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Mindful Attention Reduces Linguistic Intergroup Bias

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Abstract

A brief mindfulness intervention diminished bias in favor of one's in-group and against one's out-group. In the linguistic intergroup bias (LIB), individuals expect in-group members to behave positively and out-group members to behave negatively. Consequently, individuals choose abstract language beset with character inferences to describe these expected behaviors, and in contrast, choose concrete, objective language to describe unexpected behaviors. Eighty-four participants received either mindful attention instructions (observe their thoughts as fleeting mental states) or immersion instructions (become absorbed in the vivid details of thoughts). After instruction, participants viewed visual depictions of an imagined in-group or out-group member's positive or negative behavior, selecting the best linguistic description from a set of four descriptions that varied in abstractness. Immersion groups demonstrated a robust LIB. Mindful attention

groups, however, exhibited a markedly tempered LIB, suggesting that even a brief mindfulness related instruction can implicitly reduce the propensity to perpetuate stereotypical thinking through language. These results contribute to understanding the mechanisms that facilitate unprejudiced thinking.

Introduction

Language offers a window to the mind. Among other things, we use language to maintain and communicate expectancies, including our privately held beliefs about people and events (Douglas et al. 2008). Regardless of our intentions, the language we use may implicitly or explicitly transmit bias in the form of stereotypes and prejudice (Maass 1999 ; Wigboldus et al. 2000 , 2005). One way to measure these kinds of bias is by using a property of language known as linguistic abstraction, specifically, the amount of interpretive information conveyed when describing a person or behavior (Semin and Fiedler 1988 , 1991 , 1992).
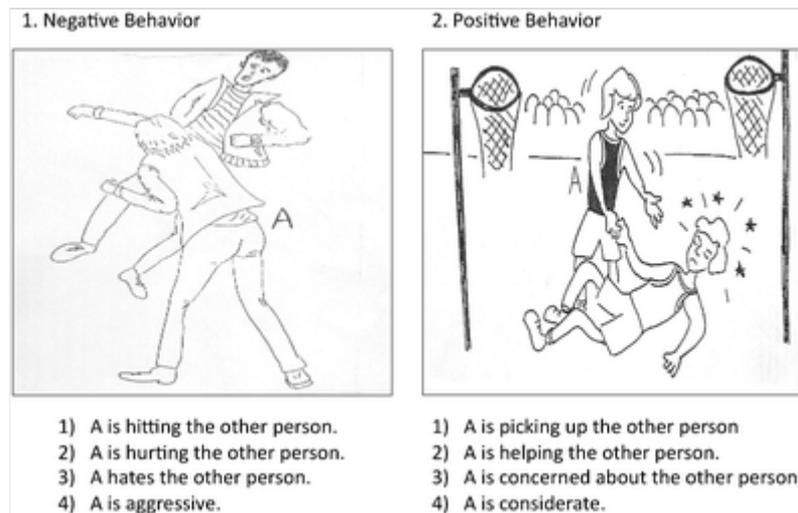
Linguistic abstraction can be used to characterize how people select verbs and adjectives to describe a person or a behavioral event at different levels of description, ranging from concrete to abstract. The Linguistic Category Model, for example, identifies four levels of

linguistic abstraction ("LCM," Semin and Fiedler 1988, 1991, 1992). Figure 1 illustrates the LCM with examples of cartoon images for (1) a negatively valenced behavior (hitting another person) and (2) a positive behavior (picking up someone who fell). The main character in the cartoon is labeled with the letter "A." The four levels of the LCM in Fig. 1 exhibit increasing amounts of interpretation about a depicted event. At Level 1, descriptive action verbs are the most concrete, providing a non-interpretive description of an event or behavior (e.g., A is hitting the other person). At Level 2, interpretive action verbs also describe a specific event or behavior, but include some interpretation, making them more abstract than Level 1 (e.g., A is hurting the other person). At Level 3, state verbs are more abstract than the previous two levels because they describe an emotional state of the person involved rather than a specific detail of the event or behavior (e.g., A hates the other person). At Level 4, adjectives are the most abstract, describing the characteristics of the person performing the behavior, not the behavior itself (e.g., A is violent). The choice to describe an action concretely vs. abstractly is really a choice about whether to describe the action in terms of someone's current physical behavior vs. their long-term abstract nature. The contexts in which people choose to make a "character judgment," or decide not to, can reveal stereotyped beliefs about social groups.

Fig. 1

Cartoon 1 is an example of a negative behavior performed by the main character labeled "A," with four possible linguistic descriptions of the behavior listed below. These four descriptions are in order of increasing abstractness, corresponding to the levels of abstraction in the Linguistic Category Model (LCM). Cartoon 2 is an example of a positive behavior performed by character A, with its corresponding linguistic descriptions. Like the negative behavior cartoon, these descriptions also correspond to the levels of linguistic abstraction in the LCM. Cartoons reproduced with the permission of. Dr. Anne Maass

1. Negative Behavior | 2. Positive Behavior

1) A is hitting the other person.
2) A is hurting the other person.
3) A hates the other person.
4) A is aggressive.

1) A is picking up the other person
2) A is helping the other person.
3) A is concerned about the other person.
4) A is considerate.

Two processes—differential expectancies and in-group protection—play important roles in determining the level of linguistic abstraction used to describe an observed action. These two processes also play central roles in conveying stereotypes and intergroup bias. Each process is addressed in turn.

First, consider differential expectancies. In general, people tend to use abstract, interpretive language when describing a behavior that matches their expectations (Maass 1999; Maass et al. 1995 95; Wigboldus et al. 2000). If one holds a stereotyped expectation that men are aggressive, for example, one would be likely to choose the most abstract description of Cartoon 1 in Fig. 1 (A is aggressive). This abstract language implies that the behavior is believed to be typical of the individual or group and is related to their "makeup" (Maass 1999; Maass et al. 1995).

In contrast, people tend to use more concrete, non-interpretive language when describing a behavior that violates their expectations (Maass 1999; Maass et al. 1995; Wigboldus et al. 2000). When a high-level explanation of the behavior is lacking, people simply describe the behavior. Returning to our previous example, if one holds a stereotyped belief that women are not aggressive and views a woman (instead of a man) hitting a person in Cartoon 1, one would be more likely to choose the most concrete description (A is hitting the other person). Concrete language implies that the behavior is believed to be uncharacteristic of

the individual or group. Such language refrains from relating the behavior to someone's nature, and prevents contradicting the stereotyped belief, for example, that women are not aggressive (Maass 1999; Maass et al. 1995).

Thus, the level of linguistic abstraction in each of these two examples serves to maintain one's stereotyped beliefs about men being aggressive and women not being aggressive (Maass 1999; Maass et al. 1995). This phenomenon is called the Linguistic Expectancy Bias or the LEB (Maass et al. 1995; Wigboldus et al. 2000). Notably, stereotyped expectations that cause the LEB can be negatively valenced (e.g., all blond women are unintelligent) or positively valenced (e.g., all Asians are good at math). Regardless of the valence, abstract language is associated with conveying stereotypical expectations, according to the LEB.

Further, consider the second process of in-group protection. When one's in-group becomes associated with something negative, in-group protection serves to maintain a positive in-group image (Maass et al. 1989). Generally speaking, in-group protection limits the process of differential expectancies to positive expectancies for in-group members (and oneself) vs. negative expectancies for out-group members. More specifically, people tend to use more abstract, interpretive language when describing a positive behavior performed by a member of their in-group (e.g., a friend) or when describing a negative behavior performed by a member of their out-group (e.g., an enemy). If, for example, character A in Cartoon 2 is their friend, people would be likely to choose description 4, A is a considerate person. Analogously, if character A in Cartoon 1 is their enemy, people would be likely to choose description 4, A is aggressive.

Conversely, people tend to use more concrete, descriptive language when describing a negative behavior performed by a member of their in-group or when describing a positive behavior performed by a member of their out-group. If for example, character A in Cartoon 2 is their enemy, people would be likely to choose description 1, A is picking up the other person. Analogously, if character A in Cartoon 1 is

their friend, people would be likely to choose description 1, A is hitting the other person.

As we have seen, abstract language relates an observed behavior to beliefs about the agent's character, whereas concrete language implies that an observed action is an exception to typical behavior, inconsistent with the nature of the individual performing it (e.g., Arcuri et al. 1993; Cole and Leets 1998; Maass 1999). As a consequence, using levels of linguistic abstraction in this manner with in-groups and out-groups serves to maintain a positive in-group bias and a negative out-group bias (Arcuri et al. 1993; Cole and Leets 1998; Maass et al. 1989). The use of linguistic abstraction to convey in-group vs. out-group biases constitutes the Linguistic Intergroup Bias or the LIB (Maass et al. 1989). The LIB is a specific form of the more general LEB. Whereas the LIB is limited to positive vs. negative expectancies for in-groups vs. out-groups, respectively, the LEB includes a wide variety of additional expectancies.

People are often not aware that the LIB transmits their underlying cognitive biases and beliefs to others (Franco & Maass, 1996; Schnake and Ruscher 1998; von Hippel et al. 1997). Consequently, it is difficult to inhibit its effect on linguistic tasks (Franco ~~and~~ & Maass 1999). For these reasons, the LIB can be used as an implicit indicator of people's prejudices (von Hippel et al. 1997). Although there is some evidence that this prejudice can be reduced through explicit means (e.g., telling people to view their out-group in a favorable way; Douglas and Sutton 2003; 2008), this reduction may simply reflect explicit effects of social desirability, not a true reduction in bias. Ideally, it would be more desirable if the LIB could be reduced implicitly, without directly asking participants about their attitudes toward in- and out-group members explicitly, thereby minimizing the influence of social desirability.
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Mindfulness offers a potential implicit modulator of the LIB. Broadly speaking, mindfulness is present-centered, nonjudgmental awareness (Kabat-Zinn 1990, 2003). It facilitates sustained attention to ongoing sensory, cognitive, and emotional experience, while diminishing the

tendency to react, elaborate, or evaluate (Bishop et al. 2004). Over the past few decades, mindfulness has been associated with numerous benefits, including increased self-control, affect tolerance, emotional intelligence, improved concentration, and mental clarity, and the ability to relate to others and oneself with kindness, acceptance, and compassion (~~Adele~~Hayes & Feldman, 2004; Baer and Lykins 2011; Bishop et al. 2004; Brown, Ryan, & Creswell, 2007; Fulton, 2005; Leary & Tate, 2007; ~~Wallace, 2001~~; Walsh & Shapiro, 2006).

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Accumulating evidence suggests that mindfulness reduces stereotypical and prejudicial cognition. Compared to control groups, participants in a wide variety of mindfulness intervention groups were less likely to discriminate against handicapped individuals (Langer et al. 1985), less likely to report that prejudicial thoughts were objective facts, and more likely to endorse the intention to actively reduce bias in their lives (Lillis and Hayes 2007). Further, evidence suggests that mindfulness can reduce stereotype threat (i.e., when a negative stereotype associated with one's in-group becomes active and decreases task performance). In Weger et al. (2012), for example, women primed with the stereotype that "men are better at math" did better on a subsequent math test if they had previously completed a brief mindfulness intervention compared to those who had not. Those without the mindfulness intervention exhibited the typical stereotype threat reduction in math performance. Similarly, Lueke and Gibson (2015) found that a mindfulness intervention reduced automatic negative reactions to out-group members based on race and age as measured by the Implicit Association Test. Finally, Ostafin et al. (personal communication, 25th March, 2014) found that individuals high in trait mindfulness were better at controlling alcohol drinking behaviors, with this relationship being partially mediated by how abstractly these behaviors were

represented. Individuals high in mindfulness tended not to link alcohol behavior to abstract, higher-order goals like emotion regulation. None of this research, however, has examined whether mindfulness modulates the LIB.

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Using a brief mindfulness-based intervention, we aimed to reduce the expectancy biases that arise during linguistic abstraction. In an in-group/out-group paradigm that has consistently produced the LIB (e.g., Maass et al. 1995; Douglas and Sutton 2003), participants imagined either their "best friend" (in-group) or "worst enemy" (out-group) behaving in expected ways or unexpected ways (as depicted by cartoons like those in Fig. 1) before selecting the linguistic description that best described the action. In the immersion groups that attempted to replicate the LIB, participants immersed themselves in their thoughts and emotional reactions to the cartoons (the default approach to engaging with them). Conversely, in the mindful attention groups, participants simply observed their thoughts and reactions to cartoons, viewing them as transient mental events. As a result of shifting perspective from the default state of immersion to mindfully observing one's thoughts, we predicted that participants would disengage from the situations depicted in the pictured scenes, such that their stereotypical reactions to them would not appear as subjectively real as usual. As a further consequence, participants should refrain from ascribing abstract, interpretive, character judgments to their friends when they acted positively, and from ascribing character judgments to their enemies when they acted negatively. Once participants no longer engaged in elaborative, inference-filled thought, they should choose relatively concrete behavioral descriptions, regardless of whether their in-group or out-group member acted in line with their expectations. Thus, we predicted that mindful attention would attenuate, and perhaps eliminate, the LIB effect that normally occurs while being immersed in viewing scenes. Specifically, we predicted that this modulation of the LIB would reveal itself in a three-way interaction between perspective (mindful attention/immersion), character (friend/enemy), and cartoon behavior valence (positive/negative).

Method

Participants

Eighty-four (21 per group) students (60 female) from Emory University participated for course credit, ranging in age from 18 to 26 ($M = 19$). The sample was 59 % Caucasian, 21 % Asian, 11 % Hispanic, 7 % African American, and 2 % identified as other. Of the 84 participants, 25 stated that they had previous meditation experience (6 in immersion/friend, 4 in immersion/enemy, 7 in mindful attention/friend, and 8 in mindful attention/enemy). These meditation experiences ranged from periodic yoga classes to daily prayers and breathing exercises. We obtained informed consent from each participant and treated them in accordance with the ethical standards laid down in the 1964 Declaration of Helsinki and its later amendments. The Emory Institutional Review Board approved this protocol.

Procedure

The experiment took place on a laptop using E-prime software inside individual cubicles in either a laboratory or library setting. The mixed design consisted of a repeated measures factor of behavior valence (positive/negative), with two between-group manipulations, character (friend/enemy), and perspective (mindful attention/immersion), yielding four groups: (1) mindful attention/friend, (2) mindful attention/enemy, (3) immersion/friend, and (4) immersion/enemy. After being randomly assigned to a condition, each participant viewed all the same cartoon stimuli, presented in a random order during both the practice and testing phases. Participants were not aware that the experiment included a mindfulness-based intervention, but instead were told that the experiment examined how we view our peers. Instructions were provided visually on the laptop, with the experimenter answering questions as needed.

In-Group/Out-Group Manipulation

Participants were first asked to imagine that the person labeled with the letter A in the cartoons to come was either their friend or enemy,

depending on their group assignment. They viewed four practice cartoons and rated whether they felt negative, neutral, or positive emotions while viewing them. This initial task encouraged participants to attend to their thoughts and reactions about the cartoons.

Immersion Instructions

After viewing the practice cartoons and rating their emotions, the participants in the "immersion perspective" groups were asked to completely immerse themselves in the cartoon events depicting their friend (or enemy). They were instructed to "live" the experience by projecting themselves into the events and by attempting to experience vivid details such as colors, sounds, smells, as well as emotions, physical sensations, and bodily states. These participants were encouraged to experience the events almost as if they were actually occurring in the present moment (see SM Appendix A for more details). The immersion instructions were adapted from Papies et al. (2012) and Wilson-Mendenhall et al. (2011).

Mindful Attention Instructions

Participants in the mindful attention groups were asked to view and think about the cartoon events depicting their friend (or enemy) using an "observing perspective." To prevent potential demand, the words "mindfulness" or "mindful attention" were never used to describe this perspective. Participants were simply instructed to observe specific thoughts and reactions that they had in response to viewing the cartoons. Rather than engaging in vivid, elaborative thought about the event, they were asked to treat their thoughts and reactions as transitory, fleeting mental states. They were further instructed that these thoughts and reactions are not really part of the cartoon events but are what the mind constructs at that moment. Thus, when the participants practiced this "observing perspective," they remained aware that they were simply observing their thoughts and reactions to the events in the present moment instead of "living" them (see SM Appendix A for more details). The mindful attention instructions were adapted from Papies et al. 2012 (also see Lebois et al. 2015; Papies et al 2015). The mindful

attention and immersion instructions were presented in a similar style and length.

After the perspective instruction, the experimenter verified that the participants understood their instructed strategy and asked them to rate how well they understood it on a scale of 1 (not at all) to 7 (very well). Next, participants viewed the four practice cartoons again, to practice immersing or observing. For each cartoon, participants had 10 s to perform immersion or observation while they viewed their friend (or enemy) in the respective event before the screen advanced to the next practice cartoon. This procedure repeated for all four practice cartoons. After this second phase of practice was completed, participants rated how well overall they were able to perform immersion or observation. Once this instruction was complete, participants advanced to the critical task.

Multiple-Choice Task

This task was introduced as a new and different part of the experiment. Depending on their group assignment, participants were instructed to continue immersing themselves in each cartoon or to continue observing their reactions to it. At the top of the screen for each trial (both practice and critical), participants were reminded to either "Immerse Yourself" or "Observe Your Thoughts" and to also imagine that the character performing the behavior in the cartoons was either their "Friend" or "Enemy." After 10 s of immersion or observation with respect to the depicted event, four descriptions appeared beneath the cartoon, and participants selected the description (1, 2, 3, or 4) that they felt best represented what was occurring in the cartoon. The descriptions varied in abstractness based on levels of the Linguistic Category Model described earlier, ranging from (1) very concrete to (4) very abstract (with nothing being said to participants about the abstractness of the descriptions). Participants had an unlimited amount of time to select the description that they felt was best suited for describing what the main character was doing in the event (typically taking about 7 to 11 s). After participants made their selection, a 2- s pause occurred before the computer screen advanced to the next

cartoon. Half of the cartoons depicted positive behaviors, and half depicted negative behaviors, all being randomly intermixed (with nothing being said to participants about the valence manipulation).

Before the critical trials, participants completed four practice trials with the same practice cartoons that they had already seen twice previously, this time selecting a description. The experimenter answered any questions before the participants moved on to the eight critical trials with the eight novel cartoons. The aforementioned procedure continued until participants had performed all eight critical trials. After completing the experiment, participants were asked to describe what they were doing while viewing the cartoons and to rate how difficult it was to immerse themselves in the scenes or observe their thoughts to them on a scale of 1 (not at all) to 7 (very difficult). After this rating, they were asked to describe any personal meditation experience. Finally, they were debriefed and received compensation for participating.

Measures

Participants viewed four practice cartoons and eight critical cartoons (see Fig. 1 for examples). Appendix B in the Supplementary Materials (SM) provides all practice and critical cartoon stimuli. Each cartoon contained one frame depicting an event. Half of the critical cartoon events depicted positive behaviors that included walking an elderly person across the road, recycling trash, picking another person up off the ground, and running. The other half depicted negative behaviors that included telling a sexist joke, throwing trash on the ground, spray-painting a wall, and hitting another person. Each cartoon had a main character clearly labeled with the letter "A." The main characters were drawn in a stylized way such that gender and age were less central features.

Each cartoon was paired with four unique descriptions of increasing abstractness that portrayed the main character, A's, actions. Two examples of these descriptions are provided in Fig. 1, and all description options are provided in SM Appendix B. The participants

were not told that the four descriptions for each cartoon represented different levels of linguistic abstraction from the Linguistic Category Model (Semin, 1994; Semin & Fiedler, 19~~9~~88). For every cartoon, the four description options for each cartoon always began with the most concrete first and the most abstract last.

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The eight critical cartoons, one practice cartoon, and their associated descriptions were the same as those constructed by Douglas and Sutton (2003). Three additional practice cartoons and associated descriptions were newly created for this experiment. These additional practice materials were added to ensure that participants viewed an equal distribution of positive and negative behavior cartoon events and that each cartoon event depicted a different behavior. All four experimental groups used the same practice and critical materials. In addition, all critical materials were normed in previous studies to ensure that people perceived the desirable behaviors as positive and the undesirable behaviors as negative (Douglas ~~and~~& Sutton 2003; Maass et al. 1995). On each trial, the cartoon description chosen was recorded, as was the response time (RT) for making the choice. Appendix C presents the internal consistencies for materials within each condition.

Data Analysis

Participants' responses on the critical multiple-choice task were transcribed into numbers based on the Linguistic Category Model, with 1 representing most concrete and 4 representing most abstract. These linguistic abstraction scores were then entered into various analyses. Each participant's responses to positive behaviors were averaged to create an overall positive behavior abstraction score, and the same was done for responses to negative behaviors, creating two data points for each participant. To assess our hypotheses, we performed a priori contrasts and an analysis of variance (ANOVA) across the four experimental groups with one repeated factor of behavior valence. Gender, ethnicity, and age did not predict differences in our results and therefore have not been controlled for in the following analyses. All

contrasts were one-tailed tests given that they tested directional hypotheses. All effect sizes are reported using Hedges' g_s calculated following Lakens (2013). Figure 2 illustrates both the descriptive statistics for the cartoon description abstraction responses and the key inferential statistics that follow (IMM = immersion, MA = mindful attention).

Fig. 2

Average linguistic abstraction scores for the four groups (immersion-friend, immersion-enemy, mindful friend, mindful enemy) for each type of scene (positive, negative). *Solid significance bars* illustrate differences between groups representing the Linguistic Intergroup Bias (LIB). *Dashed significance bars* illustrate significant reductions in the LIB. *$p <$ 0.05. *Standard error bars* are ± one standard error of the mean
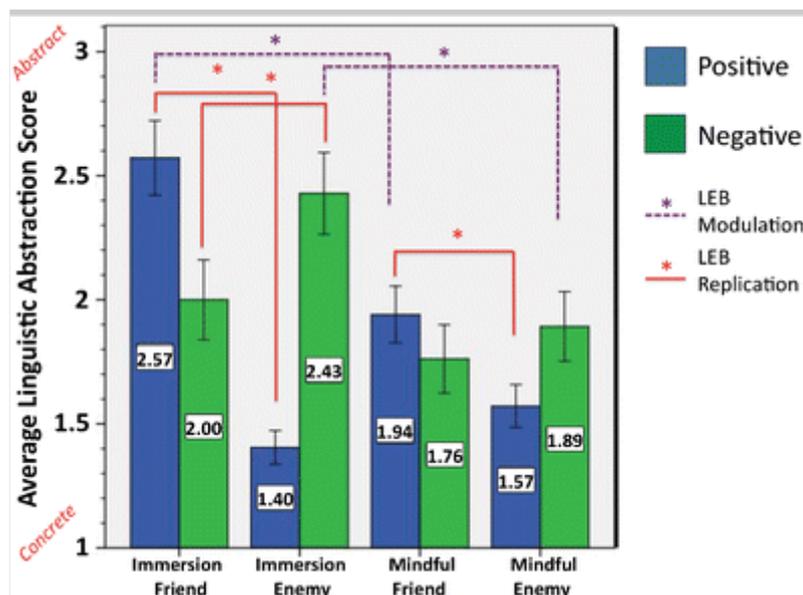
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Results

Our key hypotheses involved the three-way interaction between perspective (mindful attention/immersion), character (friend/enemy), and behavior valence (positive/negative). We hypothesized that the immersion groups would robustly replicate the LIB and that the mindful attention groups would show diminished bias. Consistent with these predictions, the omnibus three-way interaction was significant, $F(1,80)$

$= 10.09$, $p = 0.002$, $\eta p^2 = 0.11$.

To examine where the predicted group differences occurred within the three-way interaction, we conducted a series of a priori contrasts further testing our hypotheses. The significance bars in Fig. 2 illustrate the results described next. In line with our hypotheses and previous work, the immersion groups exhibited the LIB. Behaviors that matched their expectations (friend positive, enemy negative) were rated more abstractly than unexpected behaviors (friend negative, enemy positive). The mean difference in the linguistic abstraction scores between friend (2.57) and enemy (1.40) for a positive behavior was 1.17, $t(40) = 7.31$, SE $= 0.16$, $p < 0.001$, $g_s = 2.15$. Conversely, the mean difference in the scores between friend (2.00) and enemy (2.43) for a negative behavior was -0.43, $t(40) = -2.05$, SE $= 0.21$, $p = 0.024$, $g_s = 0.57$. As described earlier, higher numbers indicate more abstraction. Thus, the difference of 1.17 for positive behaviors indicates that the linguistic abstraction scores for the friend group were more abstract than were the scores for the enemy group. In contrast, the difference of -0.43 for negative behaviors indicates that the linguistic abstraction scores for the friend group were less abstract than were the scores for the enemy group. Thus, overall, participants described behaviors that matched their expectations relatively abstractly (friend positive, enemy negative) and those that violated their expectations relatively concretely (enemy positive, friend negative).

Although the mindful attention groups also exhibited the LIB, it was significantly attenuated as predicted. Four results support this conclusion. First, the mindful attention groups only exhibited the LIB for positive behaviors (positive behaviors: friend vs. enemy, M difference $= 0.37$, $t(40) = 2.31$, SE $= 0.16$, $p = 0.010$, $g_s = 0.79$; negative behaviors: friend vs. enemy, M difference $= -0.13$, $t(40) = -0.62$, SE $= 0.21$, $p > 0.250$, $g_s = 0.20$). Mindful attention participants were more likely to ascribe character judgments to their friends when they were behaving positively than they were to ascribe these abstract descriptions to their enemies' positive actions. These participants did not, however, ascribe more abstract character judgments to their enemies when they

were behaving negatively compared to when their friends behaved negatively.

Second, the LIB exhibited for positive behaviors in the mindful attention groups was much smaller than the LIB exhibited for positive behaviors in the immersion groups; IMM, M difference = 1.17 vs. MA, M difference = 0.37; $t(82) = 3.53$, SE = 0.23, $p < 0.005$. This finding indicates that mindful attention significantly reduced the LIB. Although mindful attention participants still ascribed character judgments to their friends when they behaved positively, they did so to a much lesser extent in comparison to the immersion groups.

Third, the LIB exhibited for positive behaviors in the mindful attention groups also had a much smaller effect size compared to the immersion groups (IMM, $g_s = 2.15$ vs. MA, $g_s = 0.79$). Although the effect size for the LIB in the mindful attention groups was still high, suggesting that the LIB is difficult to overcome, it was much smaller than in the immersion groups. Again, mindful attention reduced the LIB.

Fourth, as the dashed significance bars further illustrate in Fig. 2, the bias exhibited by the mindful attention groups, relative to the immersion groups, was attenuated substantially. As hypothesized, this attenuation occurred for expected behaviors (friend positive, enemy negative). Specifically, positive behaviors for friends and negative behaviors for enemies were rated more concretely in the mindful attention groups than in the immersion groups (Positive friend behaviors: IMM vs. MA, M difference = 0.63, $t(40) = 3.94$, SE = 0.16, $p < 0.001$, $g_s = 1.01$; Negative enemy behaviors: IMM vs. MA, M difference = 0.54, $t(40) = 2.57$, SE = 0.21, $p = 0.007$, $g_s = 0.76$). This pattern indicates that biased knowledge played less of a role in the construal of perceived behavior during mindful attention than during immersion.

We did not have any hypotheses about mindful attention's influence on ratings for unexpected behaviors (friend negative, enemy positive). When we compared immersion and mindful attention groups on these behaviors, however, there were no significant differences. Consistent

with the LIB, behaviors that violated expectations were rated concretely in both the immersion and mindful attention groups (negative friend behaviors: IMM vs. MA, M difference $= 0.24$, $t(40) = 1.14$, SE $= 0.21$, $p = 0.135$, $g_s = 0.34$; positive enemy behaviors: IMM vs. MA, M difference $= -0.17$, $t(40) = -1.06$, SE $= 0.16$, $p = 0.142$, $g_s = 0.47$). This pattern is not surprising because unexpected behaviors were already described more concretely in the immersion groups and because mindful attention tended to elicit concrete descriptions overall (as described next).

We were also interested in the main effect of perspective (mindful attention vs. immersion), predicting that mindful attention would elicit more concrete responses compared to immersion. Consistent with this prediction, we found a significant main effect of perspective, $F(1,80) = 9.60$, $p = 0.003$, $\eta p^2 = 0.11$. Collapsed across character groups (friend and enemy), responses in the mindful attention group were more concrete ($M = 1.79$, SE $= 0.07$) than were responses in the immersion group ($M = 2.10$, SE $= 0.07$; M difference $= 0.31$). This finding suggests that, in general, participants in the mindful attention groups were more likely to simply describe the specific details of their in-group and out-group members' actions, whereas immersion groups were more likely to draw relatively abstract inferences about the character and emotional states of both in-group and out-group members from their actions.

The main effect of character was also significant, $F(1,80) = 5.97$, $p = 0.017$, $\eta p^2 = 0.07$. Collapsed across perspective and behavior valence, the friend groups received more abstract responses ($M = 2.07$, SE $= 0.07$) than did the enemy groups ($M = 1.82$, SE $= 0.07$). As the three-way interaction in Fig. 2 illustrates, this main effect is most likely driven by the immersion groups' abstract responses to friends behaving positively, together with their concrete responses to enemies behaving negatively.

The omnibus interaction between behavior valence and character (collapsed across perspective) was also significant, $F(1,80) = 36.94$, $p < 0.001$, $\eta p^2 = 0.32$. The mean difference in the linguistic abstraction

scores between friend (2.26) and enemy (1.49) for a positive behavior was 0.77, $t(82) = 7.00$, SE = 0.11, $p < 0.001$, $g_s = 0.34$. Conversely, the mean difference in the scores between friend (1.88) and enemy (2.16) for a negative behavior was −0.28, $t(82) = 1.87$, SE = 0.15, $p = 0.034$, $g_s = 0.53$. As this pattern illustrates, there was a significant LIB across the entire sample, driven primarily by the strong LIB in the two immersion groups.

The main effect of behavior valence, the interaction between valence and perspective, and the interaction between perspective and character were not significant, $F(1,80) = 2.98$, $p = 0.088$, $\eta p^2 = 0.04$; $F(1,80) = 0.81$, $p > 0.250$, $\eta p^2 = 0.37$; and $F(1,80) = 1.57$, $p = 0.214$, $\eta p^2 = 0.02$, respectively. These results do not limit or have any bearing on our main overall hypotheses and so are not discussed further.

Some participants in our sample had previous experience with meditation (25 out of 84). As a result of this experience, these participants could have biased the data toward our hypothesized outcomes. To address this issue, we conducted a supplemental analysis excluding individuals who had previous meditation experience of any kind (see Appendix C in the SM for the complete details). As illustrated in SM Figure 1, the same pattern of results found for all 84 participants also emerged for the 59 participants without meditation experience. Critically, there was still a significant three-way omnibus interaction between behavior valence, perspective, and character type in the non-meditators, $F(1,55) = 4.69$, $p = 0.035$, $\eta p^2 = 0.08$. The immersion groups still demonstrated the LIB for positive behaviors (positive behaviors: friend vs. enemy, M difference = 1.15, $t(30) = 6.39$, SE = 0.18, $p < 0.001$, $g_s = 2.20$). They did not, however, exhibit a significant LIB for negative behaviors (negative behaviors: friend vs. enemy, M difference = −0.23, $t(30) = −0.88$, SE = 0.26, $p = 0.187$, $g_s = 0.30$), but classic research does not always observe the LIB for negative behaviors (Maass 1999; Maass et al. 1989).

Non-meditators in the mindful attention groups also exhibited the LIB for positive behaviors but not for negative behaviors (positive behaviors: friend vs. enemy, M difference = 0.47, $t(25) = 2.35$, SE =

0.20, $p = 0.011$, $g_s = 0.88$; negative behaviors: friend vs. enemy, M difference $= -0.01$, $t(25) = -0.04$, SE $= 0.28$, $p > 0.250$, $g_s = 0.01$). These participants still rated the positive behavior of friends more abstractly than the positive behavior of enemies. Compared to immersion groups, however, the mindful attention groups exhibited a reduced LIB (positive friend behaviors: IMM vs. MA, M difference $= 0.62$, $t(27) = 3.26$, SE $= 0.19$, $p = 0.001$, $g_s = 1.18$; negative enemy behaviors: IMM vs. MA, M difference $= 0.54$, $t(28) = 1.93$, SE $= 0.27$, $p = 0.026$, $g_s = 0.69$). Thus, the mindful attention groups still rated expected behaviors (positive friend, negative enemy) more concretely compared to the immersion groups. In contrast, immersion groups were more likely to ascribe abstract character judgments in these contexts. The SM includes all other main effect and interaction results for the non-meditator subgroup.

In summary, non-meditators still exhibited the crucial pattern evident in the complete sample: The immersion group exhibited the LIB, and the mindful attention group exhibited a reduced LIB. Therefore, the influence of individuals who already had experience with mindfulness-based practices was not the driving force behind the original results.

Although our sample only included 25 participants with varied meditation experience, we ran an exploratory analysis to see if this subgroup displayed a unique pattern of results (see Appendix C in the SM for the complete details). Again, the omnibus three-way interaction between valence, perspective, and character was the key result to examine for our hypotheses. As illustrated in SM Figure 2, this interaction was again significant, $F(1,21) = 6.70$, $p = 0.017$, $\eta p^2 = 0.24$.

In the meditation subgroup, the immersion groups demonstrated the LIB for both the expected positive friend behaviors and negative enemy behaviors (positive behaviors: friend vs. enemy, M difference $= 1.19$, $t(8) = 3.72$, SE $= 0.32$, $p < 0.001$, $g_s = 2.13$; negative behaviors: friend vs. enemy, M difference $= -1.02$, $t(8) = 2.76$, SE $= 0.37$, $p = 0.006$, $g_s = 1.58$). Just like the pattern in our main results, immersion groups replicated the LIB by describing expected behaviors (friend positive, enemy negative) more abstractly than unexpected behaviors (friend

negative, enemy positive).

Meditators in the mindful attention groups, however, exhibited no LIB. These participants did not ascribe more abstract character judgments to behaviors that matched biased expectations of friends behaving positively and enemies negatively (positive behaviors: friend vs. enemy, M difference = 0.21, $t(13)$ = 0.81, SE = 0.26, p = 0.207, g_s = 0.39; negative behaviors: friend vs. enemy, M difference = −0.36, $t(13)$ = −1.20, SE = 0.30, p = 0.121, g_s = 0.58). Because the sample sizes in these comparisons were small, power was low, and the results should be interpreted with caution. Nevertheless, the results suggest tentatively that when meditators are instructed to use mindful attention, the LIB may be relatively weak and perhaps not present.

Again, mindful attention groups had significantly more concrete responses to expected behaviors (friend positive, enemy negative) when compared to immersion groups (positive friend behaviors: IMM vs. MA, M difference = 0.66, $t(11)$ = 2.36, SE = 0.28, p = 0.013, g_s = 1.22; negative enemy behaviors: IMM vs. MA, M difference = 0.69, $t(10)$ = 1.97, SE = 0.35, p = 0.032, g_s = 1.05). All other main effects and interactions are reported in the SM. Based on these initial explorations, it appears that the participants with meditation experience were even more successful with mindful attention. When performing the observe strategy, these participants exhibited no bias, whereas individuals in the meditation naïve subgroup still exhibited an attenuated LIB. The implications of these exploratory subgroup analyses are addressed further in the "Discussion" section.

Discussion

The linguistic expectancy bias (LEB) is the use of abstract interpretive language to describe expected behaviors (e.g., a friend's positive behavior, an enemy's negative behavior), while using concrete language to describe unexpected behaviors (e.g., a friend's negative behavior, an enemy's positive behavior; Maass 1999). Using abstract interpretive language implies that a behavior is a stable characteristic of an individual, whereas concrete descriptive language implies that a

behavior is unique and uncharacteristic. The linguistic intergroup bias (LIB) is a specific example of the LEB, related to the valence of expectancies about in-groups and out-groups. Whereas in-group members are expected to behave positively, out-group members are expected to behave negatively (e.g., Maass et al. 1989). Previous research indicates that people are often unaware of their biased linguistic tendencies and that the LEB and LIB can be used as implicit measures of prejudice (Franco & Maass, 1996; von Hippel et al. 1997). In the experiment reported here, we adapted a friend/enemy paradigm (Douglas and Sutton 2003; Maass et al. 1995) and observed two basic results: First, we replicated the LIB with immersion instructions. Second, we observed a reduction in the LIB with mindful attention instructions. We briefly review each result in turn.

When participants were asked to immerse themselves in cartoon stimuli depicting a friend's or enemy's behavior, they described expected behaviors (friend positive, enemy negative) more abstractly than unexpected behaviors (friend negative, enemy positive). This bias may have occurred with immersion instructions specifically because it involved actively projecting oneself into an event. Participants were encouraged to become absorbed in their thoughts and reactions to the event and to vividly imagine actually being in the situation. In this way, immersion instructions may have encouraged inferential linguistic descriptions.

Importantly, our immersion condition replicates many previous LIB experiments in which participants did not receive immersion instructions but simply selected the best description for a scene with no particular instructions given (e.g., Maass et al. 1995; Douglas ~~and~~& Sutton 2003). This finding suggests that immersion is the default strategy participants apply when processing scenes (for supporting evidence related to food stimuli, see Papies et al. 2012, 2015).

Previous research reduced the LIB with explicit communication goals (e.g., telling participants to view their out-group member in a more positive light; Douglas and Sutton 2003; 2008). Our results demonstrate that mindful attention—an aspect of mindfulness (Bishop

et al. 2004 ; Lebois et al. 2015 ; Papies et al. 2015)—is an implicit modulator of linguistic abstraction, effectively reducing the LIB without directly asking participants to be unbiased. Both mindful attention groups had lower average linguistic abstraction scores overall compared to the immersion groups. Additionally, both mindful attention groups viewed expected behavior descriptions (friend positive, enemy negative) more concretely than did the immersion groups. These results suggest that observing one's thoughts and reactions to events as fleeting mental states reduces elaborations and inferences about actions, encouraging a more concrete viewpoint on events, such that abstract descriptions become less likely.

Although the mindful attention groups exhibited a significantly reduced LIB compared to immersion groups, they still demonstrated a modest linguistic intergroup bias for positive behaviors. Mindful attention groups continued to describe positive behaviors for friends more abstractly than those for enemies, suggesting that the LIB may be difficult to overcome, even with a brief mindful attention intervention. Later, we discuss how long-term meditation training may offer a more powerful means of inducing still stronger changes in linguistic and cognitive biases.

A variety of possible mechanisms associated with mindfulness could be responsible for the modulation of the LIB that we observed, including, decentering, self-disengagement, and subjective realism, each addressed in turn. First, increasing evidence suggests that mindfulness produces a shift in perspective often referred to as decentering (Bishop et al. 2004 ; Brown, Ryan, & Creswell, 2007; Teasdale, Segal, & Williams, 1995). Decentering produces the realization that thoughts, feelings, and reactions to events are fleeting patterns of mental activity. Rather than being experienced as true representations of one's self and events in the world, thoughts are simply experienced for what they are, thoughts. Rather than being immersed in one's thoughts, one sees them as transitory mental states arising and dissipating in the moment.

AQ13

Second, the shift in perspective associated with mindfulness and

decentering may result from disengaging a sense of self from one's thoughts. Following brief mindfulness interventions, two neuroimaging experiments reported less self-referential, emotional, and visceral integration for recalling negative autobiographical memories (Kross et al., 2009) and for imagining stressful situations (Lebois et al. 2015). Further evidence suggests that mindfulness reduces ego defensiveness under threat (Brown et al. 2008; Niemiec et al. 2010) and diminishes concern with oneself (Brown ~~and~~& Ryan 2003). Additionally, Niemiec et al. (2010) found that after participants' in-group was threatened, those low in mindfulness exhibited higher in-group partiality and more out-group deprecation relative to those high in mindfulness. Across these diverse paradigms, the decentering process associated with mindfulness appears to decrease the association between one's sense of self and one's thoughts.

AQ14

Third, the ability to disengage a sense of self from one's thoughts via decentering may reduce the subjective realism of thoughts. Subjective realism is the experience that an imagined event or thought feels as if it were happening in the present moment via mental time travel (Lebois et al. 2015; Papies, et al. 2012, 2015; also see "cognitive fusion," Hayes and Feldman 2004). The construct of subjective realism is readily demonstrated in people's responses to food cues. Much research shows that viewing a picture of a delicious food typically activates an eating simulation that reenacts tasting the food and experiencing the reward of consuming it (e.g., Papies 2013; Simmons, Martin, & Barsalou, 2005; van der Laan et al. 2011). Once these eating simulations become active, they motivate consumptive behavior, especially when hungry (Papies et al. 2015). This process may work the same way in the context of imagining an in-group or out-group member acting in positive or negative ways. As these simulations become active, they produce something like the experience of actually interacting with an in-group/out-group member, which motivates subsequent reactions. Most importantly, the shift in perspective associated with decentering may disengage a sense of self from these simulations, such that they no longer seem subjectively real, but are experienced instead as passing

thoughts.
AQ15

Most likely the three mechanisms just described are not independent: The shift in perspective associated with decentering appears to disengage a sense of self from one's thoughts, thereby decreasing their subjective realism. All three mechanisms probably work together to produce the benefits of mindfulness. From this perspective, we assume that all three mechanisms may have operated in concert to decrease the impact of bias and stereotypes observed here. Specifically, when a stereotype became active as a thought during mindful attention, the participant disengaged from the thought, decreasing its subjective realism. In turn, the effects of differential expectancies and in-group protection decreased, such that less linguistic abstraction occurred in a biased way.

An important goal for future research is to assess the process model just described, along with other possible accounts of how mindful attention reduces the LIB. In doing so, it would be useful to establish evidence for each individual mechanism and for their interaction. Another important issue is to establish the extent to which people are born with these mechanisms in place, as opposed to learning them through instruction (Lebois et al. 2015).

Earlier, we reviewed literature illustrating that differential expectancies and in-group protection promote linguistic abstraction. The mechanisms just proposed to modulate the LIB may, more generally, modulate the LEB. First, consider how mindful attention could operate to undermine in-group protection. As described earlier, in-group protection is the internal motivation to maintain a positive in-group and self-image by abstractly describing desirable in-group behaviors and undesirable out-group behaviors (Maass et al. 1989; Maass 1999). Much evidence suggests that mindfulness induces feelings of acceptance and compassion towards the self and others (Condon et al. 2013) and also reduces reactivity to potential self-threats (e.g., Niemiec et al. 2010). Therefore, when practicing mindful attention, our participants may have not only felt more accepting towards themselves but may also have felt

more accepting of out-group members. Participants may not have felt the need to shield their self-image by attributing positive inferences to their in-group and negative inferences to their out-group. As a result, in-group protection decreased.

More generally, mindful attention may have also reduced differential expectancies. As described earlier, differential expectancies constitute a cognitive strategy that involves describing expected information abstractly and unexpected information concretely (Maass et al. 1995; Wigboldus et al. 2000, 2005). Beyond the LIB, differential expectancies can occur regardless of the valence of the behavior paired with an in-group or out-group member. Say, for example, that you are Caucasian. The stereotype exists that all Asians (your out-group) are good at math. Even though Asians are your out-group, a linguistic abstraction paradigm might show that you ascribe this positive math ability to your out-group via an abstract description of this ability (instead of a concrete behavior). If, however, you observe such thoughts as passing mental states in the present moment (mindful attention), the typical abstract, inferential, and evaluative thinking that produces stereotypical expectations about people may not occur. Rather than relying on previously stored beliefs about a person or an event, you may simply observe the behavioral event occurring in the moment more concretely for what it is.

Because we did not assess such non-valenced expected behaviors in our experiment, we cannot conclude that mindful attention reduces differential expectancies. Thus, another important goal for future research is to examine whether mindful attention reduces differential expectancies beyond the valenced behaviors associated with the LIB. By examining a variety of other abstractions associated with stereotypes (such as Asians being good at math), it should be possible to assess whether mindful attention reduces the LEB more generally.

As reported earlier, we did not find significant differences between the mindful attention and immersion groups for unexpected behaviors (friend negative, enemy positive). Because these unexpected behaviors were already described concretely in the immersion groups, a floor

effect may have occurred in the mindful attention groups, such that these behaviors could not be described more concretely. Although our primary focus was to reduce linguistic abstraction bias by eliciting concrete descriptions of expected behaviors, one might nevertheless imagine it would be desirable to describe the positive behaviors of out-group members abstractly, at least under some circumstances. In other words, attributing positive abstract characteristics to the positive behaviors of out-group members offers an additional means of reducing the LIB, besides reducing negative abstract character attributions to negative behaviors.

Limitations and Future Directions

In our paradigm, participants were instructed to implement a specific perspective (mindful attention or immersion) while viewing the critical cartoon materials. A more robust test of mindful attention's effect on the LIB would be to teach participants the perspective initially and then see if it carries over to their later viewing of the materials without explicitly being told to adopt it. In our experiment here, however, instructing participants to continue with the perspective while viewing the critical materials may actually mirror how novice meditators first begin to attend mindfully. Initially, this perspective may be an effortful choice that gradually becomes more unconscious with practice.

Although our paradigm used an implicit task and intervention in the sense that we (1) did not directly ask participants about their in-group/out-group biases, (2) did not directly tell them that we were measuring their biases, and (3) did not directly ask them to change their biases (Fazio ~~and~~& Olson 2003), it is unclear whether the reduction in LIB occurred outside conscious awareness. During the exit interview, we did not ask participants whether they noticed differences in linguistic abstraction between the four LCM descriptions that were provided nor did we ask mindful attention participants if they were aware of the potential effect that the "observing" perspective might have had on their choices. Thus, we cannot say for certain that the observed reduction in the LIB here occurred completely outside participants' conscious awareness (analogous to the same issue that

confronts many other implicit tasks, such as the Implicit Association Test). Future experiments could begin to test conscious awareness by introducing these questions during an exit interview and by using other methods that establish unconscious processing.

Previous LIB research has not included immersion instructions. Instead, LIB experiments have simply instructed participants to imagine their friend or enemy performing the behaviors depicted in the cartoon events without explicitly telling them how to do so (e.g., Maass et al. 1995; Douglas ~~and~~& Sutton 2003). One might worry that explicit immersion instructions were responsible for our results. Rather than mindful attention reducing bias, immersion may have increased it.

Several reasons, however, suggest that this was not the case. First, previous research has demonstrated that immersion instructions and regular viewing instructions (e.g., "simply look at the pictures") produce similar results, suggesting that immersion constitutes participants' default perspective toward their thoughts (Papies et al. 2012, 2015). Second, the responses in our immersion groups were strikingly similar to those reported in the LIB literature when immersion instructions were not used (see Maass 1999 for a review). To the extent that responses in our immersion group deviated from those the literature, they were often more concrete (e.g., friend/positive: 2.57 for us vs. 2.69 for Maass et al. 1989; enemy/negative: 2.43 vs. 2.82 for Maass et al. 1989; friend/negative: 2 vs. 2.51 for Maass et al 1989; enemy/positive: 1.40 vs. 2.47 for Maass et al. 1989). Both findings suggest that immersion instructions were not responsible for the differences in the LIB that we observed between the immersion and mindful attention groups. Future experiments, however, could include both immersion and regular viewing groups to assess this issue directly.

Our participant sample was comprised of individuals who were both meditation-naïve and meditation-experienced. Another possible concern is that participants with meditation experience constituted the driving force behind our observed reduction in the LIB, not the mindful attention instructions. To ensure a more uniformly meditation-naïve sample, we could have recruited only meditation-naïve participants

from the outset. Problematically, however, participants could have anticipated the relevance of meditation-related principles with this exclusion procedure, which could have biased their responses. Instead, to address this concern, we completed a follow-up analysis including only meditation-naïve participants. In this analysis, these participants still exhibited the critical pattern observed in the complete sample. The immersion groups still displayed the LIB, and the mindful attention groups still exhibited a reduced LIB.

A natural avenue for future research, however, would be to examine similar effects with experienced meditators. Previous research has demonstrated that for individuals to respond without prejudice to out-group members, they must overcome years of exposure to stereotypical information (Devine 1989), using effortful, regulatory strategies (Devine and& Monteith 1993, 1999; Devine et al. 2002). Our modulation of the LIB with a very brief mindful attention intervention suggests that another way of reducing bias and prejudice is to cultivate mindfulness. Although we only had 25 participants of varied meditation experience in our sample, we found that these individuals did not exhibit the LIB in the mindful attention groups. This finding needs to be replicated in a larger sample of experienced meditators, but it does suggest that more consistent, extended practice with mindfulness meditation may have strong effects on linguistic biases associated with prejudice.

Acknowledgments
AQ16

Compliance with Ethical Standards

Conflict of Interest The authors declare that they have no competing interests.

Electronic Supplementary Material

Below is the link to the electronic supplementary material.

ESM 1

(DOCX 1602 kb)

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