $d=0.375$ (experiment 3, $n=329$), $d=0.644$ (experiment 4, $n=147$) and $d=0.199$ (experiment 5, $n=628$, control versus social norms). See Results and Extended Data Figs. 2–5 and 7 for full statistical results. Error bars, ±1 s.e.m.

described). A power analysis revealed that we had 0.833 power to detect a medium effect ($d=0.5$) and 0.216 power to detect a small effect ($d=0.2$). We conducted an independent samples *t*-test. Like all other analyses reported in this paper, the test was two-tailed and analyses were not performed blind to the conditions of the experiment. There was a statistically significant difference between experimental conditions on the inclusive climate score, $t(137)=2.229$, $P=0.027$, $d=0.381$, 95% confidence interval, CI [0.032, 0.536] (Fig. 1 and Extended Data Fig. 2).

To demonstrate that our results were not affected by our specific choice regarding the variables we included in the inclusive climate score, we also formed a 'total score' for which we combined all outcome variables included in the experiment: the six variables mentioned earlier and feeling accepted, external motivation to respond without prejudice, perceived variability and perceived differences. An independent samples *t*-test revealed a statistically significant condition effect on the total score, $t(137)=2.083$, $P=0.039$, $d=0.356$, 95% CI [0.010, 0.378]. The significant condition effects on the inclusive climate score and on the total score show that participants who were exposed to our social norms poster were considerably more inclusive—endorsed fewer racist beliefs, were more highly motivated to respond in an unprejudiced manner and were more likely to reject discrimination—than participants who saw our control poster. Admittedly, not all of the individual outcome scores showed significant effects individually (Extended Data Fig. 2). It should be noted, however, that some participants may not even have looked at the poster that was put up in the waiting room.

We divided our sample in two groups: Caucasian (non-Hispanic) participants who were either Christian or had no religion were considered 'privileged', whereas all other participants were considered 'marginalized'. Two 2×2 ANOVA with 'condition' and 'privilege' as independent variables revealed that the condition effect was not moderated by 'privilege', neither for the inclusive climate score nor for the total score (for both $P>0.30$), suggesting that privileged and marginalized individuals were equally affected by our social norms poster.

Experiment 2. We computed five outcome scores by averaging across items belonging to the same scales (appreciation of diversity, allophilia, climate, belonging and attitudes toward minorities). We submitted all outcome scores to an exploratory factor analysis. The scree plot suggested a one-factor solution and all five outcome scores loaded highly (>0.514) on the first unrotated factor. We formed an inclusive climate score by standardizing all five outcome scores and then averaging across them (Cronbach's $\alpha=0.81$). Supplementary Information Table 2 shows the descriptive statistics, Cronbach's alphas and correlations for all outcomes. A power analysis revealed that we had 0.991 power to detect a medium effect ($d=0.5$) and 0.411 power to detect a small effect ($d=0.2$). An independent samples *t*-test revealed that there was a statistically significant difference between experimental conditions on the inclusive climate score, $t(298)=2.016$, $P=0.045$, $d=0.230$, 95% CI [0.004, 0.360] (Fig. 1 and Extended Data Fig. 3). Participants who were exposed to our social norms poster had higher inclusive climate scores than did participants in the control condition. According to Cohen's classification[33], the effect is small, but it is worth noting that outcomes were assessed 10–12 weeks after the beginning of the study and that many students in the experimental condition may not have noticed our poster. Note also that the somewhat artificial labels for values of Cohen's *d* were developed for laboratory research in controlled settings, where effect sizes tend to be larger than in field research.

We used the same definition of 'privilege' as that used in experiment 1 to divide the sample into two groups. A 2×2 ANOVA with 'condition' and 'privilege' as independent variables revealed that the condition effect on the inclusive climate score was not moderated by 'privilege' ($P=0.123$). We ran a linear mixed-effects model in which we regressed the inclusive climate score on a fixed intercept and a by-classroom random intercept. The variance of the random intercept was small and non-significant, $s^2_{\text{random\_intercept}}=0.032$, Wald $Z=1.337$, $P=0.182$, suggesting that clustering by classroom was negligible and that there was no need to adjust the standard errors for the above-mentioned inferential tests.

Experiment 3. Since the outcome measures were the same as in experiment 2, our data analytic strategy was identical. We first computed outcome scores by combining the items belonging to the same scales. An exploratory factor analysis suggested a one-factor solution and all five outcome scores loaded highly (>0.415) on the first unrotated factor (Cronbach's $\alpha = 0.77$). We formed an inclusive climate score by standardizing and then averaging across all five outcomes (see Supplementary Information Table 3 for the descriptive statistics, Cronbach's alphas and correlations for all of the outcomes). We had 0.995 power to detect a medium effect ($d = 0.5$) and 0.443 power to detect a small effect ($d = 0.2$). Participants' inclusive climate scores differed significantly between experimental conditions, $t(327) = 3.403$, $P = 0.001$, $d = 0.375$, 95% CI [0.113, 0.423] (Fig. 1 and Extended Data Fig. 4). Participants who were exposed to our social norms video on the first day of the semester had higher inclusive climate scores 10–12 weeks later than participants in the control condition. The effect is larger than in experiment 2, which may be because more students saw the video than saw the poster. This difference in effect size provides indirect support for the idea that a short video can be more effective than a poster at bringing across the message to students that most of their peers value diversity and try to create a welcoming climate for students from all backgrounds.

As in the previous experiment, the condition effect on the inclusive climate score was not moderated by 'privilege' ($P = 0.377$) and the clustering by classroom was small and negligible, $s^2_{\text{random\_intercept}} = 0.022$, Wald $Z = 1.310$, $P = 0.190$.

Experiment 4. As in experiments 2 and 3, we averaged across items belonging to each of the scales. On the basis of the results of an exploratory factor analysis (all factor loadings on the first unrotated factor >0.488; Cronbach's $\alpha = 0.80$), we combined the five standard outcome scores into a single inclusive climate score (Supplementary Information Table 4). We had 0.853 power to detect a medium effect ($d = 0.5$) and 0.228 power to detect a small effect ($d = 0.2$). There was a statistically significant difference between the two experimental conditions on participants' inclusive climate score, $t(145) = 3.870$, $P < 0.001$, $d = 0.644$, 95% CI [0.222, 0.687] (Fig. 1 and Extended Data Fig. 5). Participants who viewed our social norms video appreciated diversity more, had more positive attitudes toward outgroups, evaluated the climate more positively and reported an increased sense of belonging compared with participants who watched the control video.

Unlike in the previous experiments, a 2×2 ANOVA revealed that the condition effect on the inclusive climate score was stronger for privileged students than for marginalized students, $t(143) = 2.647$, $P = 0.009$, $d = 0.444$, 95% CI [0.177, 1.220]. We have no explanation for this effect. Note, however, that relatively fewer individuals from marginalized groups took part in this experiment ($n = 42$). Experiment 5 specifically examined the effects of our intervention on marginalized students.

To explore students' interest in, and likelihood of joining, various campus programmes we formed two scores. We averaged across the two ratings for the social justice course ($r = 0.76$) to form a 'joining social justice course score'. And we averaged across the six ratings for the other programmes ($\alpha = 0.77$) to form a 'joining other programmes score'. We then conducted a 2×2 mixed-model ANOVA with condition as the between-subjects factor (social norms versus control) and type of programme as the repeated measure (social justice course versus other programmes). The predicted interaction was just shy of conventional levels of significance, $F(1, 145) = 3.760$, $P = 0.054$, 95% CI [−0.004, 0.695]. Whereas participants in the control condition were less interested in joining the social justice course than the other programmes, $t(145) = 3.315$, $P < 0.001$, 95% CI [0.170, 0.663], participants in the social norms condition were just as interested in joining the social justice course as they were in joining the other programmes, $t(145) = 0.559$, $P = 0.577$, 95% CI [−0.177, 0.319].

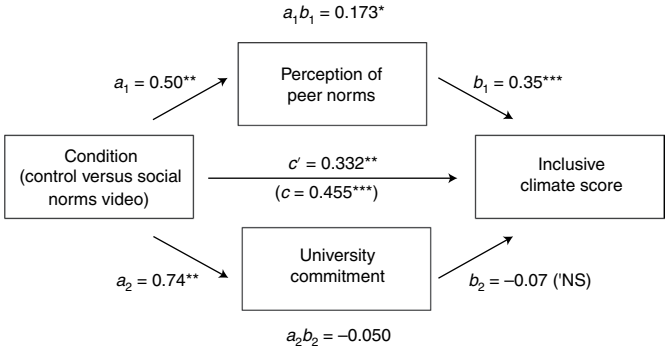

Fig. 2 | Results from the mediation analysis in Experiment 4. The results suggest that the effect of the social norms video on inclusive climate is probably due to a shift in perceived peer norms and not in their perceptions of the university's commitment to diversity ($n = 147$).The video affects how normative respondents perceive inclusive behaviours to be among their peers, and this perception in turn influences their own attitudes and behaviours. The numbers next to the arrows are unstandardized path coefficients. Estimates of the indirect effect, labelled a_1b_1 and a_2b_2, were obtained via non-parametric bootstrapping with 1,000 samples. The direct effect (c') and the total effect (c) are also reported. The indirect effect through perceptions of peer norms is statistically significant, $a_1b_1 = 0.173$, $z = 2.265$, $P = 0.023$, 95% CI [0.038, 0.332]. The indirect effect through university commitment is non-significant (NS), $a_2b_2 = -0.050$, $z = -1.139$, $P = 0.225$. 95% CI [−0.149, 0.032]. $^*P < 0.05$, $^{**}P < 0.01$, $^{***}P < 0.001$.

We conducted mediation analyses in which we divided the total effect of experimental condition on the inclusive climate score into three parts: the indirect effect through 'perceptions of peer norms', $a_1b_1 = 0.173$ [0.038, 0.332], $\text{s.e.m.}_{\text{bootstrap}} = 0.076$, $z = 2.265$, $P = 0.023$, the indirect effect through 'university commitment', $a_2b_2 = -0.050$ [−0.149, 0.032], $\text{s.e.m.}_{\text{bootstrap}} = 0.044$, $z = -1.139$, $P = 0.255$ and the direct effect, $c' = 0.332$ [0.119, 0.543], $\text{s.e.m.}_{\text{bootstrap}} = 0.106$, $z = 3.133$, $P = 0.002$ (Fig. 2 and Extended Data Fig. 6). The estimates of the effects, their 95% CIs and the standard errors are based on 1,000 percentile-bootstrapped samples. The fact that the former indirect effect is statistically significant, whereas the latter indirect effect is not, is consistent with the idea that the condition effect is driven by participants' perceived social norms, that is, by a shift in their perceptions of their peers' inclusiveness and not by their perceptions of the university's commitment to diversity.

Experiment 5. As in previous experiments, we computed an inclusive climate score by first standardizing, then averaging across all outcomes indicative of an inclusive climate: allophilia, climate, belonging, attitudes toward minorities, intergroup anxiety, physical health and emotional health. Note that these outcomes overlap partially but not fully with the standard outcomes used in experiments 2–4. In an exploratory factor analysis extracting a single factor, all variables had satisfactory loadings (all >0.328; Cronbach's $\alpha = 0.64$). To demonstrate that our results did not depend on the particular constructs that we had decided to include in the inclusive climate score we also computed a 'total score' that consisted of all outcome variables except the two hypothesized mediators, perceptions of peer norms and university commitment (all factor loadings on the first unrotated factor >0.205; Cronbach's $\alpha = 0.75$; Supplementary Information Table 5). We computed composite scores only for participants who completed at least 80% of the measures comprising them, leaving 628 participants (inclusive climate score) and 627 participants (total score) to be included in the analyses.

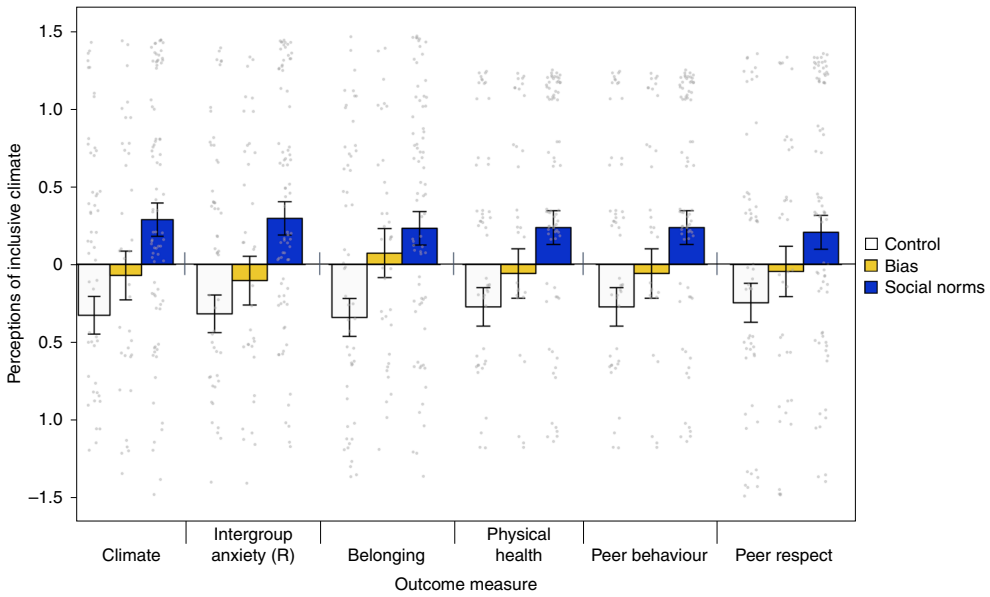

Fig. 3 | Perceptions of inclusive climate as a function of experimental condition among marginalized students in Experiment 5. The social norms video caused significant increases in climate-related outcomes for marginalized students compared to control. Data were plotted for a range −1.5 to +1.5. As a result, 123 of the 1,097 data points (11.2%) with extreme values are not represented in the figure. Intergroup anxiety was recoded so that higher values represent less anxiety. The effect sizes are $d = 0.574$ (climate), $d = 0.542$ (intergroup anxiety), 0.521 (belonging), 0.464 (physical health), 0.442 (peer behaviour) and 0.402 (peer respect). See Results and Extended Data Fig. 8 for full statistical results. Error bars, ±1 s.e.m. Number of marginalized students, $n = 184$. R, reverse-coded.

We examined our hypotheses in a series of one-way ANOVAs in which we tested both the overall condition effect (with 2 d.f.), as well as two dummy codes that contrast the no-exposure control condition to each of the two video conditions (0, 1, 0 and 0, 0, 1 for the control, bias and social norms conditions respectively; see ref. [34]). For each of the two contrasts, we had 1.00 power to detect a medium effect ($d = 0.5$) and 0.705 power to detect a small effect ($d = 0.2$). Students exposed to the social norms video had significantly higher inclusive climate scores than students in the control condition, $t(625) = 2.488$, $P = 0.013$, $d = 0.199$, 95% CI [0.027, 0.227], while those exposed to the bias video did not significantly differ from the control, $t(625) = 1.165$, $P = 0.245$, $d = 0.094$, 95% CI [−0.047, 0.185] (Fig. 1 and Extended Data Fig. 7). Students exposed to the social norms video also had significantly higher total scores than students in the control condition, $t(624) = 2.700$, $P = 0.007$, $d = 0.216$, 95% CI [0.033, 0.212], while those exposed to the bias video did not significantly differ from control, $t(624) = 1.472$, $P = 0.141$, $d = 0.119$, 95% CI [−0.026, 0.182] (Extended Data Fig. 7). Mediational analyses suggest that this effect is driven by a shift in perceived peer norms, rather than by a different perception of the university's commitment to diversity (Extended Data Fig. 6).

Because of the larger sample size in experiment 5, we were able to conduct analyses in which we included only students from marginalized backgrounds. We used the same definition of 'marginalized' as in the previous experiments (that is, all religious minorities and non-Whites; $n = 184$). For each of the two contrasts, we had 0.920 power to detect a medium effect ($d = 0.5$) and 0.270 power to detect a small effect ($d = 0.2$). Among students from marginalized backgrounds, the social norms video had a strong and significant positive effect on inclusive climate scores, $t(178) = 3.904$, $P < 0.001$, $d = 0.585$, 95% CI [0.162, 0.492] (Extended Data Fig. 8). The beneficial effects of the social norms video (compared to control) were consistently larger than those of the bias video, which seemed to have a weak impact at best (compared to control). Most importantly, marginalized students in courses that were exposed to the social norms video reported that their peers behaved significantly more inclusively, $t(180) = 3.104$, $P = 0.002$, $d = 0.463$, 95% CI [0.208, 0.934] and treated them with more respect, $t(177) = 2.734$, $P = 0.007$, $d = 0.410$, 95% CI [0.142, 0.876] (Fig. 3).

Unlike in the previous experiments, the condition effect (social norms video versus control) on the inclusive climate score was stronger for marginalized students than for privileged students, $t(617) = -4.353$, $P < 0.001$, $d = 0.351$, 95% CI [−0.692, −0.262]. Note that this interaction effect is in the opposite direction as in experiment 4. The findings suggest that the effects on marginalized students in experiment 5 are not simply due to marginalized students being exposed to the social norms video but rather to privileged students viewing the video and then changing their behaviour: students from marginalized backgrounds reported that their peers treated them more inclusively and with more respect.

The clustering by classroom was statistically significant, $s^2_{\text{random\_intercept}} = 0.025$, Wald $Z = 2.381$, $P = 0.017$. We completed the same analyses as those reported above, taking into account the non-independence due to classroom (Extended Data Figs. 9 and 10). In these analyses, the effects are comparable to those obtained in tests using the individual as the unit of analysis, but, due to the small number of clusters, the P values are generally larger than the P values reported above.

Internal meta-analysis experiments 1–5. To assess the robustness of the effect of the social norms manipulation, we conducted an internal meta-analysis[35]. We distilled the results of experiments 1–5, recording the standardized mean difference effect sizes found on the inclusive climate score. For experiment 5, we included the comparison between the control condition and the social norms condition. We submitted these effect sizes to an internal meta-analysis function in the R package metafor using a random effects estimation procedure. The standardized mean difference effect sizes for the individual studies ranged from 0.23 (experiment 5) to 0.64 (experiment 4). The meta-analysis yielded an overall effect size estimate of 0.33, which differed significantly from 0, $z = 5.510$, $P < 0.001$, 95% CI [0.214, 0.451] (Extended Data Fig. 1). This test provides strong

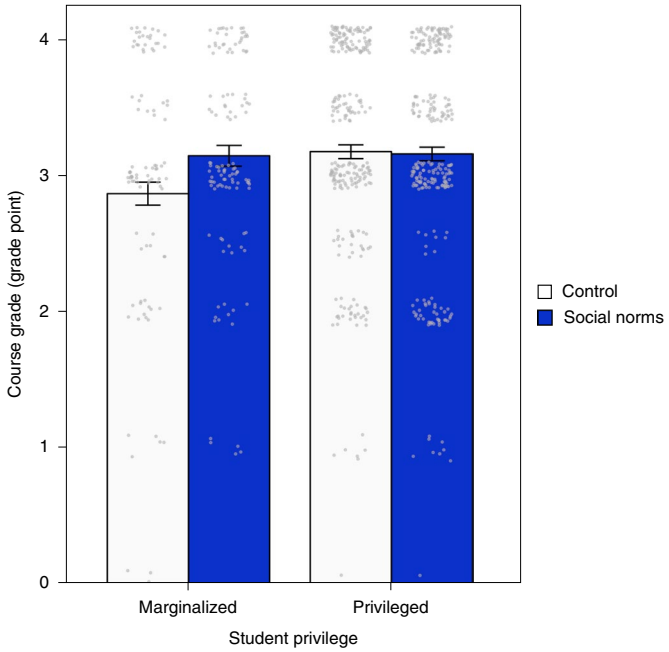

Fig. 4 | Course grades as a function of experimental condition and student privilege in experiment 6. Participants were students in STEM courses ($n = 763$). The social norms video led to a significant reduction in the achievement gap between privileged and marginalized students, $F(1, 759) = 4.772$, $P = 0.029$, $d = 0.155$, 95% CI [−0.560, −0.030]. Error bars, ±1 s.e.m.

evidence for the effect of our manipulations of social norms on the inclusive climate in classrooms.

Experiment 6. We conducted a 2×2 ANOVA with condition and privilege as independent variables and grades as the dependent variable. We used the same definition of marginalized as in previous studies: 218 marginalized students and 553 privileged students provided usable data. We had 1.00 power to detect a medium effect ($d = 0.5$) and 0.787 power to detect a small effect ($d = 0.2$). The predicted interaction was statistically significant, $F(1, 759) = 4.772$, $P = 0.029$, $d = 0.155$, 95% CI [−0.560, −0.030] (Fig. 4). Post-hoc tests revealed that in the control condition, marginalized students had significantly lower grades (mean = 83.69, s.d. = 10.78) than privileged students (mean = 86.77, s.d. = 8.35), $F(1, 759) = 9.757$, $P = 0.002$, $d = 0.227$, 95% CI [0.115, 0.502]. In the social norms condition, however, there was no significant achievement gap: marginalized students' grades (mean = 86.47, s.d. = 7.46) did not differ from privileged students' grades (mean = 86.61, s.d. = 7.84), $F(1, 759) = 0.022$, $P = 0.883$, $d = 0.011$, 95% CI [−0.167, 0.194].

The clustering by section was statistically significant, $s^2_{\text{random\_intercept}} = 11.495$, Wald $Z = 2.825$, $P = 0.005$. We thus tested whether the effect on students' grades held up when we accounted for non-independence due to classrooms (that is, by including a by-classroom random intercept and by-classroom random slope for privilege). When this random effect structure was included, there was a statistically significant difference between marginalized and privileged students in the control condition, $F(1, 9.967) = 7.639$, $P = 0.020$, 95% CI [0.229, 0.851], but there was no significant difference between the two groups of students in the social norms condition, $F(1, 11.582) = 0.463$, $P = 0.509$, 95% CI [−0.176, 0.359].

Discussion

Our research demonstrates the effectiveness of inclusive climate interventions with randomized controlled trials and delayed outcome measures. Our interventions have two particular strengths. First, they are quite scalable; it is easy to create a poster or a video communicating to people that their peers value diversity and try to behave in a welcoming way towards others. Such posters and videos can easily be disseminated on a large scale in a variety of settings (for example, universities, grade schools, organizations and community settings).

Second, the effects of our social norms interventions can easily be amplified by using multiple channels to communicate the same message. Imagine a campus on which students are not only exposed to our social norms video or poster, but where instructors talk about the frequency of inclusive behaviours on campus, the university leadership mentions most students' commitment to diversity, student organizations publicly distance themselves from all forms of bigotry and the university adopts an internal communication strategy that conveys to members of the campus community that most of their peers make an effort to treat others in a welcoming, respectful and inclusive way.

A common approach to creating an inclusive climate consists of raising awareness about bias. As part of this approach, it is communicated to students and employees that they and their peers have implicit biases and, without being aware of it, frequently engage in micro-aggressions and other discriminatory behaviours. Not only are such communications often unsupported by data[36], our research suggests that they probably have a detrimental effect. Telling people that their peers frequently engage in discriminatory behaviours is likely to create a less, rather than a more, inclusive climate[37].

Descriptive norms messaging is likely to be particularly effective if it validates the experiences of discrimination of students from marginalized groups. This is precisely what we did in our social norms video: the local scientists and diversity specialists explicitly state that acts of bigotry undoubtedly occur on campus and although most students hold pro-diversity attitudes and try to behave inclusively, this by no means implies that students from marginalized groups are no longer the target of discrimination. Without such acknowledgement, a descriptive norms message could adversely affect members of marginalized groups, leading them to blame themselves for negative experiences, or fail to detect biased treatment, in turn undermining the overall positive effect of the message[38].

Our research is not without limitations. The effects on some of the outcomes were small and sometimes non-significant. Some studies included outcome measures that were included for exploratory purposes. We slightly varied the outcome measures from one experiment to the next. We consider this aspect a strength because it contributes to the generalizability of our research, but some researchers might consider the variability in outcome measures a limitation. The outcome measures in experiments 1–5 were primarily self-reports. Although experiment 5 provides some evidence that members of non-marginalized groups actually changed their behaviour, this evidence is indirect and should be confirmed in future studies with behavioural outcome measures. In experiments 2, 3, 5 and 6, students were clustered in classrooms. We reported inferential tests based on analyses with the individual as the unit of analysis and, when the clustering by classroom was statistically significant, we also reported inferential tests from multilevel models where we took into account the non-independence due to classrooms. Our approach follows the guidelines by well-known experts in the field[39,40], but some researchers might argue that we should have reported only the results of the multilevel models. Note that failure to take into account clustering by classroom increases type I error rates. However, given that we replicated the effect in six consecutive experiments it is highly unlikely that our basic finding is a false positive[41].

We tested the effectiveness of our social norms interventions in a setting in which most individuals truly held egalitarian views and valued diversity. Thus, the pro-diversity norm was factual in the experimental environment and probably characteristic of most

university contexts. More research is necessary to determine how social norms messaging can be used in settings in which outgroup attitudes are more negative and intergroup relations are more conflictual. In such settings, it may be possible to focus people's attention on the widespread agreement with general statements about fairness (for example, '94% of the people in this county agree that it is wrong to discriminate against others based on race') or the messages could reference dynamic norms (for example, by suggesting that an increasing number of individuals now hold a certain attitude or engage in a certain behaviour[42]). A third solution is to report data from a larger group of people where pro-diversity norms may be more prevalent, for example, all university students in the United States, or all technology sector employees in California.

Communication about social norms—telling people what most of their peers do—is a highly effective way to influence human behaviour. This approach has been used in many domains[25,43] and the present research suggests that it can be leveraged to promote inclusive behaviours in real-world settings. The approach requires regular climate surveys and, ideally, empirical studies that include behavioural outcome measures of discrimination and inclusion[22]. The data from these surveys and studies would serve as a gauge for actual norms that can be communicated in interventions. With such data in hand, a given institution can inform its members about the many respondents who enjoy the presence of others belonging to different social groups, who try to create a welcoming environment for all, who support the institution's commitment to diversity and who reject bigotry in all forms. As demonstrated in our six randomized controlled trials, communicating such information helps address one of the major challenges of the twenty-first century: how to create harmonious relationships between members of different social groups in a rapidly diversifying society.

Methods

All experiments reported in this paper were approved by the Institutional Review Board at the University of Wisconsin-Madison and comply with all relevant ethical regulations. Participants provided informed consent. In each of the experiments conducted in the field (all except experiments 1 and 4), we recruited the largest number of classrooms possible and tried to maximize participation within each of these classrooms. The power analyses for experiments 1 and 4 are reported below.

Experiment 1. *Participants.* We recruited 163 individuals ranging from 18 to 60 years of age. Only those who identified as being from the United States were included in the analyses, $n = 139$. Of these, 97 identified as female, 118 were Caucasian (non-Hispanic) and 101 identified as being Christian or having no religion. All participants were students at a large Midwestern university who received extra credit in their introductory psychology course for completing the study.

Stimulus material. All participants were exposed to a poster in an experimental waiting room. Participants in the social norms condition were exposed to a poster suggesting that it was normative to value diversity. The following statement appeared at the top of the poster: 'We embrace diversity and welcome people from all backgrounds into our UW-Madison community'. In the middle of the poster was an outline of the state of Wisconsin. Inside the outline were 24 headshots of a diverse group of students (though most were Caucasian to accurately represent the University's population). The bottom of the poster included two statistics that were previously collected in a survey with a representative sample of students. In the survey, students indicated whether or not they agreed with the above statements and if they would be willing to have their picture appear on the poster. The statements on the poster read '93% of students we approached agreed with the message on this poster' and '84% of those students agreed to have their picture put on this poster'. The poster was pilot-tested with both students who did and did not come from marginalized backgrounds to ensure that it contained only non-offensive material and conveyed a message that reflected their experiences. The social norms poster is included in the Supplementary Information. Participants in the control condition were exposed to a poster from the Centers for Disease Control and Prevention communicating the importance of getting a flu vaccine (control condition).

Outcome measures. Participants were asked to complete a series of outcome measures. Some of these measures were indicators of positive intergroup attitudes and behaviours. Positive traits called upon participants to rate Black Americans on a number of positive traits (for example, pleasant and trustworthy). Participants also completed a modern racism measure modified from the modern racism scale[44]. The variable 'internal motivation to respond without prejudice scale'[45] assessed people's motivations to respond in non-prejudiced ways for internal reasons (for example, values). 'Rejection of racism' consisted of the 'acceptance of racist conduct scale'[46] and evaluated the extent to which people would accept racism in a university context. Similarly, 'rejection of discrimination', measured how acceptable participants found discrimination to be[28]. Feeling thermometers assessed participants' warmth towards, and liking, for different social groups. Four outcome measures were included for exploratory purposes. 'Feeling accepted' was modified from the 'socially valued role classification scale'[47] and measured how socially accepted participants felt. The 'external motivation to respond without prejudice scale'[45] assessed people's motivations to respond in non-prejudiced ways for external reasons (for example, fear of disapproval from others). Finally, 'perceived variability' and 'perceived differences' measured the extent to which participants perceived Black Americans as being different from one another with a modified version of the range task[48]. For more details on outcome measures, see Supplementary Information.

Procedure. The experiment took place in two laboratory rooms of the Psychology building. After consenting to partake in the study, the experimenter escorted the participants to a waiting room. The room was set up with three chairs against one wall divided by a small side table with a lamp and plant on it. Three posters were placed on the opposite wall. The two posters on the left and right sides were the same in both experimental conditions. One poster simply said 'Don't Text and Drive' and the other said 'More Reasons to Eat Fruit' and had a list of fruits and their benefits. The social norms poster (or the control poster) was always placed in the centre of the wall. To ensure participants would actually look at the posters, the experimenter had instructed them to leave their belongings, including electronic devices, in the room where they had filled out the consent forms. Participants were left in the waiting room for 5–7 min before the experimenter returned to get them to supposedly start in the study. The experimenter explained that the laboratory was running multiple studies at the same time and that they would first complete a short memory study and then another unrelated study on social attitudes. They were then escorted to another room with computers where they did a 6-min memory filler task in which they saw a group of 16 words for 1 min followed by 1 min to write down all the words they could recall. They completed the task three times, after which the computer directed them to a so-called second study in which they completed all of the outcome measures. After completing the outcome measures, participants were thanked and debriefed.

Experiment 2. *Participants.* We recruited 366 individuals ranging from 18 to 41 years of age and retained 300 who identified as being from the United States. A total 159 identified as female and one chose a non-binary gender identity. Additionally, 248 participants identified as Caucasian (non-Hispanic) and 244 as being Christian or having no religion. All participants were students at a large Midwestern university from 18 different courses who received extra credit in their respective course for completing the outcome measures. All participants consented to participate in the assessment portion of the study, whereas a waiver of informed consent was obtained for exposure to the intervention itself (the same was true for experiments 3, 5 and 6).

Outcome measures. 'Appreciation of diversity' assessed how much participants value diversity. 'Allophilia' was measured on the basis of a modified allophilia scale[49] and assessed how positive participants felt about people from different social outgroups. 'Climate' was a measure of how welcoming the classroom climate was. 'Belonging' measured the extent to which participants felt they belonged at the university. 'Attitude toward minorities' consisted of warmth ratings on the feeling thermometers towards Blacks, Hispanics, Arabs and gay men. See Supplementary Information for more details about the outcome measures.

Procedure. Before the start of the semester, instructors agreed to have their students participate in the study. Courses were paired up to match as much as possible in topic, size, level, day of week and time of day. For each pair, one course was randomly assigned to the social norms condition and the other to the control condition. During the exposure period, students were not aware they were part of a scientific study (the same is true for experiments 3, 5 and 6). Participants in the social norms condition were exposed to our social norms poster (see experiment 1), which was placed on the walls of the classroom for the first five weeks of the semester. Depending on the size of the room, four to six posters were placed on the classroom walls. Posters were put up 10–30 min before the start of each class session, before the instructor's and students' arrival and taken down 5 min after everyone had left the room. Those in the control condition were not exposed to a poster. In weeks 10–12 of the semester, students in all of the courses were invited to complete a survey that included the outcome measures. Afterwards, they were thanked and given extra credit for participating in the study.

Experiment 3. *Participants.* We recruited 348 individuals ranging from 18 to 48 years of age. Again, we removed those who were not from the United States, retaining 329. A total 147 participants identified as female, 270 as Caucasian (non-Hispanic) and 279 as being Christian or having no religion. All participants were students at a large Midwestern university from 13 different courses who received extra credit in their respective course for completing the study.

Stimulus material. Participants in the social norms condition watched a 5-min social norms video (Supplementary Information). The video depicted students from

different ethnic backgrounds (largely Caucasian to accurately represent the student population at the university) expressing how much they value the diversity on campus and try to be inclusive in their daily interactions. The video also included local scientists and diversity specialists who discussed anecdotal evidence and empirical studies that had been conducted at the university. According to these individuals, most students support the university's commitment to diversity and do not engage in discriminatory behaviour and the bigoted acts that occurred at the university were committed by a minority of individuals whose values are fundamentally different from those of most other people on campus. Overall, the video communicated the message that it was descriptively normative for people in the university community to value diversity and try to be welcoming to people from all social backgrounds. Like the poster in experiments 1 and 2, the video was pilot-tested with students from different social backgrounds to ensure that it did not contain offensive material and conveyed a message that reflected the students' experiences.

Outcome measures. We collected the same outcome measures as in experiment 2: appreciation of diversity, allophilia, climate, belonging and attitudes toward minorities.

Procedure. The procedure used in this study was very similar to that used in experiment 2, but instead of being exposed to the poster in their classrooms, participants in the social norms condition watched the video on the first day of the semester. Instructors in the social norms condition told students that the university had encouraged them to show a video and then screened the social norms video. The courses proceeded for the remainder of the semester as usual, with no additional exposure. Those in the control condition did not watch any video. Outcome measures were collected in weeks 10–12 of the semester.

Experiment 4. *Participants.* We conducted an a-priori power analysis assuming a medium effect ($d = 0.50$), an attrition rate up to 20% and a power of 0.800. Accordingly, we recruited 155 individuals ranging from 18 to 48 years of age and retained the 147 from the United States for the analyses. Eighty identified as female, 122 as Caucasian (non-Hispanic) and 126 as Christian or having no religion. All participants were students at a large Midwestern university who received extra credit in their introductory psychology course for completing the study online. All participants consented to participate in the study.

Outcome measures. All of the standard outcome measures in experiments 2 and 3 were included in experiment 4: appreciation of diversity, allophilia, climate, belonging and attitudes toward minorities, although climate and belonging were measured using different items (listed in the Supplementary Information). Together, these five outcome measures comprised the inclusive climate score discussed earlier. We also measured perceptions of peer norms, which assessed participants' perceptions of social norms among their peers regarding diversity on campus and university commitment, which assessed the extent to which participants believed the university, as an institution, valued diversity. To measure behavioural intentions, we also assessed participants' self-reported interest in, and likelihood of joining, four programmes on campus. One of the programmes was a social justice course (joining social justice course), whereas the three others were unrelated to race relations (joining other programmes).

Procedure. Experiment 4 took place online. After consenting to be in the study, participants were randomly assigned to either the social norms condition or the control condition. All participants were told that they would be watching a short video and completing a series of tasks and questions as part of research on media consumption, memory and social attitudes. Those in the social norms condition then watched the same social norms video used in experiment 3. Those in the control condition watched a neutral video on Wisconsin's cranberry production (Supplementary Information). Afterwards, participants did a short memory filler task (they saw a group of 16 words for 1 min followed by 1 min to write down all the words they could recall) and then completed all of the outcome measures.

Experiment 5. *Participants.* We recruited 682 individuals ranging from 18 to 67 years of age. We did not record the national origin of the participants and thus nationality was not an exclusion criterion. Because the manipulation in this experiment occurred on the first day of the semester, only those present for the first class session were included in the analysis ($n = 665$). An additional 30 participants had to be excluded for various reasons (for example, no condition information, too many responses missing), yielding a total of 635 participants included in the analyses. Of these participants, 358 identified as female (and five as a non-binary gender identity), 538 were Caucasian (non-Hispanic) and 532 identified as Christian or having no religion. A total of 184 students were classified as 'marginalized'. Among marginalized students, 67 were part of an ethnic minority but not of a religious minority, 73 were part of a religious minority but not of an ethnic minority and 44 were part of both an ethnic and a religious minority. All participants were students at a large Midwestern university from 25 different academic courses who received extra credit in their respective courses for completing the online survey.

Outcome measures. Many of the same measures from previous experiments were used, including allophilia, attitudes toward minorities, perceptions of peer norms, belonging and university commitment. Climate was also measured using different items (listed in the Supplementary Information). Additionally, we measured the following constructs. 'Policy support' assessed the extent to which participants believed the university should instate and maintain policies promoting diversity. 'Intergroup anxiety' measured how comfortable participants felt interacting with members of social outgroups. 'Confronting discrimination' was an indicator of participants' self-reported tendency to speak up when witnessing discriminatory behaviour. Participants indicated how frequently they had engaged in a series of specific 'inclusive behaviours' over the course of the semester. They also completed measures assessing their 'physical health' and 'emotional health' over the course of the semester because a large body of research shows that health disparities arise from discrimination[50]. Finally, they reported their perceptions of how inclusively the professor of their course behaved ('professor behaviour'), how inclusively their peers in the course behaved ('peer behaviour') and how much they felt respected by their peers in the course ('peer respect').

Procedure. The procedure used in this study was similar to that used in experiment 3 with two notable differences. First, outcome measures were collected 2 weeks later, in weeks 12–14 of the semester. Second, there were three experimental conditions in which professors screened the social norms video described above (social norms condition), screened a video that consisted primarily of minority students encouraging a dialogue about the micro-aggressions and discrimination that occur on campus (bias condition) or showed no video at all (control condition). The bias condition was added to determine whether the effects of the social norm video were attributable to students viewing a video related to diversity. Again, courses were sorted into groups of three based on topic, size and level, then randomly assigned to condition within these trios. In some cases, there were only two similar courses, which we assigned either to the social norms video or to the control condition. The professors were told both videos could be effective to eliminate expectancy effects. As in previous classroom studies, students did not know they were participating in an experiment in the exposure period. Three courses were randomly assigned to condition at the level of the discussion section, yielding 51 clusters.

Experiment 6. *Participants.* We recruited 776 individuals enrolled in four STEM courses at a large Midwestern university ranging from 18 to 30 years of age. Of these, 533 identified as female (three selected a non-binary gender identity), 585 were Caucasian (non-Hispanic) and 626 identified as Christian or having no religion. Using the same definition of marginalized as in previous studies, 223 students were marginalized and 553 were privileged. Among the marginalized students, 152 were part of an ethnic minority but not of a religious minority, 32 were part of a religious minority but not of an ethnic minority and 39 were part of both an ethnic and a religious minority. The courses were Physiology, Introductory Biology, Technical Communication (Engineering) and Research Methods (Agriculture and Life Sciences). All courses had multiple sections and students in different sections of the same course completed the same exams and were graded according to the same criteria. There were 35 sections in all.

Procedure. Sections of each course were randomly assigned to one of two experimental conditions (so there were equal numbers of sections in both conditions in each course). In half of the sections, the instructor showed our social norms video in the first section meeting (social norms condition). In the other half of the sections, the instructor added a short pro-diversity statement to the syllabus that was distributed in paper format during the first section meeting (control condition). Both conditions involved adding pro-diversity material to the course to reduce expectancy effects. The pro-diversity statement briefly mentioned the university's commitment to diversity and inclusive excellence (see full text in the Supplementary Information). Students in the social norms condition also received an email from the university's Deputy Vice Chancellor for Diversity and Inclusion in week 7 of the semester. The email reported some positive findings from the university's most recent climate survey (suggesting that most students are strongly committed to diversity) and encouraged students to continue working toward an inclusive social climate. Students in the control condition did not receive an email. We obtained grade information from the registrar once grades were finalized.

Reporting Summary. Further information on research design is available in the Nature Research Reporting Summary linked to this article.

Data availability

Due to Institutional Review Board restrictions, the data are not publicly available. However, the data are stored on a secure university server and are available upon request (contact markus.brauer@wisc.edu).

Code availability

As for data availability, all R code files can also be provided upon request. All other study materials are included in the Supplementary Information.

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Author contributions

M.B. and S.M. jointly conceived the research and decided on the stimulus material and outcome measures. S.M. created the first drafts of the poster and video and collected data for experiments 1–4. M.C. collected data for experiments 5 and 6. All authors contributed to the analyses of the data. All authors participated in the writing and revision of the paper.

Competing interests

The authors declare no competing interests.

Additional information

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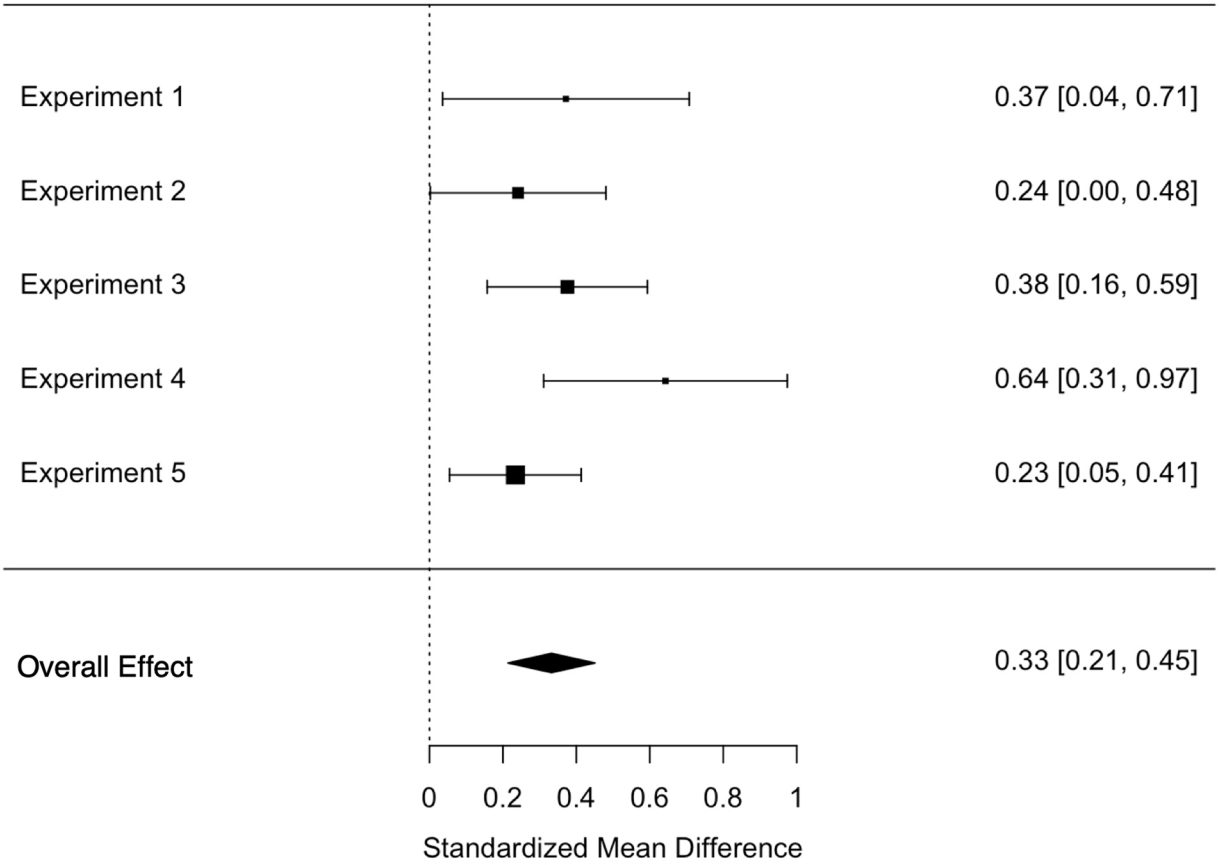

Extended Data Fig. 1 | Effect size estimates and the results of the internal meta-analysis for Experiments 1–5. Points represent standardized mean difference effect size estimates. The lines around the points represent the 95% confidence intervals. The overall effect of the social norms manipulations was .33, indicating that the inclusive climate score of students in the social norms conditions was on average .33 standard deviation units higher than that of students in the control conditions.

Outcome Variables	Control Condition Mean	Control Condition SD	Social Norms Condition Mean	Social Norms Condition SD	B	95% CI	t	df	p	d
(1) Positive Traits	5.43	1.19	5.53	1.08	.096	[-0.295, 0.486]	.485	131	.629	.090
(2) Modern Racism (R)	5.37	1.01	5.76	.92	.393	[0.724, 0.060]	2.345	131	.021	.408
(3) IMS[(a)]	6.82	1.57	7.57	1.28	.749	[0.260, 1.239]	3.029	131	.003	.527
(4) Rejection of Racism	5.43	1.30	5.65	1.49	.219	[-0.252, 0.691]	.920	137	.359	.155
(5) Rejection of Discrimination	6.05	1.04	6.34	.86	.297	[-0.022, 0.616]	1.839	137	.068	.314
(6) Attitudes toward Minorities	68.42	17.91	70.72	17.50	2.295	[-3.648, 8.238]	.764	137	.446	.127
(7) Feeling Accepted	5.94	.85	6.03	.76	.088	[-0.182, 0.357]	.642	137	.522	.110
(8) EMS[(a)]	5.27	1.87	4.76	1.87	-.515	[-1.156, 0.126]	-1.588	131	.115	.278
(9) Perceived Variability	66.55	25.29	71.36	22.16	4.816	[-3.45, 13.083]	1.153	127	.251	.191
(10) Perceived Differences	61.50	30.09	69.30	25.66			1.649	137	.101	.278
(11) Inclusive Climate Score	-.13	.80	.15	.70	.284	[0.032, 0.536]	2.229	137	.027	.381
(12) Total Score	-.10	.60	.09	.50	.194	[0.010, 0.378]	2.083	137	.039	.356

Extended Data Fig. 2 | Means and standard deviations broken down by condition, as well as inferential statistics for the outcome variables assessed in Experiment 1. (a) IMS = Internal Motivation to Respond without Prejudice, EMS = External Motivation to Respond without Prejudice Note: All variables have been recoded so that higher values express greater Inclusive Climate. "(R)" denotes scales that have been inverted from their original scoring to fit this standard. "95% CI" refers to the 95% confidence interval for the effect.

	Control Condition		Social Norms Condition							
Outcome Variables	Mean	SD	Mean	SD	B	95% CI	t	df	p	d
(1) Appreciation of Diversity	5.67	1.04	5.94	.88	.275	[0.038, 0.512]	2.283	298	.023	.263
(2) Allophilia	5.54	.98	5.81	.93	.270	[0.039, .0502]	2.300	298	.022	.263
(3) Climate	5.61	1.09	5.84	1.11	.231	[-0.032, 0.493]	1.728	298	.085	.201
(4) Belonging	5.77	1.07	5.88	1.17	.110	[-0.155, 0.375]	.819	298	.413	.090
(5) Attitudes toward Minorities	78.24	18.76	79.04	16.15	.794	[-3.510, 5.097]	.363	296	.717	.000
(6) Inclusive Climate Score	-.06	.77	.12	.69	.182	[0.004, 0.360]	2.016	298	.045	.230

Extended Data Fig. 3 | Means and standard deviations broken down by condition, as well as inferential statistics for the outcome variables assessed in Experiment 2. Note: "95% CI" refers to the 95% confidence interval for the effect.

	Control Condition		Social Norms Condition							
Outcome Variables	Mean	SD	Mean	SD	B	95% CI	t	df	p	d
(1) Appreciation of Diversity	5.77	1.04	6.05	.89	.283	[0.074, .0493]	2.663	327	.008	.293
(2) Allophilia	5.74	.97	6.03	.69	.291	[0.109, 0.473]	3.146	327	.002	.263
(3) Climate	5.72	1.23	5.94	.90	.215	[-0.018, 0.448]	1.818	327	.070	.201
(4) Belonging	5.96	1.01	5.99	1.13	.026	[-0.207, 0.259]	.219	327	.826	.000
(5) Attitudes toward Minorities	79.32	19.59	87.69	14.07	8.370	[4.682, 12.059]	4.465	326	.000	.496
(6) Inclusive Climate Score	-.14	.80	.13	.63	.268	[0.113, 0.423]	3.403	327	.001	.375

Extended Data Fig. 4 | Means and standard deviations broken down by condition, as well as inferential statistics for the outcome variables assessed in Experiment 3. Note: "95% CI" refers to the 95% confidence interval for the effect.

Outcome Variables	Control Condition Mean	Control Condition SD	Social Norms Condition Mean	Social Norms Condition SD	B	95% CI	t	df	p	d
(1) Appreciation of Diversity	5.60	1.11	6.19	.90	.588	[0.258, 0.918]	3.526	145	.001	.586
(2) Allophilia	5.57	1.08	6.14	.76	.573	[0.267, 0.878]	3.705	145	.000	.613
(3) Climate	5.28	1.36	5.96	1.05	.675	[0.279, 1.072]	3.366	145	.001	.557
(4) Belonging	5.68	1.23	6.07	1.12	.397	[0.013, 0.782]	2.043	145	.043	.339
(5) Attitudes toward Minorities	78.47	19.83	83.18	16.53	4.705	[-1.251, 10.66]	1.561	145	.121	.263
(6) Perceptions of Peer Norms	5.35	.1.17	5.85	1.04	.495	[0.134, 0.856]	2.711	145	.008	.449
(7) University Commitment	5.20	1.51	5.94	1.21	.742	[0.295, 1.190]	3.278	145	.001	.544
(8) Joining Social Justice Course	3.84	1.34	4.23	1.31	.388	[-0.046, 0.822]	1.77	145	.079	.293
(9) Joining Other Programs	4.25	1.31	4.30	.98	.042	[-0.298, 0.382]	.246	145	.806	.000
(10) Inclusive Climate Score	-.23	.80	.23	.61	.455	[0.222, 0.687]	3.870	145	.000	.644

Extended Data Fig. 5 | Means and standard deviations broken down by condition, as well as inferential statistics for the outcome variables assessed in Experiment 4. Note: "95% CI" refers to the 95% confidence interval for the effect.

Exp.	Comparison Control vs.	Outcome	Type of effect	Mediator	Effect Estimate	95% CI	$SE_{bootstrap}$	z	p
Analysis #1 (see also Figure 2):									
4	Social norms	Inclusive Climate Score	Indirect	Perceived peer norms	0.173	[0.038, 0.332]	0.076	2.265	.023
4	Social norms	Inclusive Climate Score	Indirect	University commitment	-0.050	[-0.149, 0.032]	0.044	-1.139	.255
4	Social norms	Inclusive Climate Score	Direct	---	0.332	[0.119, 0.543]	0.106	3.133	.002
4	Social norms	Inclusive Climate Score	Total	---	0.455	[0.219, 0.674]	0.115	3.937	.000
Analysis #2:									
5	Social norms	Inclusive Climate Score	Indirect	Perceived peer norms	0.045	[0.012, 0.088]	0.019	2.294	.022
5	Social norms	Inclusive Climate Score	Indirect	University commitment	0.029	[0.001, 0.064]	0.016	1.895	.058
5	Social norms	Inclusive Climate Score	Direct	---	0.053	[-0.031, 0.141]	0.043	1.230	.219
5	Social norms	Inclusive Climate Score	Total	---	0.127	[0.026, 0.229]	0.052	2.475	.013
Analysis #3:									
5	Bias	Inclusive Climate Score	Indirect	Perceived peer norms	0.019	[-0.003, 0.053]	0.014	1.349	.177
5	Bias	Inclusive Climate Score	Indirect	University commitment	0.050	[0.011, 0.099]	0.022	2.272	.023
5	Bias	Inclusive Climate Score	Direct	---	0.001	[-0.104, 0.097]	0.052	0.018	.986
5	Bias	Inclusive Climate Score	Total	---	0.070	[-0.047, 0.183]	0.058	1.201	.229
Analysis #4:									
5	Social norms	Total Score	Indirect	Perceived peer norms	0.034	[0.009, 0.066]	0.014	2.345	.019
5	Social norms	Total Score	Indirect	University commitment	0.023	[0.000, 0.053]	0.013	1.795	.079
5	Social norms	Total Score	Direct	---	0.068	[-0.013, 0.142]	0.040	1.704	.088
5	Social norms	Total Score	Total	---	0.126	[0.032, 0.214]	0.045	2.796	.005
Analysis #5:									
5	Bias	Total Score	Indirect	Perceived peer norms	0.015	[-0.004, 0.045]	0.012	1.243	.214
5	Bias	Total Score	Indirect	University commitment	0.032	[0.005, 0.068]	0.016	2.040	.041
5	Bias	Total Score	Direct	---	0.034	[-0.068, 0.121]	0.049	0.689	.491
5	Bias	Total Score	Total	---	0.081	[-0.029, 0.175]	0.052	1.551	.121

Extended Data Fig. 6 | Mediation analyses conducted in Experiments 4 and 5. The effect of the social norms video is mediated by participants' perceptions of peer norms. Note: The confidence intervals were computed with 1,000 bootstrapped samples. "95% CI" refers to the 95% confidence interval for the effect.

	Control condition		Bias condition		Social Norms condition		Omnibus test			Control vs. Bias		Control vs. Social Norms	
Outcome Variables	Mean	SD	Mean	SD	Mean	SD	df_{error}	F	p	t	p	t	p
(1) Allophilia	5.55	0.90	5.49	1.01	5.47	1.04	630	0.442	.643	-0.638	.523	-0.910	.363
(2) Climate	4.83	1.63	5.09	1.33	5.13	1.38	629	2.755	.064	1.668	.096	2.243	.025
(3) Belonging	5.14	1.52	5.32	1.26	5.32	1.33	630	1.125	.325	1.181	.238	1.372	.171
(4) Attitudes toward Minorities	83.74	14.59	84.89	13.02	85.14	14.37	622	0.623	.536	0.767	.443	1.077	.282
(5) Policy Support	5.95	1.00	6.08	0.89	5.91	1.00	630	1.520	.219	1.265	.206	-0.464	.642
(6) Intergroup Anxiety (R)	5.03	1.02	5.04	1.04	5.27	1.06	631	3.988	.019	0.075	.940	2.525	.012
(7) Inclusive Behaviors (R)	3.12	0.84	3.08	0.85	3.04	0.85	631	0.484	.617	-0.420	.675	-0.982	.326
(8) Confront Discrimination	5.25	1.14	5.13	1.18	5.13	1.16	631	0.796	.452	-1.002	.317	-1.148	.251
(9) Physical Health	4.81	1.47	4.85	1.37	5.11	1.32	627	3.293	.038	0.304	.761	2.390	.017
(10) Emotional Health (R)	4.89	1.52	5.01	1.26	4.97	1.45	627	0.357	.700	0.786	.432	0.646	.518
(11) Perceptions of Norms	5.17	1.11	5.33	0.93	5.43	0.91	628	4.355	.013	1.604	.109	2.941	.003
(12) University Commitment	5.45	1.35	5.79	1.10	5.70	1.17	630	3.999	.019	2.574	.010	2.244	.025
(13) Professor Behavior	5.78	1.05	6.04	1.02	6.11	1.03	624	6.187	.002	2.348	.019	3.420	.001
(14) Peer Behavior	5.74	1.04	5.78	1.14	6.00	1.00	626	4.392	.013	0.340	.734	2.752	.006
(15) Peer Respect	5.48	1.15	5.66	1.10	5.81	1.11	624	5.213	.006	1.535	.125	3.229	.001
(16) Inclusive Climate Score	-0.07	0.56	0.00	0.54	0.06	0.55	625	3.094	.046	1.165	.244	2.488	.013
(17) Total Score	-0.07	0.48	0.00	0.49	0.05	0.50	624	3.666	.026	1.472	.141	2.70	.007

Extended Data Fig. 7 | Means and standard deviations broken down by condition, as well as inferential statistics for the entire sample (both privileged and marginalized students) in Experiment 5. Note: "Omnibus test" is the two-degree of freedom F test for the condition variable. The "Bias versus Control" and "Social Norms versus Control" columns show the inferential statistics obtained with dummy codes representing these two comparisons. All scales are scored such that higher values indicate more positivity/inclusiveness. "(R)" denotes scales that have been inverted from their original scoring to fit this standard.

	Control condition		Bias condition		Social Norms condition		Omnibus test			Control vs. Bias		Control vs. Social Norms	
Outcome Variables	Mean	SD	Mean	SD	Mean	SD	df_{error}	F	p	t	p	t	p
(1) Allophilia	5.58	0.94	5.56	0.93	5.73	0.94	181	0.634	.532	-0.098	.922	0.952	.342
(2) Climate	4.28	1.77	4.70	1.50	5.28	1.44	181	7.382	.001	1.292	.198	3.809	.000
(3) Belonging	4.39	1.55	4.99	1.22	5.23	1.42	181	6.374	.002	2.076	.039	3.533	.001
(4) Attitudes toward Minorities	79.88	16.57	84.06	13.20	85.19	14.96	176	2.224	.111	1.338	.182	2.061	.041
(5) Policy Support	5.86	0.87	6.30	0.76	6.01	0.86	181	3.242	.041	2.544	.012	1.059	.291
(6) Intergroup Anxiety (R)	4.83	1.05	5.05	1.05	5.47	0.96	181	7.515	.001	1.079	.282	3.805	.000
(7) Inclusive Behaviors (R)	3.28	0.87	3.22	0.89	3.20	0.89	181	0.130	.878	-0.317	.751	-0.500	.618
(8) Confront Discrimination	5.31	1.01	5.28	1.06	5.23	1.19	181	0.083	.920	-0.124	.902	-0.402	.688
(9) Physical Health	4.37	1.60	4.92	1.57	5.10	1.26	178	4.557	.012	1.841	.067	2.974	.003
(10) Emotional Health (R)	4.43	1.74	4.85	1.29	4.89	1.52	178	1.703	.185	1.320	.189	1.759	.080
(11) Perceptions of Norms	4.76	1.17	5.20	0.93	5.57	0.92	181	11.433	.000	2.118	.036	4.781	.000
(12) University Commitment	4.79	1.42	5.58	1.10	5.67	1.26	181	9.187	.000	2.979	.003	4.103	.000
(13) Professor Behavior	5.52	1.00	5.76	0.97	6.20	0.97	180	8.613	.000	1.185	.237	4.076	.000
(14) Peer Behavior	5.40	1.17	5.64	1.11	5.98	1.03	180	4.905	.008	1.064	.289	3.104	.002
(15) Peer Respect	5.31	1.16	5.54	0.97	5.82	1.11	178	3.787	.025	0.984	.326	2.734	.007
(16) Inclusive Climate Score	-0.33	0.58	-0.07	0.57	0.12	0.53	178	12.012	.000	2.287	.023	4.901	.000
(17) Total Score	-0.27	0.48	-0.04	0.48	0.12	0.48	180	11.512	.000	2.346	.020	4.796	.000

Extended Data Fig. 8 | Means and standard deviations broken down by condition, as well as inferential statistics for students from marginalized groups only in Experiment 5. Note: "Omnibus test" is the two degree of freedom F test for the condition variable. The "Bias versus Control" and "Social Norms versus Control" columns show the inferential statistics obtained with dummy codes representing these two comparisons. All scales are scored such that higher values indicate more positivity/inclusiveness. "(R)" denotes scales that have been inverted from their original scoring to fit this standard.

	Control vs. Bias						Control vs. Social Norms					
Outcome Variables	B	95% CI	SE	df_{error}	t	p	B	95% CI	SE	df_{error}	t	p
(1) Allophilia	-0.058	[-0.283, 0.167]	0.111	37.266	0.952	.342	-0.067	[-0.266, 0.132]	0.097	26.605	-0.694	.500
(2) Climate	0.027	[-0.556, 0.610]	0.289	42.561	-0.518	.610	0.104	[-0.428, 0.636]	0.263	40.530	0.397	.695
(3) Belonging	0.132	[-0.253, 0.517]	0.190	38.163	0.093	.927	0.119	[-0.227, 0.465]	0.170	32.733	0.697	.494
(4) Attitudes toward Minorities	1.481	[-2.125, 5.087]	1.778	36.872	0.693	.495	1.906	[-1.313, 5.125]	1.576	30.254	1.210	.240
(5) Policy Support	0.172	[-0.075, 0.419]	0.122	37.102	0.833	.413	-0.016	[-0.237, 0.205]	0.108	29.991	-0.150	.883
(6) Intergroup Anxiety (R)	0.002	[-0.237, 0.241]	0.118	37.168	1.410	.169	0.237	[0.025, 0.449]	0.103	26.548	2.309	.031
(7) Inclusive Behaviors (R)	-0.019	[-0.244, 0.206]	0.111	37.769	0.017	.986	-0.021	[-0.223, 0.181]	0.099	31.479	-0.208	.838
(8) Confront Discrimination	-0.122	[-0.396, 0.152]	0.135	37.189	-0.168	.868	-0.103	[-0.345, 0.139]	0.118	27.893	-0.872	.396
(9) Physical Health	0.045	[-0.267, 0.357]	0.154	36.880	-0.902	.376	0.310	[0.034, 0.586]	0.134	25.993	2.316	.031
(10) Emotional Health (R)	0.075	[-0.288, 0.438]	0.179	37.117	0.291	.774	0.045	[-0.278, 0.368]	0.158	29.928	0.286	.779
(11) Perceptions of Norms	0.045	[-0.305, 0.395]	0.173	40.772	0.420	.679	0.155	[-0.161, 0.471]	0.156	38.155	0.990	.330
(12) University Commitment	0.159	[-0.287, 0.605]	0.221	41.530	0.258	.799	0.088	[-0.317, 0.493]	0.200	39.123	0.440	.664
(13) Professor Behavior	0.164	[-0.232, 0.560]	0.196	42.733	0.723	.476	0.244	[-0.118, 0.606]	0.179	39.880	1.359	.183
(14) Peer Behavior	-0.026	[-0.318, 0.266]	0.144	38.211	0.836	.410	0.219	[-0.044, 0.482]	0.129	32.737	1.704	.100
(15) Peer Respect	0.096	[-0.280, 0.472]	0.186	40.872	-0.179	.859	0.264	[-0.078, 0.606]	0.169	37.151	1.569	.127
(16) Inclusive Climate Score	0.053	[-0.121, 0.227]	0.086	38.779	0.517	.610	0.122	[-0.034, 0.278]	0.077	35.204	1.584	.124
(17) Total Score	0.070	[-0.064, 0.204]	0.066	37.356	0.619	.542	0.124	[0.004, 0.244]	0.059	31.746	2.111	.044

Extended Data Fig. 9 | Parameter estimates and inferential statistics for the entire sample (privileged and marginalized students) in Experiment 5 when accounting for the non-independence due to classroom. Note: We estimated a linear mixed-effects model in which we regressed the outcome variable on the two dummy codes (see Experiment 5 Results) and included a by-classroom random intercept. These results should be interpreted with caution, because 9 (out of 51, that is, 18%) classrooms had 2 or fewer respondents and 19 (37%) had 5 or fewer respondents, leading to substantial volatility in the classroom means (and thus relatively large standard errors of the parameter estimates). With error degrees of freedom around 40, the inferential tests are underpowered. All scales are scored such that higher values indicate more positivity/inclusiveness. "(R)" denotes scales that have been inverted from their original scoring to fit this standard.

	Control vs. Bias						Control vs. Social Norms					
Outcome Variables	B	95% CI	SE	df_{error}	t	p	B	95% CI	SE	df_{error}	t	p
(1) Allophilia	-0.019	[-0.412, 0.374]	0.192	29.773	-0.098	.924	0.149	[-0.186, 0.484]	0.156	14.753	0.952	.382
(2) Climate	-0.096	[-1.025, 0.833]	0.458	36.223	-0.209	.836	0.337	[-0.497, 1.171]	0.409	31.008	0.823	.420
(3) Belonging	0.603	[-0.050, 1.256]	0.320	31.276	1.887	.073	0.808	[0.243, 1.373]	0.270	19.815	2.997	.009
(4) Attitudes toward Minorities	5.166	[-1.874, 12.21]	3.447	30.466	1.499	.151	6.467	[0.343, 12.59]	2.936	20.738	2.203	.044
(5) Policy Support	0.440	[0.086, 0.794]	0.173	29.789	2.544	.019	0.149	[-0.153, 0.451]	0.141	14.805	1.057	.333
(6) Intergroup Anxiety (R)	0.223	[-0.200, 0.646]	0.207	29.773	1.079	.302	0.641	[0.281, 1.001]	0.168	14.753	3.805	.003
(7) Inclusive Behaviors (R)	-0.048	[-0.454, 0.358]	0.199	31.408	-0.243	.813	-0.018	[-0.368, 0.332]	0.168	20.219	-0.107	.918
(8) Confront Discrimination	-0.017	[-0.493, 0.459]	0.233	30.352	-0.073	.943	-0.052	[-0.461, 0.357]	0.193	16.758	-0.270	.799
(9) Physical Health	0.550	[-0.062, 1.162]	0.299	28.593	1.841	.084	0.728	[0.203, 1.253]	0.245	14.687	2.974	.013
(10) Emotional Health (R)	0.414	[-0.260, 1.088]	0.330	30.297	1.254	.230	0.450	[-0.129, 1.029]	0.273	16.715	1.644	.134
(11) Perceptions of Norms	0.239	[-0.293, 0.771]	0.262	34.071	0.913	.373	0.603	[0.130, 1.076]	0.230	26.776	2.627	.015
(12) University Commitment	0.387	[-0.344, 1.118]	0.360	35.449	1.076	.293	0.426	[-0.226, 1.078]	0.319	29.521	1.335	.196
(13) Professor Behavior	0.254	[-0.272, 0.780]	0.259	34.318	0.982	.338	0.556	[0.090, 1.022]	0.227	27.212	2.449	.022
(14) Peer Behavior	0.240	[-0.220, 0.700]	0.225	30.564	1.064	.307	0.571	[0.179, 0.963]	0.184	15.280	3.104	.010
(15) Peer Respect	0.226	[-0.247, 0.699]	0.232	32.330	0.974	.348	0.502	[0.099, 0.905]	0.189	15.935	2.65	.023
(16) Inclusive Climate Score	0.250	[-0.005, 0.505]	0.125	30.685	1.995	.059	0.445	[0.224, 0.666]	0.106	20.096	4.182	.001
(17) Total Score	0.230	[0.020, 0.440]	0.103	31.081	2.223	.037	0.378	[0.197, 0.559]	0.086	18.019	4.396	.000

Extended Data Fig. 10 | Parameter estimates and inferential statistics for students from marginalized groups only in Experiment 5 when accounting for the non-independence due to classroom. Note: We estimated a linear mixed-effects model in which we regressed the outcome variable on the two dummy codes (see Experiment 5 Results) and included a by-classroom random intercept. These results should be interpreted with caution, because 17 (out of 41, that is, 41%) classrooms with data for students from marginalized groups had 2 or fewer respondents and 28 (68%) had 5 or fewer respondents, leading to substantial volatility in the classroom means (and thus relatively large standard errors of the parameter estimates). All scales are scored such that higher values indicate more positivity/inclusiveness. "(R)" denotes scales that have been inverted from their original scoring to fit this standard.

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Study description	Randomized controlled trials. One experiment was conducted online, one in the lab, and four in the field.
Research sample	Participants were undergraduates at the University of Wisconsin-Madison. Full demographic information is provided in the paper. The sample is not perfectly representative, but quite representative, given that we recruited instructors from a wide variety of areas and the students in their classes were not necessarily majors in that field. The goal was to test our hypothesis in a setting in which we could do random assignment to conditions, and the university setting was ideal for that. Finally, our goals was to see if our social norms intervention causes a more inclusive climate among students and helps students from marginalized groups succeed in college, so we opted for students as participants.
Sampling strategy	For the online experiment and the laboratory experiment we conducted an a priori power analyses and recruited participants accordingly. For the field experiments, we recruited as many instructors as possible for the semester in which the study was conducted. We provide a post-hoc power analysis in the paper.
Data collection	All data for Experiments 1-5 were collected on-line through Qualtrics. No experimenter was present when participants completed the Qualtrics survey in the lab in Experiment 1. We obtained grades from the registrar in Experiment 6.
Timing	All experiments were conducted in the same semester. Data collection for this project started in 2014 and ended in 2019.
Data exclusions	We excluded participants who were foreign nationals because the social norms information we provided in our interventions was not relevant for them. Some participants were excluded because they had missing values or the condition information could not be retrieved at the time they completed the outcome survey at the end of the semester. No other participants were excluded. All data exclusions are reported in the paper.
Non-participation	Since all data were collected in a single session, no participants dropped out.
Randomization	All Experiments reported in the paper were randomized controlled trials. Randomization occurred either at the individual level (Experiments 1 and 4) or at the classroom level (all other Experiments).

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Population characteristics	See above
Recruitment	Participants in Experiments 1 and 4 were recruited through the Department of Psychology's SONA subject pool. They received partial course credit. The instructors in Experiments 2, 3, 5, and 6 were recruited through email. They received no compensation.
Ethics oversight	The University of Wisconsin's IRB approved the study protocol

Note that full information on the approval of the study protocol must also be provided in the manuscript.