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Abstract

Although implicit bias training programs have become common, the effects of these programs on employee attitudes and behaviours are still unclear, particularly when it comes to the efficacy of repeated, mandatory training. Additional understanding of these programs' efficacy is needed for setting effective training policy. We measured the effects of training in a mandatory bias literacy program for academic staff involved in personnel decisions at an American public university, specifically by examining the relationship among bias-related knowledge, attitudes, and behaviours and two training variables: the number of times training had been completed, and the time since last training. Time since training had a beneficial effect on behavioural intentions whereas training repetition showed a slight detrimental effect. Results of demographic factors investigated indicated effects of gender, amount of personnel-related committee service, and years at the university on training outcomes. Implications of these results for training policy at universities are discussed.

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Many organisations, including universities, have training programs designed to increase diversity, equity, and inclusion by educating employees about the dynamics and impacts of discrimination, reducing their biases, and enhancing their knowledge, motivation, and skills in terms of interacting with diverse others (Bezrukova et al., 2016; Kulik & Roberson, 2008; Pendry et al., 2007; Sevo & Chubin, 2008). Training programs typically cover topics such as implicit bias, stereotypes, cultural competence, and legal issues related to personnel decisions and workplace conduct. For example, implicit bias, a preference outside of conscious awareness for or against something (Greenwald et al., 2009; Jolls & Sunstein, 2006; Josta et al., 2009) is more predictive of behaviour than are self-reported attitudes (Greenwald et al., 2009). Implicit bias may explain why inequities persist because they are as damaging as overt discrimination because of effects that accumulate over time (Jones et al., 2017; Jones et al., 2016). The hope is that, during training, these biases can be brought to conscious awareness so they can be averted (Carnes et al., 2012).

Training programs often cost considerable money and other resources to develop and deliver, as well as employee time to take the training. Resistance to the training, including backlash, can be strong (Kaplan, 2006; Rynes & Rosen, 1995), creating doubts that these efforts are worthwhile (MacDonald, 1993; Smith, 2015). For example, researchers have observed increased hostility towards minority groups after bias training (Holladay & Quiñones, 2008). Given the costs and resistance, interest has grown in assessing whether these programs effectively train employees to mitigate implicit bias and contribute to an increasingly diverse workforce with fewer lawsuits or personnel issues (Bezrukova et al., 2012; Goldstein Hode et al., 2018; Pendry et al., 2007).

Generally, implicit bias training has been found to be effective (e.g., Girod et al., 2016) but with mixed results, mainly because of differences in training characteristics (e.g., Goldstein Hode et al., 2018; Kalinoski et al., 2013; Kulik & Roberson, 2008; Smith, 2015). Larger effects have been found in organisational settings than in educational settings (Bezrukova et al., 2016). However, a meta-analysis suggested that many of these programs have fallen short in demonstrating effectiveness (Bezrukova et al., 2016) and only about a third of organisations report seeing long-term results of their implicit bias or diversity training programs, which is thought to be a function of environmental support factors such as whether managers are rewarded for increasing diversity (Bezrukova et al., 2016; Rynes & Rosen, 1995). Also, to date, most programs are offered only once and for a short period of time, such as a multi-hour seminar (e.g., De Meuse et al., 2007; Kulik & Roberson, 2008). Longer and repeated training programs would seem to be indicated by these findings but these programs are rarer, and thus less is known about their efficacy. Therefore, more conclusive research is needed for evidence-based policy decisions regarding whether and how to provide implicit bias training (Kulik & Roberson, 2008). In this study, we examined the effects of a multi-week, mandatory, repeated implicit bias training program required of all university faculty involved in personnel decisions (hiring committees, tenure and promotion committees). We examined the effects of repeated training and the effects of time since training for this relatively substantial training program (meaning more than a few hours). We also examined whether factors such as gender of respondent and experience on personnel committees affected training outcomes under these conditions.

Training content and specific outcomes

Implicit bias training usually targets cognitive, affective, and behavioural outcomes which are then measured to evaluate training effectiveness (e.g., Kalinoski et al., 2013; Kraiger et al., 1993). Cognitive learning outcomes include foundational knowledge, critical thinking, and cognitive strategies; affective learning outcomes include individual characteristics such as self-awareness, self-efficacy, and openness to diverse groups; and behavioural learning outcomes include the automaticity of skills and procedures that reduce biased behaviours (Goldstein Hode et al., 2018; Kraiger et al., 1993).

The dissemination of diversity-related information, such as telling people about research on the value of diversity and the organisation's diversity-related expectations, targets cognitive change through increased knowledge of concepts (Kulik & Roberson, 2008). A meta-analysis of implicit bias training effects indicated that of all outcomes, reactions to training and cognitive learning showed the largest training effects (Bezrukova et al., 2016). Materials covering concepts such as the universality of implicit bias and its impacts on minority groups, also targets affective or attitudinal change by bringing implicit biases to conscious awareness (Carnes et al., 2012; Goltz & Sotirin, 2014; Smith, 2015). For instance, participants may learn about the Implicit Association Test (Greenwald et al., 1998), a measure of implicit bias, and may even be asked to take it to become aware of their own biases. Affective outcomes have been the most commonly measured result of implicit bias training (Curtis & Drechslin, 2008), suggesting that they are a valued outcome; however significant affective effects have been weaker than the cognitive effects of training and affective effects also decay more quickly than cognitive effects (Bezrukova et al., 2016; Kalinoski et al., 2013).

Ultimately, organisations are interested in the effects of these programs on behaviour change. To this end, diversity training programs may teach methods addressing behavioural change (e.g., Goltz & Sotirin, 2014; Isaac et al., 2016; Smith, 2015), such as taking time to evaluate applicants so that negative stereotypes are less likely to be activated (e.g., Kulik & Roberson, 2008; Rivers et al., 2020). As with affective outcomes, behavioural outcomes have been found to be sizable but smaller than the effects of training on cognitive outcomes, and there is some indication that they also are less stable over time when compared to cognitive effects of training (Bezrukova et al., 2016; Kalinoski et al., 2013).

Previous research indicates demographic effects such as gender and ethnicity on training outcomes, although results have been mixed (e.g., Bezrukova, et al., 2012). First, research indicates the genders do not arrive at training with the same level of knowledge, with women having higher initial scores (Jackson, Hillard, & Schneider, 2014; Rawski & Conroy, 2020). Also, attitudinal changes tend to be shown more by groups that did not previously support women (e.g., international academic staff) whereas behavioural changes tend to be shown more by groups that did previously support women (e.g., women—Chang et al., 2019). Finally, the proportion of women to men appears to affect training outcomes, with more favourable outcomes when the proportion of women is higher (Bezrukova, et al., 2012).

Training characteristics

Implicit bias training can vary considerably in its delivery, such as: required or voluntary, once or repeated, in-person or online venues (Goldstein Hode et al., 2018; Goltz & Sotirin, 2014; Chang et al., 2019). In past research, voluntary bias training has been perceived more favourably by participants, but mandatory training has resulted in greater learning, particularly behavioural learning, suggesting that training should be mandatory (Bezrukova et al., 2012; Ehrke et al., 2014; Goldstein Hode et al., 2018; Pettigrew & Tropp, 2006). However, there is growing evidence that training program attributes, such as trainer-trainee demographics and programmatic characteristics, also influence training effectiveness (Goldstein Hode et al., 2018; Kulik et al., 2007; Bezrukova et al., 2016; Holladay & Quiñones, 2008).

One under-examined issue is the efficacy of repeated training on outcomes, particularly since refresher courses add to the cost of these training programs. Most programs are designed to train employees only once (De Meuse et al., 2007; Kulik & Roberson, 2008); fewer programs require refresher training offered on a regular basis (Goltz & Sotirin, 2014). However, training may need to be repeated to retain its efficacy (Chang et al., 2019), as repeated exposure to learning material results in better understanding and recall of concepts (Kiewra et al., 1991), and repeated testing generates significant improvements in recall (Spreckelsen & Juenger, 2017; Wiklund-Hörnqvist et al., 2014). Accordingly, it has been recommended that implicit bias training be offered as more than just a one-time event (Bezrukova et al., 2012; Bezrukova et al., 2016; Roberson et al., 2001). But when and how often training should be repeated has yet to be determined.

Short-term positive effects of training can disappear over the longer term without repeated exposure to the training material, even within a matter of a couple of months (Smith, 2015). This observation is consistent with literature in the field of education, in which the time that elapses between learning new material and being tested on or applying that material has been studied extensively (e.g., Carpenter et al., 2012). In general, learning performance is better when evaluated sooner after learning than later (Cepeda et al., 2008; Kamuche & Ledman, 2005). Research that compares ‘mass’ training and ‘spaced’ training effects suggests that for long-term retention, there should be spacing gaps between training (Cepeda et al., 2008). This has been termed the ‘distributed practice’ effect (Cepeda et al., 2006), a key effect considered in learning and memory research (Benjamin & Tullis, 2010). Spacing effects may arise from being able to review information after it was initially learned, which then may result in improved encoding and retrieval of the information (Benjamin & Tullis, 2010). Distributed practice effects were found to be higher for information provided through lecture and online methods (Donovan & Radosovich, 1999); in other words, providing follow-up training or opportunities for practicing the information such as through application appears to be particularly important when knowledge is delivered in these ways. In the context of implicit bias training at universities, this practice occurs when academic staff serve on hiring committees and tenure and promotion committees, when they are expected to make personnel decisions without bias and while adhering to labour laws.

Learning decay appears to be an issue for at least for some outcomes. The Bezrukova et al. (2016) meta-analysis indicated cognitive learning effects are ‘stickier’ than attitudinal effects, which tend to decay over time. Additionally, attitude changes from bias training have not been found to be significantly related to later behavioural measures of training efficacy (Chang et al., 2019). Furthermore, the transfer of training, which is key to behavioural outcomes, appears to be related to both the content of training and individual motivational aspects (e.g., Blume, Ford, Baldwin, & Huang, 2010; Yelon & Ford, 1999); this could explain the weaker behavioural effects found for implicit bias training (e.g., Bezrukova et al., 2016). Most importantly, it should not be assumed that a training program is effective simply because it was delivered.

The primary purpose of our study was to evaluate the effect of training repetition and recency on the cognitive, affective, and behavioural outcomes of employees who have completed a required implicit bias training program. We also examined effects of the demographic factors of gender, years at the university, and committee service on these outcomes given the literature on gender effects and effects of practice opportunities. The training at this institution uses an online facilitated course with participant discussions. Across the university, ever since the online workshop was introduced (2011), the training has been required of members of academic hiring committees and tenure and promotion committees. The initial training lasts three weeks, with a one-week refresher course required every four years for academic staff to maintain their training status.

We hypothesised that individuals who took the diversity training program more recently and more often (via refresher courses) would exhibit higher cognitive, affective, and behavioural outcomes than individuals who took the training less recently and/or fewer times (Figure 1). Given that prior research has found cognitive effects of training to be ‘stickier’ than affective and behavioural effects, we were especially interested in the impact of repeated training and time since training on affective and behavioural outcomes, which have been shown to decay over time. Academic staff who have taken the implicit bias training more often and more recently should have more positive attitudes toward diversity and be better able to identify methods that can be used to counteract implicit bias and discrimination, particularly related to hiring, tenure, and promotion situations.

Materials and methods

Institutional context

The study took place at a rural STEM-focused institution in the midwestern United States with 478 academic staff and administrators (e.g., chairs, deans, etc.). Both the undergraduate student body and academic staff have remained persistently male- and white-dominated despite decades of explicit strategic plans to increase diversity. As of fall 2021, women comprised 33 per cent of the tenure-track and tenured academics. Similarly, academic staff are mostly white, non-Hispanic and of domestic origin (71 per cent of academic staff as of fall 2021).

The training was initially funded through the NSF ADVANCE program, which focuses on increasing women in academic positions in STEM fields. As such, the focus of the training was on implicit bias based on gender to reduce gender bias in personnel decisions and ultimately

to increase the proportion of female academics at all ranks. However, the training did briefly address other dimensions of diversity and intersectionality. The training was composed of readings, quizzes, and discussions focusing on how implicit bias, stereotypes, and discriminatory behaviour regarding gender impact hiring decisions and decisions regarding tenure and promotion. The discussion component allowed participants to share their own experiences with others; social interaction has been observed to yield stronger effects on affective-based outcomes than non-interactive training (Kalinowski et al., 2013).

Measures

We emailed a survey questionnaire hosted on SurveyMonkey that took roughly 15 minutes to complete to all 478 academic staff and administrators at our university to recruit respondents to participate in our study. All academics and administrators were asked to participate in this study regardless of whether they had or had not completed the university's implicit bias training program. Respondents were given the option to receive a \$10 gift card automatically for completing our questionnaire and were entered in a drawing to win either a \$25 or \$50 gift card to boost our response rate. After three reminder emails over the course of one month, a total of 63 individuals had fully completed the survey questionnaire, resulting in a 13 per cent response rate (see Results section for sample demographics).

Our 41-item online questionnaire consisted of an informed consent statement and a mix of multiple-choice, rating-scale, and free-response questions. Items assessed participants' cognitive knowledge of implicit bias, attitudes towards diversity, and behavioural intentions, as well as the key explanatory (time since last training and number of trainings completed) and control variables (gender, years at the university, and experience on a promotion or hiring committee) we thought would best explain respondent differences in these implicit bias areas. The questions used to measure the cognitive, affective, and behavioural responses were adopted from the Modern Sexism Scale (Swim et al., 1995), the Neosexism Scale (Tougas et al., 1995), the Motivation to Control Prejudiced Reactions Scale (MCPR; Dunton & Fazio, 1997), the Color-Blind Racial Attitudes Scale (CoBRAS; Neville et al., 2000), and the Personal Beliefs About Diversity Scale (Pohan & Aguilar, 2001). Both the MCPR Scale and CoBRAS have been used in evaluations of implicit bias training programs (e.g., Stewart et al., 2003; Goldstein Hode et al., 2018). Items were chosen based on their prominence and reliability as measures of prejudice, as well as to include a variety of types of prejudice and bias for adequate coverage of the cognitive, affective, and behavioural domains. Some items were modified to represent the university context (e.g., changing 'firm' to 'university') or to use language consistent with the institutions' training program across survey items (e.g., changing 'prejudice' to 'bias').

We used 11 items to measure respondents' cognitive knowledge of concepts covered by the training program and professional beliefs about the value of institutional diversity. Seven of these items used a 5-point Likert scale (ranging from 'strongly agree' to 'strongly disagree') to prompt respondents to evaluate the importance of faculty diversity (e.g., 'A racially, ethnically, and culturally diverse staff and faculty is only needed when the university serves a diverse student body,' reverse scored and modified from Pohan & Aguilar, 2001). These questions were found to be reliable, $\alpha = 0.81$ ($M = 33.06$, $SD = 5.68$). The other four cognitive learning items

were multiple choice, with two about implicit bias and two about legalities of hiring scenarios taken from the training program.

Affective outcomes were measured with nine items using a 5-point Likert scale (ranging from 'strongly agree' to 'strongly disagree'). These items referred to respondents' personal attitudes about bias (e.g., 'It's important to me that my own bias does not affect others,' modified from Dunton & Fazio, 1997) or personal attitudes about the university's diversity efforts (e.g., 'It is important for university leaders to talk about diversity and discrimination to help work through the institution's problems,' modified from Neville et al., 2000). These are meant to represent respondents' own beliefs and motivations regardless of how the institution promotes thinking about diversity and bias. These questions were found to be reliable, $\alpha = 0.82$ ($M = 35.02$, $SD = 6.57$).

Behavioural skills and intentions were measured with 10 items regarding how respondents perceive the optimal responses to bias in realistic situations, based on what was covered in the training program. Two items were based on social distance (e.g., openness to social contact with members of other groups; Bogardus, 1925) with multiple choice responses. Two items were statements relating to the use of strategies to lessen one's own bias (e.g., 'I am able to monitor situations and catch myself displaying bias,' modified from Dunton & Fazio, 1997) with 5-point Likert-scale responses (ranging from 'strongly agree' to 'strongly disagree'). These items were found to be reliable, $\alpha = 0.70$ ($M = 27.91$, $SD = 4.82$). The final six behavioral items were longer scenarios modified from the Instructor Cultural Competence Questionnaire (ICCCQ; Roberson et al., 2002) for a university context, each with multiple responses ranked on their appropriateness based on skills learned in the training program. These scenarios involve the reader imagining that they are witnessing acts of implicit bias from colleagues either directly or as reported by other colleagues and identifying responses that both validate harm caused and address individuals expressing bias.

Finally, respondents were asked to report the number of years they were employed at the university, their academic status (e.g., non-tenure track, tenure-track, tenured), and whether they had served on a promotion and tenure and/or hiring committee. The Human Resources department at the university provided information on the number of times a given respondent completed the training program, the time since their last training, and their gender as reported in their employee record to keep this information both accurate and anonymous to the researchers. See 'Supplemental Online Materials' for the full survey instrument.

Results

All statistical analyses for the results reported below were performed in the IBM SPSS v.24 statistical software package.

Descriptive statistics

Of the 63 respondents who completed our survey, four respondents (6per cent) had not taken the implicit bias training at all, 35 per cent had taken the training once, 46 per cent had taken the training twice, and 13 per cent had taken the training three times. Thirty-six per cent of

respondents who completed the training did so in the year our survey was conducted, 19 per cent in the year prior to our survey, 15 per cent two years prior, 24 per cent three years prior, three respondents (5 per cent) did so four years prior, and only one respondent (2 per cent) completed the training more than four years prior. Those reporting no experience with hiring or promotion committee service comprised 32 per cent of respondents; 24 per cent reported experience with one of these committees but not the other and 43 per cent reported experience with both committee types. Those reporting having worked at the university for over 25 years comprised 14 per cent of respondents; eight per cent reported between 20 and 25 years, 16 per cent between 15 and 20 years, 14 per cent between 10 and 15 years, 22 per cent between 5 and 10 years, and 25 per cent between 0 and 5 years. Human Resources identified 48 per cent percent of our respondents as female and 52 per cent as male. Race and ethnicity data were not collected.

Respondents tended to be more competent in the area of attitudes toward diversity ($M = 4.08$, $SD = 0.59$) on average than cognitive knowledge ($M = 3.15$, $SD = 0.42$) or behavioural intentions ($M = 2.87$, $SD = 0.39$). However, it is worth noting that the association between cognitive knowledge and attitudes about diversity ($r = 0.72$) was much stronger than the association between cognitive knowledge and behavioural intention ($r = 0.40$), with a moderate association between attitudes about diversity and behavioural intention ($r = 0.58$) present among our respondents.

Regression analysis

We conducted linear regression analysis for each dimension of implicit bias competency (cognitive knowledge, attitudes about diversity, and behavioural intentions) as the dependent variable using the same explanatory variables in each model. We excluded academic status from this analysis due to the high potential for multicollinearity with committee service, given that tenure is a requirement for service on promotion and tenure committees in our university. Indeed, the Variance Inflation Factor for academic status was above 6.7 in all regression models when academic status was included along with committee service, while none of the academic status coefficients were statistically significant in any of these models.

No explanatory or control variables were statistically significant predictors of respondent differences in their cognitive knowledge of implicit bias at the 95 per cent confidence level, but gender was statistically significant at the 90 per cent confidence level ($\beta = -0.22$ and $p = 0.065$; Table 1). For attitudes about diversity, gender was the only coefficient to achieve statistical significance at the 95 per cent confidence level when controlling for all other variables ($\beta = -0.459$ and $p = 0.004$; Table 2), while years at the university achieved statistical significance at the 90 per cent confidence level ($\beta = -0.12$ and $p = 0.054$). Finally, for behavioural intentions, the number of years since a respondent completed the implicit bias training ($\beta = -0.097$ and $p = 0.014$; Table 3) and experience with both forms of committee service relative to no service ($\beta = 0.461$ and $p = 0.017$) were the only statistically significant coefficients at the 95 per cent confidence level when controlling for all other variables, while the number of times the respondent took the training ($\beta = -0.171$ and $p = 0.090$) and their years at the university ($\beta = -0.072$ and $p = 0.086$) were statistically significant at the 90 per cent confidence level. In other words, the cognitive knowledge of male respondents was 0.222 points lower than the cognitive knowledge of female respondents on average, and male respondent attitudes toward diversity

were 0.459 points lower than female respondents on average. Each year at the university decreased beneficial attitudes toward diversity 0.120 points on average, and each year that elapsed since a respondent completed the implicit bias training decreased behavioural intention by 0.097 points on average. Experience with both forms of committee service increased behavioural intention 0.461 points on average when compared to no service. As the number of training experiences increased, behavioural intentions decreased by 0.171 points on average, while each year at the university decreased behavioural intentions by 0.072 points on average.

Discussion

The purpose of our survey was to determine whether the number of times a training was taken and/or the time elapsed since last training impacted the knowledge, attitudes, and behaviours associated with reduced implicit bias in personnel decision-making, ultimately to determine the effectiveness of the university's required training policy. We found no significant effect of the frequency of training on either the cognitive ($p = 0.882$) or affective ($p = 0.410$) dimension of implicit bias competence (Tables A-B), but a small, negative effect of training frequency on behavioural intentions ($p = 0.090$; Table 3). Our results differ from previous research indicating that learning increases with increased exposure to training material (e.g., Chang et al., 2019; Kiewra et al, 1991). Our result could be due to the small sample size and the limited range of repetition (zero to 3 times), or may reflect a real and rapid decay of knowledge and attitudes post-training, with some annoyance with mandatory material refreshers that has a detrimental effect on behaviours. Future research should use a pre- and post-training assessment after each training session to determine whether there are any gains in these competency dimensions with repetition. However, should our results hold more generally, training programs could eliminate fixed-schedule refresher courses that can demand a significant amount of time and resources from an organisation and its employees.

Although years since training had no significant relationship with affective ($p = 0.208$) competence, we did find an effect of time since training on our measures of cognitive (at the $p = 0.1$ level) and behavioural competence, with those having received training more recently reflecting less implicit bias in their knowledge and behavioural intentions ($p = 0.100$ and $p = 0.014$ respectively; Tables 1-3). Our results differ from those found in Bezrukova et al.'s (2016) meta-analysis, which found that training positively influenced cognitive knowledge and attitudes, but attitudinal effects of training decayed over time while cognitive effects were more sustained. Considering both our findings and Bezrukova and colleagues' (2016) findings, we conclude that it is likely the recency of training, not the repetitiveness, that dictates improvements in dimensions of competence for implicit bias. Therefore, we would recommend that implicit bias training be administered at the beginning of a decision-making committee's service, so that the committee's knowledge, attitudes, and behaviours brought to their task most closely reflect the needs and values of the organisation.

Years at the university had no effect on cognitive knowledge, but a small, negative effect (at the $p = 0.10$ level) for attitudes ($p = 0.054$) and behavioural intentions ($p = 0.086$; Tables 1-3). These observations may reflect a cohort effect (with younger academics more amenable to or familiar with implicit bias concepts) or a cultural effect of the skewed demographics of the university faculty that have been slow to change (see further discussion in the 'Gender' section

below). However, these results may also reflect training program administration and the negative impact that training repetition has on training outcomes; the policy of mandatory refreshers every four years resulted in academic staff with longer tenures at the university taking the training more times than newer hires. As for committee service, we observed no effect of training on cognitive knowledge or attitudes, but a significant positive effect for behavioural intentions for academic staff who had served both types of committees ($p = 0.017$). In essence, experience with both forms of committee service increased behavioural intention 0.461 points on average when compared to no service, perhaps reflecting the educational benefits of applying the skills and concepts from the trainings into practice on real hiring decisions.

Although gender effects for competency were not our main focus, gender emerged as a consistent factor influencing implicit bias competency. Male-identified academics scored significantly lower in attitudes regarding implicit bias than female-identified academics ($p = 0.004$, Table 2), and lower in cognitive knowledge ($p = 0.065$, Table 1). While we can only speculate, we suspect that the predominantly white male demographics of the academics may create an environment where women (and minorities) observe or are targets of implicit bias frequently, and thus enter the training program with a higher baseline of bias-informed knowledge and attitudes. In contrast, these biases may be relatively invisible to majority academics, or the training itself may elicit an unconscious reluctance on the part of majority men to accept the concept of implicit bias altogether (Handley et al., 2015). The over-representation of women in the survey response dataset suggests that women are more voluntarily engaged with the subject. We recommend the further examination of gender effects within unique populations such as this to better understand contextual effects and potential relevance to training policy.

Our study suffered from the usual limitations of doing field research in which conditions are not always optimal for making conclusions about causality. For example, the gender effects found in the present study may have been present prior to participants doing the training, but we could not assess this because no pre-tests were given. Another concern is self-selection: individuals who were indifferent to implicit bias issues or training may not have responded to the invitation to participate, whereas individuals with strong feelings (positive or negative) may have been overrepresented. We know, for example, that women were over-represented as compared with their general representation in the academic staff. Despite these shortcomings, we believe the study design allows for some initial conclusions about the effectiveness of extended and repeated training, which has not received much attention in the research literature on diversity training. However, future research studies that replicate these findings would be useful.

Our results support a policy of mandatory implicit bias training that is assigned immediately before service on a search or tenure and promotion committee, rather than on a fixed schedule (every four years, in our case), to assure that the material and concepts are fresh and retrievable. Given our observations that years at the institution are associated with negative outcomes for bias competency, administrators should be prepared for push-back against both the training and the broader institutional goals related to diversity, equity, inclusion among more veteran employees. Furthermore, our results suggest that the completion of a training course (or maintaining an up-to-date refresher status) does not necessarily generate competency; administrators should refrain from concepts such as ‘certification’ that imply that training completion has mitigated or eliminated an individual’s system of implicit bias.

In conclusion, effects of repeated diversity training on behavioural intentions have important policy implications. We found that time since training and committee service both had a beneficial effect on behavioural intentions. Policy makers should consider that it is not the number of times one took the training but how recently they took it and whether they had an opportunity to practice it by being on a committee when creating diversity training policies.

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Figure 1

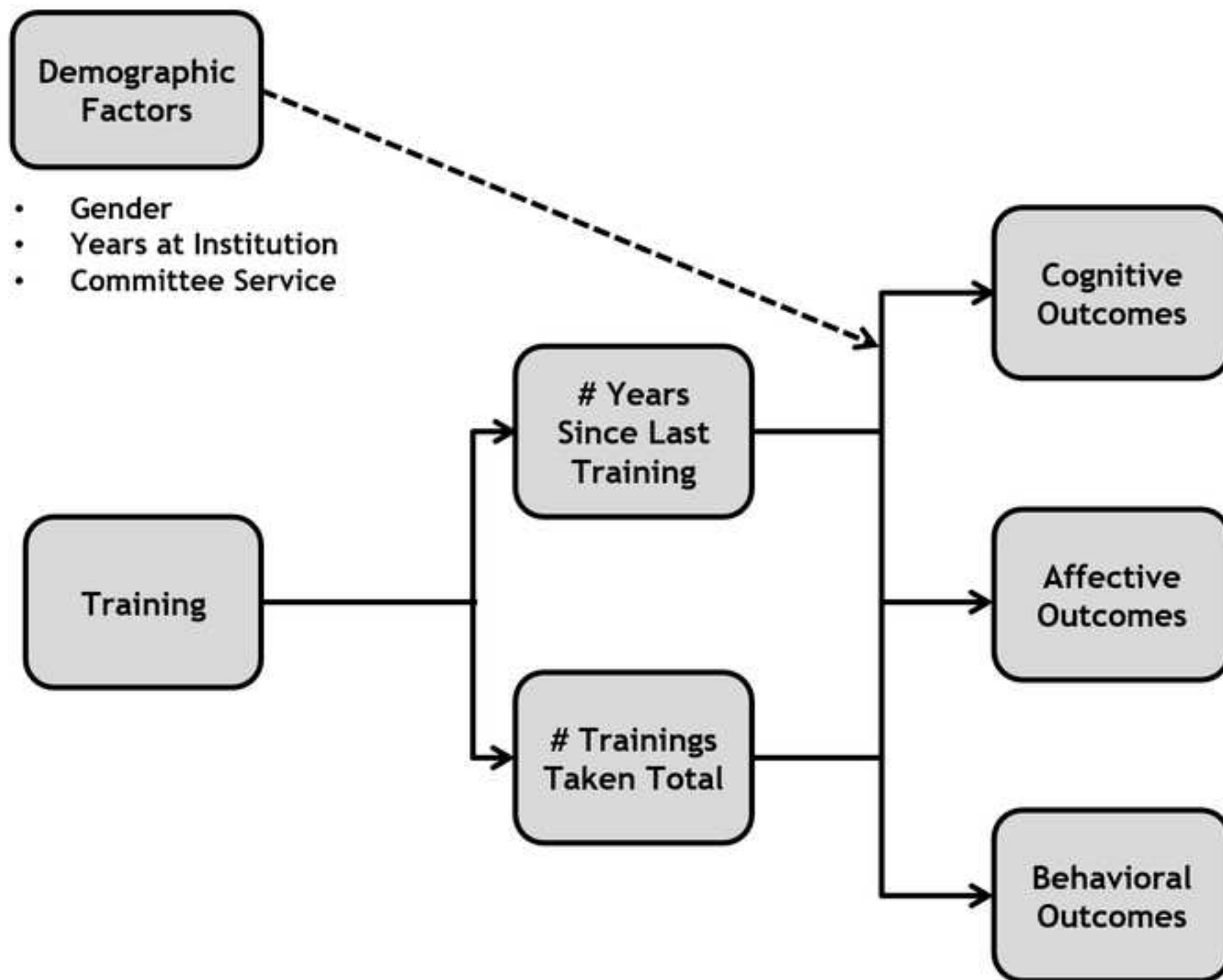


Figure 1

Conceptual model showing hypothesised relationship of training and outcomes.

Table 1

Linear regression with key explanatory variables on cognitive knowledge.

	B	SE	Beta	<i>t</i>	<i>p</i>
Constant	3.530	0.192		18.428	0.000
Years Since	-0.074	0.044	-0.237	-1.674	0.100
Times Taken	0.017	0.115	-0.027	-0.149	0.882
Years At University	-0.012	0.048	-0.048	-0.255	0.800
Gender (Male)	-0.222	0.118	-0.257	-1.886	0.065
Committee Service (One)	-0.080	0.174	-0.082	-0.458	0.649
Committee Service (Both)	-0.148	0.217	-0.170	-0.683	0.498

Note. $r^2 = 0.177$ and adjusted- $r^2 = 0.082$

Table 2

Linear regression with key explanatory variables on attitudes toward diversity.

	B	SE	Beta	<i>t</i>	<i>p</i>
Constant	4.771	0.245		19.447	0.000
Years Since	-0.072	0.056	-0.170	-1.276	0.208
Times Taken	-0.122	0.147	-0.139	-0.830	0.410
Years At University	-0.120	0.061	-0.349	-1.972	0.054
Gender (Male)	-0.459	0.151	-0.389	-3.047	0.004
Committee Service (One)	0.158	0.223	0.119	0.707	0.483
Committee Service (Both)	0.399	0.278	0.337	1.437	0.157

Note. $r^2 = 0.276$ and adjusted- $r^2 = 0.192$

Table 3

Linear regression with key explanatory variables on behavioural intention.

	B	SE	Beta	<i>t</i>	<i>p</i>
Constant	3.360	0.165		20.312	0.000
Years Since	-0.097	0.038	-0.349	-2.555	0.014
Times Taken	-0.171	0.099	-0.297	-1.729	0.090
Years At University	-0.072	0.041	-0.318	-1.749	0.086
Gender (Male)	-0.150	0.102	-0.194	-1.480	0.145
Committee Service (One)	0.190	0.151	0.218	1.264	0.212
Committee Service (Both)	0.461	0.187	0.592	2.461	0.017

Note. $r^2 = 0.236$ and adjusted $r^2 = 0.148$

Effects of repeated implicit bias training in a North American university

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Abstract

Although implicit bias training programs have become common, the effects of these programs on employee attitudes and behaviours are still unclear, particularly when it comes to the efficacy of repeated, mandatory training. Additional understanding of these programs' efficacy is needed for setting effective training policy. We measured the effects of training in a mandatory bias literacy program for academic staff involved in personnel decisions at an American public university, specifically by examining the relationship among bias-related knowledge, attitudes, and behaviours and two training variables: the number of times training had been completed, and the time since last training. Time since training had a beneficial effect on behavioural intentions whereas training repetition showed a slight detrimental effect. Results of demographic factors investigated indicated effects of gender, amount of personnel-related committee service, and years at the university on training outcomes. Implications of these results for training policy at universities are discussed.

Key Words: implicit bias, personnel committees, training effectiveness, training policy

Effects of repeated implicit bias training in a North American university

Many organisations, including universities, have training programs designed to increase diversity, equity, and inclusion by educating employees about the dynamics and impacts of discrimination, reducing their biases, and enhancing their knowledge, motivation, and skills in terms of interacting with diverse others (Bezrukova et al., 2016; Kulik & Roberson, 2008; Pendry et al., 2007; Sevo & Chubin, 2008). Training programs typically cover topics such as implicit bias, stereotypes, cultural competence, and legal issues related to personnel decisions and workplace conduct. For example, implicit bias, a preference outside of conscious awareness for or against something (Greenwald et al., 2009; Jolls & Sunstein, 2006; Josta et al., 2009) is more predictive of behaviour than are self-reported attitudes (Greenwald et al., 2009). Implicit bias may explain why inequities persist because they are as damaging as overt discrimination because of effects that accumulate over time (Jones et al., 2017; Jones et al., 2016). The hope is that, during training, these biases can be brought to conscious awareness so they can be averted (Carnes et al., 2012).

Training programs often cost considerable money and other resources to develop and deliver, as well as employee time to take the training. Resistance to the training, including backlash, can be strong (Kaplan, 2006; Rynes & Rosen, 1995), creating doubts that these efforts are worthwhile (MacDonald, 1993; Smith, 2015). For example, researchers have observed increased hostility towards minority groups after bias training (Holladay & Quiñones, 2008). Given the costs and resistance, interest has grown in assessing whether these programs effectively train employees to mitigate implicit bias and contribute to an increasingly diverse workforce with fewer lawsuits or personnel issues (Bezrukova et al., 2012; Goldstein Hode et al., 2018; Pendry et al., 2007).

Generally, implicit bias training has been found to be effective (e.g., Girod et al., 2016) but with mixed results, mainly because of differences in training characteristics (e.g., Goldstein Hode et al., 2018; Kalinoski et al., 2013; Kulik & Roberson, 2008; Smith, 2015). Larger effects have been found in organisational settings than in educational settings (Bezrukova et al., 2016). However, a meta-analysis suggested that many of these programs have fallen short in demonstrating effectiveness (Bezrukova et al., 2016) and only about a third of organisations report seeing long-term results of their implicit bias or diversity training programs, which is thought to be a function of environmental support factors such as whether managers are rewarded for increasing diversity (Bezrukova et al., 2016; Rynes & Rosen, 1995). Also, to date, most programs are offered only once and for a short period of time, such as a multi-hour seminar (e.g., De Meuse et al., 2007; Kulik & Roberson, 2008). Longer and repeated training programs would seem to be indicated by these findings but these programs are rarer, and thus less is known about their efficacy. Therefore, more conclusive research is needed for evidence-based policy decisions regarding whether and how to provide implicit bias training (Kulik & Roberson, 2008). In this study, we examined the effects of a multi-week, mandatory, repeated implicit bias training program required of all university faculty involved in personnel decisions (hiring committees, tenure and promotion committees). We examined the effects of repeated training and the effects of time since training for this relatively substantial training program (meaning more than a few hours). We also examined whether factors such as gender of respondent and experience on personnel committees affected training outcomes under these conditions.

Training content and specific outcomes

Implicit bias training usually targets cognitive, affective, and behavioural outcomes which are then measured to evaluate training effectiveness (e.g., Kalinoski et al., 2013; Kraiger et al., 1993). Cognitive learning outcomes include foundational knowledge, critical thinking, and cognitive strategies; affective learning outcomes include individual characteristics such as self-awareness, self-efficacy, and openness to diverse groups; and behavioural learning outcomes include the automaticity of skills and procedures that reduce biased behaviours (Goldstein Hode et al., 2018; Kraiger et al., 1993).

The dissemination of diversity-related information, such as telling people about research on the value of diversity and the organisation's diversity-related expectations, targets cognitive change through increased knowledge of concepts (Kulik & Roberson, 2008). A meta-analysis of implicit bias training effects indicated that of all outcomes, reactions to training and cognitive learning showed the largest training effects (Bezrukova et al., 2016). Materials covering concepts such as the universality of implicit bias and its impacts on minority groups, also targets affective or attitudinal change by bringing implicit biases to conscious awareness (Carnes et al., 2012; Goltz & Sotirin, 2014; Smith, 2015). For instance, participants may learn about the Implicit Association Test (Greenwald et al., 1998), a measure of implicit bias, and may even be asked to take it to become aware of their own biases. Affective outcomes have been the most commonly measured result of implicit bias training (Curtis & Drechslin, 2008), suggesting that they are a valued outcome; however significant affective effects have been weaker than the cognitive effects of training and affective effects also decay more quickly than cognitive effects (Bezrukova et al., 2016; Kalinoski et al., 2013).

Ultimately, organisations are interested in the effects of these programs on behaviour change. To this end, diversity training programs may teach methods addressing behavioural change (e.g., Goltz & Sotirin, 2014; Isaac et al., 2016; Smith, 2015), such as taking time to evaluate applicants so that negative stereotypes are less likely to be activated (e.g., Kulik & Roberson, 2008; Rivers et al., 2020). As with affective outcomes, behavioural outcomes have been found to be sizable but smaller than the effects of training on cognitive outcomes, and there is some indication that they also are less stable over time when compared to cognitive effects of training (Bezrukova et al., 2016; Kalinoski et al., 2013).

Previous research indicates demographic effects such as gender and ethnicity on training outcomes, although results have been mixed (e.g., Bezrukova, et al., 2012). First, research indicates the genders do not arrive at training with the same level of knowledge, with women having higher initial scores (Jackson, Hillard, & Schneider, 2014; Rawski & Conroy, 2020). Also, attitudinal changes tend to be shown more by groups that did not previously support women (e.g., international academic staff) whereas behavioural changes tend to be shown more by groups that did previously support women (e.g., women—Chang et al., 2019). Finally, the proportion of women to men appears to affect training outcomes, with more favourable outcomes when the proportion of women is higher (Bezrukova, et al., 2012).

Training characteristics

Implicit bias training can vary considerably in its delivery, such as: required or voluntary, once or repeated, in-person or online venues (Goldstein Hode et al., 2018; Goltz & Sotirin, 2014; Chang et al., 2019). In past research, voluntary bias training has been perceived more favourably by participants, but mandatory training has resulted in greater learning, particularly behavioural learning, suggesting that training should be mandatory (Bezrukova et al., 2012; Ehrke et al., 2014; Goldstein Hode et al., 2018; Pettigrew & Tropp, 2006). However, there is growing evidence that training program attributes, such as trainer-trainee demographics and programmatic characteristics, also influence training effectiveness (Goldstein Hode et al., 2018; Kulik et al., 2007; Bezrukova et al., 2016; Holladay & Quiñones, 2008).

One under-examined issue is the efficacy of repeated training on outcomes, particularly since refresher courses add to the cost of these training programs. Most programs are designed to train employees only once (De Meuse et al., 2007; Kulik & Roberson, 2008); fewer programs require refresher training offered on a regular basis (Goltz & Sotirin, 2014). However, training may need to be repeated to retain its efficacy (Chang et al., 2019), as repeated exposure to learning material results in better understanding and recall of concepts (Kiewra et al., 1991), and repeated testing generates significant improvements in recall (Spreckelsen & Juenger, 2017; Wiklund-Hörnqvist et al., 2014). Accordingly, it has been recommended that implicit bias training be offered as more than just a one-time event (Bezrukova et al., 2012; Bezrukova et al., 2016; Roberson et al., 2001). But when and how often training should be repeated has yet to be determined.

Short-term positive effects of training can disappear over the longer term without repeated exposure to the training material, even within a matter of a couple of months (Smith, 2015). This observation is consistent with literature in the field of education, in which the time that elapses between learning new material and being tested on or applying that material has been studied extensively (e.g., Carpenter et al., 2012). In general, learning performance is better when evaluated sooner after learning than later (Cepeda et al., 2008; Kamuche & Ledman, 2005). Research that compares ‘mass’ training and ‘spaced’ training effects suggests that for long-term retention, there should be spacing gaps between training (Cepeda et al., 2008). This has been termed the ‘distributed practice’ effect (Cepeda et al., 2006), a key effect considered in learning and memory research (Benjamin & Tullis, 2010). Spacing effects may arise from being able to review information after it was initially learned, which then may result in improved encoding and retrieval of the information (Benjamin & Tullis, 2010). Distributed practice effects were found to be higher for information provided through lecture and online methods (Donovan & Radosovich, 1999); in other words, providing follow-up training or opportunities for practicing the information such as through application appears to be particularly important when knowledge is delivered in these ways. In the context of implicit bias training at universities, this practice occurs when academic staff serve on hiring committees and tenure and promotion committees, when they are expected to make personnel decisions without bias and while adhering to labour laws.

Learning decay appears to be an issue for at least for some outcomes. The Bezrukova et al. (2016) meta-analysis indicated cognitive learning effects are ‘stickier’ than attitudinal effects, which tend to decay over time. Additionally, attitude changes from bias training have not been found to be significantly related to later behavioural measures of training efficacy (Chang et al., 2019). Furthermore, the transfer of training, which is key to behavioural outcomes, appears to be related to both the content of training and individual motivational aspects (e.g., Blume, Ford, Baldwin, & Huang, 2010; Yelon & Ford, 1999); this could explain the weaker behavioural effects found for implicit bias training (e.g., Bezrukova et al., 2016). Most importantly, it should not be assumed that a training program is effective simply because it was delivered.

The primary purpose of our study was to evaluate the effect of training repetition and recency on the cognitive, affective, and behavioural outcomes of employees who have completed a required implicit bias training program. We also examined effects of the demographic factors of gender, years at the university, and committee service on these outcomes given the literature on gender effects and effects of practice opportunities. The training at this institution uses an online facilitated course with participant discussions. Across the university, ever since the online workshop was introduced (2011), the training has been required of members of academic hiring committees and tenure and promotion committees. The initial training lasts three weeks, with a one-week refresher course required every four years for academic staff to maintain their training status.

We hypothesised that individuals who took the diversity training program more recently and more often (via refresher courses) would exhibit higher cognitive, affective, and behavioural outcomes than individuals who took the training less recently and/or fewer times (Figure 1). Given that prior research has found cognitive effects of training to be ‘stickier’ than affective and behavioural effects, we were especially interested in the impact of repeated training and time since training on affective and behavioural outcomes, which have been shown to decay over time. Academic staff who have taken the implicit bias training more often and more recently should have more positive attitudes toward diversity and be better able to identify methods that can be used to counteract implicit bias and discrimination, particularly related to hiring, tenure, and promotion situations.

Materials and methods

Institutional context

The study took place at a rural STEM-focused institution in the midwestern United States with 478 academic staff and administrators (e.g., chairs, deans, etc.). Both the undergraduate student body and academic staff have remained persistently male- and white-dominated despite decades of explicit strategic plans to increase diversity. As of fall 2021, women comprised 33 per cent of the tenure-track and tenured academics. Similarly, academic staff are mostly white, non-Hispanic and of domestic origin (71 per cent of academic staff as of fall 2021).

The training was initially funded through the NSF ADVANCE program, which focuses on increasing women in academic positions in STEM fields. As such, the focus of the training was on implicit bias based on gender to reduce gender bias in personnel decisions and ultimately

to increase the proportion of female academics at all ranks. However, the training did briefly address other dimensions of diversity and intersectionality. The training was composed of readings, quizzes, and discussions focusing on how implicit bias, stereotypes, and discriminatory behaviour regarding gender impact hiring decisions and decisions regarding tenure and promotion. The discussion component allowed participants to share their own experiences with others; social interaction has been observed to yield stronger effects on affective-based outcomes than non-interactive training (Kalinowski et al., 2013).

Measures

We emailed a survey questionnaire hosted on SurveyMonkey that took roughly 15 minutes to complete to all 478 academic staff and administrators at our university to recruit respondents to participate in our study. All academics and administrators were asked to participate in this study regardless of whether they had or had not completed the university's implicit bias training program. Respondents were given the option to receive a \$10 gift card automatically for completing our questionnaire and were entered in a drawing to win either a \$25 or \$50 gift card to boost our response rate. After three reminder emails over the course of one month, a total of 63 individuals had fully completed the survey questionnaire, resulting in a 13 per cent response rate (see Results section for sample demographics).

Our 41-item online questionnaire consisted of an informed consent statement and a mix of multiple-choice, rating-scale, and free-response questions. Items assessed participants' cognitive knowledge of implicit bias, attitudes towards diversity, and behavioural intentions, as well as the key explanatory (time since last training and number of trainings completed) and control variables (gender, years at the university, and experience on a promotion or hiring committee) we thought would best explain respondent differences in these implicit bias areas. The questions used to measure the cognitive, affective, and behavioural responses were adopted from the Modern Sexism Scale (Swim et al., 1995), the Neosexism Scale (Tougas et al., 1995), the Motivation to Control Prejudiced Reactions Scale (MCPR; Dunton & Fazio, 1997), the Color-Blind Racial Attitudes Scale (CoBRAS; Neville et al., 2000), and the Personal Beliefs About Diversity Scale (Pohan & Aguilar, 2001). Both the MCPR Scale and CoBRAS have been used in evaluations of implicit bias training programs (e.g., Stewart et al., 2003; Goldstein Hode et al., 2018). Items were chosen based on their prominence and reliability as measures of prejudice, as well as to include a variety of types of prejudice and bias for adequate coverage of the cognitive, affective, and behavioural domains. Some items were modified to represent the university context (e.g., changing 'firm' to 'university') or to use language consistent with the institutions' training program across survey items (e.g., changing 'prejudice' to 'bias').

We used 11 items to measure respondents' cognitive knowledge of concepts covered by the training program and professional beliefs about the value of institutional diversity. Seven of these items used a 5-point Likert scale (ranging from 'strongly agree' to 'strongly disagree') to prompt respondents to evaluate the importance of faculty diversity (e.g., 'A racially, ethnically, and culturally diverse staff and faculty is only needed when the university serves a diverse student body,' reverse scored and modified from Pohan & Aguilar, 2001). These questions were found to be reliable, $\alpha = 0.81$ ($M = 33.06$, $SD = 5.68$). The other four cognitive learning items

were multiple choice, with two about implicit bias and two about legalities of hiring scenarios taken from the training program.

Affective outcomes were measured with nine items using a 5-point Likert scale (ranging from ‘strongly agree’ to ‘strongly disagree’). These items referred to respondents’ personal attitudes about bias (e.g., ‘It’s important to me that my own bias does not affect others,’ modified from Dunton & Fazio, 1997) or personal attitudes about the university’s diversity efforts (e.g., ‘It is important for university leaders to talk about diversity and discrimination to help work through the institution’s problems,’ modified from Neville et al., 2000). These are meant to represent respondents’ own beliefs and motivations regardless of how the institution promotes thinking about diversity and bias. These questions were found to be reliable, $\alpha = 0.82$ ($M = 35.02$, $SD = 6.57$).

Behavioural skills and intentions were measured with 10 items regarding how respondents perceive the optimal responses to bias in realistic situations, based on what was covered in the training program. Two items were based on social distance (e.g., openness to social contact with members of other groups; Bogardus, 1925) with multiple choice responses. Two items were statements relating to the use of strategies to lessen one’s own bias (e.g., ‘I am able to monitor situations and catch myself displaying bias,’ modified from Dunton & Fazio, 1997) with 5-point Likert-scale responses (ranging from ‘strongly agree’ to ‘strongly disagree’). These items were found to be reliable, $\alpha = 0.70$ ($M = 27.91$, $SD = 4.82$). The final six behavioral items were longer scenarios modified from the Instructor Cultural Competence Questionnaire (ICCCQ; Roberson et al., 2002) for a university context, each with multiple responses ranked on their appropriateness based on skills learned in the training program. These scenarios involve the reader imagining that they are witnessing acts of implicit bias from colleagues either directly or as reported by other colleagues and identifying responses that both validate harm caused and address individuals expressing bias.

Finally, respondents were asked to report the number of years they were employed at the university, their academic status (e.g., non-tenure track, tenure-track, tenured), and whether they had served on a promotion and tenure and/or hiring committee. The Human Resources department at the university provided information on the number of times a given respondent completed the training program, the time since their last training, and their gender as reported in their employee record to keep this information both accurate and anonymous to the researchers. See ‘Supplemental Online Materials’ for the full survey instrument.

Results

All statistical analyses for the results reported below were performed in the IBM SPSS v.24 statistical software package.

Descriptive statistics

Of the 63 respondents who completed our survey, four respondents (6per cent) had not taken the implicit bias training at all, 35 per cent had taken the training once, 46 per cent had taken the training twice, and 13 per cent had taken the training three times. Thirty-six per cent of

respondents who completed the training did so in the year our survey was conducted, 19 per cent in the year prior to our survey, 15 per cent two years prior, 24 per cent three years prior, three respondents (5 per cent) did so four years prior, and only one respondent (2 per cent) completed the training more than four years prior. Those reporting no experience with hiring or promotion committee service comprised 32 per cent of respondents; 24 per cent reported experience with one of these committees but not the other and 43 per cent reported experience with both committee types. Those reporting having worked at the university for over 25 years comprised 14 per cent of respondents; eight per cent reported between 20 and 25 years, 16 per cent between 15 and 20 years, 14 per cent between 10 and 15 years, 22 per cent between 5 and 10 years, and 25 per cent between 0 and 5 years. Human Resources identified 48 per cent percent of our respondents as female and 52 per cent as male. Race and ethnicity data were not collected.

Respondents tended to be more competent in the area of attitudes toward diversity ($M = 4.08$, $SD = 0.59$) on average than cognitive knowledge ($M = 3.15$, $SD = 0.42$) or behavioural intentions ($M = 2.87$, $SD = 0.39$). However, it is worth noting that the association between cognitive knowledge and attitudes about diversity ($r = 0.72$) was much stronger than the association between cognitive knowledge and behavioural intention ($r = 0.40$), with a moderate association between attitudes about diversity and behavioural intention ($r = 0.58$) present among our respondents.

Regression analysis

We conducted linear regression analysis for each dimension of implicit bias competency (cognitive knowledge, attitudes about diversity, and behavioural intentions) as the dependent variable using the same explanatory variables in each model. We excluded academic status from this analysis due to the high potential for multicollinearity with committee service, given that tenure is a requirement for service on promotion and tenure committees in our university. Indeed, the Variance Inflation Factor for academic status was above 6.7 in all regression models when academic status was included along with committee service, while none of the academic status coefficients were statistically significant in any of these models.

No explanatory or control variables were statistically significant predictors of respondent differences in their cognitive knowledge of implicit bias at the 95 per cent confidence level, but gender was statistically significant at the 90 per cent confidence level ($\beta = -0.22$ and $p = 0.065$; Table 1). For attitudes about diversity, gender was the only coefficient to achieve statistical significance at the 95 per cent confidence level when controlling for all other variables ($\beta = -0.459$ and $p = 0.004$; Table 2), while years at the university achieved statistical significance at the 90 per cent confidence level ($\beta = -0.12$ and $p = 0.054$). Finally, for behavioural intentions, the number of years since a respondent completed the implicit bias training ($\beta = -0.097$ and $p = 0.014$; Table 3) and experience with both forms of committee service relative to no service ($\beta = 0.461$ and $p = 0.017$) were the only statistically significant coefficients at the 95 per cent confidence level when controlling for all other variables, while the number of times the respondent took the training ($\beta = -0.171$ and $p = 0.090$) and their years at the university ($\beta = -0.072$ and $p = 0.086$) were statistically significant at the 90 per cent confidence level. In other words, the cognitive knowledge of male respondents was 0.222 points lower than the cognitive knowledge of female respondents on average, and male respondent attitudes toward diversity

were 0.459 points lower than female respondents on average. Each year at the university decreased beneficial attitudes toward diversity 0.120 points on average, and each year that elapsed since a respondent completed the implicit bias training decreased behavioural intention by 0.097 points on average. Experience with both forms of committee service increased behavioural intention 0.461 points on average when compared to no service. As the number of training experiences increased, behavioural intentions decreased by 0.171 points on average, while each year at the university decreased behavioural intentions by 0.072 points on average.

Discussion

The purpose of our survey was to determine whether the number of times a training was taken and/or the time elapsed since last training impacted the knowledge, attitudes, and behaviours associated with reduced implicit bias in personnel decision-making, ultimately to determine the effectiveness of the university's required training policy. We found no significant effect of the frequency of training on either the cognitive ($p = 0.882$) or affective ($p = 0.410$) dimension of implicit bias competence (Tables A-B), but a small, negative effect of training frequency on behavioural intentions ($p = 0.090$; Table 3). Our results differ from previous research indicating that learning increases with increased exposure to training material (e.g., Chang et al., 2019; Kiewra et al, 1991). Our result could be due to the small sample size and the limited range of repetition (zero to 3 times), or may reflect a real and rapid decay of knowledge and attitudes post-training, with some annoyance with mandatory material refreshers that has a detrimental effect on behaviours. Future research should use a pre- and post-training assessment after each training session to determine whether there are any gains in these competency dimensions with repetition. However, should our results hold more generally, training programs could eliminate fixed-schedule refresher courses that can demand a significant amount of time and resources from an organisation and its employees.

Although years since training had no significant relationship with affective ($p = 0.208$) competence, we did find an effect of time since training on our measures of cognitive (at the $p = 0.1$ level) and behavioural competence, with those having received training more recently reflecting less implicit bias in their knowledge and behavioural intentions ($p = 0.100$ and $p = 0.014$ respectively; Tables 1-3). Our results differ from those found in Bezrukova et al.'s (2016) meta-analysis, which found that training positively influenced cognitive knowledge and attitudes, but attitudinal effects of training decayed over time while cognitive effects were more sustained. Considering both our findings and Bezrukova and colleagues' (2016) findings, we conclude that it is likely the recency of training, not the repetitiveness, that dictates improvements in dimensions of competence for implicit bias. Therefore, we would recommend that implicit bias training be administered at the beginning of a decision-making committee's service, so that the committee's knowledge, attitudes, and behaviours brought to their task most closely reflect the needs and values of the organisation.

Years at the university had no effect on cognitive knowledge, but a small, negative effect (at the $p = 0.10$ level) for attitudes ($p = 0.054$) and behavioural intentions ($p = 0.086$; Tables 1-3). These observations may reflect a cohort effect (with younger academics more amenable to or familiar with implicit bias concepts) or a cultural effect of the skewed demographics of the university faculty that have been slow to change (see further discussion in the 'Gender' section

below). However, these results may also reflect training program administration and the negative impact that training repetition has on training outcomes; the policy of mandatory refreshers every four years resulted in academic staff with longer tenures at the university taking the training more times than newer hires. As for committee service, we observed no effect of training on cognitive knowledge or attitudes, but a significant positive effect for behavioural intentions for academic staff who had served both types of committees ($p = 0.017$). In essence, experience with both forms of committee service increased behavioural intention 0.461 points on average when compared to no service, perhaps reflecting the educational benefits of applying the skills and concepts from the trainings into practice on real hiring decisions.

Although gender effects for competency were not our main focus, gender emerged as a consistent factor influencing implicit bias competency. Male-identified academics scored significantly lower in attitudes regarding implicit bias than female-identified academics ($p = 0.004$, Table 2), and lower in cognitive knowledge ($p = 0.065$, Table 1). While we can only speculate, we suspect that the predominantly white male demographics of the academics may create an environment where women (and minorities) observe or are targets of implicit bias frequently, and thus enter the training program with a higher baseline of bias-informed knowledge and attitudes. In contrast, these biases may be relatively invisible to majority academics, or the training itself may elicit an unconscious reluctance on the part of majority men to accept the concept of implicit bias altogether (Handley et al., 2015). The over-representation of women in the survey response dataset suggests that women are more voluntarily engaged with the subject. We recommend the further examination of gender effects within unique populations such as this to better understand contextual effects and potential relevance to training policy.

Our study suffered from the usual limitations of doing field research in which conditions are not always optimal for making conclusions about causality. For example, the gender effects found in the present study may have been present prior to participants doing the training, but we could not assess this because no pre-tests were given. Another concern is self-selection: individuals who were indifferent to implicit bias issues or training may not have responded to the invitation to participate, whereas individuals with strong feelings (positive or negative) may have been overrepresented. We know, for example, that women were over-represented as compared with their general representation in the academic staff. Despite these shortcomings, we believe the study design allows for some initial conclusions about the effectiveness of extended and repeated training, which has not received much attention in the research literature on diversity training. However, future research studies that replicate these findings would be useful.

Our results support a policy of mandatory implicit bias training that is assigned immediately before service on a search or tenure and promotion committee, rather than on a fixed schedule (every four years, in our case), to assure that the material and concepts are fresh and retrievable. Given our observations that years at the institution are associated with negative outcomes for bias competency, administrators should be prepared for push-back against both the training and the broader institutional goals related to diversity, equity, inclusion among more veteran employees. Furthermore, our results suggest that the completion of a training course (or maintaining an up-to-date refresher status) does not necessarily generate competency; administrators should refrain from concepts such as ‘certification’ that imply that training completion has mitigated or eliminated an individual’s system of implicit bias.

In conclusion, effects of repeated diversity training on behavioural intentions have important policy implications. We found that time since training and committee service both had a beneficial effect on behavioural intentions. Policy makers should consider that it is not the number of times one took the training but how recently they took it and whether they had an opportunity to practice it by being on a committee when creating diversity training policies.

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