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# **The impact of mindfulness and perspective-taking on implicit associations towards the elderly: A Relational Frame Theory account**

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## **Conflict of Interest:**

All authors report no conflict of interest.

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**Short title: Perspective-taking and implicit associations**

Perspective-taking interventions have been shown to improve attitudes toward social outgroups. In contrast, similar interventions have produced opposite effects (i.e., enhanced negativity) in the context of attitudes towards elderly groups. The current study investigated whether a brief perspective-taking intervention enhanced with mindfulness would be associated with less negativity than perspective-taking alone. 105 participants were randomly assigned to one of four conditions which comprised of an active or control perspective-taking component and an active or control mindfulness component. Participants were then administered an Implicit Associated Test to assess implicit biases toward the elderly. Results supported previous findings in that the condition in which perspective-taking was active but mindfulness was inactive was associated with greater negative implicit bias toward the elderly, however, some of this negativity decreased in the active perspective-taking and active mindfulness condition. The current findings and other mixed effects that have emerged from perspective-taking interventions are discussed from a Relational Frame Theory perspective.

**Key words:** Implicit Association Test; Perspective-Taking; Mindfulness; Relational Frame Theory

## Introduction

The ability to take the perspective of another person has long been considered a critical feature of human psychology (Galinsky & Moskowitz, 2000; Parker & Axtell, 2001). Earliest accounts of perspective-taking date back as far as Piaget (1932), who suggested that this ability was a fundamental developmental milestone of cognitive functioning. Kohlberg (1976) subsequently suggested that perspective-taking is particularly foundational in moral reasoning. More recent academic interests in the concept of perspective-taking have focused on the putative role of these skills in social biases. For example, interventions based on improving an outsider's view of a different social group appear to reduce both implicit and explicit prejudice (Batson et al., 1997; Dovidio et al., 2004; Galinsky & Ku, 2004; Galinsky & Moskowitz, 2000), even in the context of race (Vescio, Sechrist, & Paolucci, 2003).

Most studies that have employed perspective-taking interventions to influence social attitudes have relied almost exclusively on explicit self-report measures, which remain potentially sensitive to extraneous sources of influence (e.g., self-presentation). More recently, however, there has been an increasing interest in the use of latency-based measures to study social attitudes at the *implicit* level. The most common of these measures is known as the Implicit Association Test (IAT; Greenwald & Banaji, 1995). The basic principle of the measure suggests that participants should be faster when pairing two closely related than weakly related categories. While the body of evidence using, and supporting the IAT is now extensive, only a handful of studies have investigated the effects of perspective-taking on implicit attitudes. Of the existing published work, Todd et al. (2011, 2012) used a Race IAT and reported that greater positive implicit attitudes were associated with a racial outgroup following a brief perspective-taking intervention. Conversely, Skorinko and Sinclair (2013) found that a similar intervention was associated with more *negative* attitudes toward the elderly, compared

with a control intervention. These mixed findings suggest that differential outcomes are associated with perspective-taking interventions when used to alter attitudes toward different groups.

A number of psychological theories may assist in the interpretation of the different attitudes recorded after perspective-taking interventions across different groups. For instance, some social psychology theorists argue that self-other associations emerge in tandem with perspective-taking and facilitate favorable responses towards outgroups (Cadinu & Rothbart, 1996; Smith & Henry, 1996). That is, perspective-taking enhances an individual's ability to appreciate the views of the outgroup and thus reduces the perception of differences and negative bias, and increases positive bias. This view finds considerable support in the perspective-taking intervention outcomes reported by Todd et al. (2011, 2012), at least in the context of racial bias. However, this account fails to explain the *negative* bias towards elderly groups after a perspective-taking intervention, as reported by Skorinko and Sinclair (2013). Some behavioral psychology theorists appear to offer a more comprehensive account of the potential relationship between perspective-taking and social bias, using basic tenets from a behavioral theory of language and cognition, known as Relational Frame Theory (RFT; Hayes, Barnes-Holmes, & Roche, 2001).

According to RFT, language is relational and the different patterns of relational responding that have been identified include: coordination, comparison, opposition, distinction, causality, hierarchy, and perspective-taking. For RFT, perspective-taking specifically involves interpersonal relations (I vs. YOU), spatial relations (HERE vs. THERE), and temporal relations (NOW vs. THEN, see Barnes-Holmes, Barnes-Holmes, & Cullinan, 2001). However, perspective-taking relations participate in relational networks with the many other types of relations in the on-going development of self. For example, "you are taller than me" involves the interpersonal relations and a comparison relation, while "my

sister and I are very alike, but different from our mother” also involves interpersonal relations but now in conjunction with a coordination relation (specified by “alike”) and a distinction relation (specified by “different from”). RFT, therefore, appears to offer an account of perspective-taking that permits considerable complexity in terms of the relations between I and you, and thus potentially in the variable patterns between in-groups and outgroups.

According to RFT, therefore, any number of relations can operate in conjunction with the interpersonal relations I and YOU. For example, some ‘others’ will be coordinated with me because they are in my in-group, while some ‘others’ will be distinct from me because they are not in my in-group, hence in an outgroup. There may be different bases for these relational responses. In the case of gender, for instance, a white female might more readily coordinate I and YOU (other females) based on gender, but distinguish herself from white males. In this case, gender forms the basis for the coordination relation between this white woman and all other women (irrespective of race), but also forms the basis of the distinction relation with all men (even white men). Conversely, the same white female might more readily coordinate I and YOU (other white people) based on race, but distinguish herself from non-white people. In this case, race forms the basis for the coordination relation between this white woman and all other white people (irrespective of gender), but also forms the basis of the distinction relation with all non-white people (even other women).

Now consider a similar example of the interpersonal perspective-taking relations operating with other relations based on age. If I am young, I am likely to participate in a comparison relation with older people (i.e., they are older than me) based on age. Now also consider the psychological and evaluative functions that are likely attached to I and YOU, such as youth being positively evaluated and old age being negatively evaluated. In this case, if I respond to “she is many years older than me”, there is not only the comparison relation based on age, but this brings to bear the relative evaluations in which she will now be

evaluated more negatively than me. For instance, if you are much older than me and age is bad, you are much worse than I am. For RFT, therefore, interpersonal relations interact with many other types of relations and the functions of the related events transfer or transform accordingly.

For perspective-taking interventions to work, they should enhance the extent to which I can see the world as others see it, at least in some respects. In many contexts, this would render an individual more positive toward the perspective of others being adopted. For example, if a young person is presented with such an exercise, she might be asked to walk around for a short time with a limp to appreciate how difficult it is to walk when your limbs are aged and infirm. For RFT, this would enhance the coordination between I and YOU regarding age and would likely transform some negative evaluative functions (e.g., slowness) that were based on the previous distinction or comparison relation to empathic functions (e.g., suffering). Consider now, however, how transforming additional functions may indeed make attitudes more negative, rather than more positive. For example, if the young person in this case recently recovered from a brief but difficult illness, coordinating her now with illness could have highly aversive functions (i.e., age is coordinated with sickness, sickness is bad, coordinating age with me is aversive). In this case, negative functions transform through the coordination of perspectives between I and the elderly. Given the increasing research interest in using RFT to understand human psychological processes, and how this translates into clinical practice, we may be able to draw upon this literature to further explore the mixed outcomes from the use of perspective-taking interventions in altering attitudes to the elderly.

In addition to RFT, mindfulness, the intervention used in this study, needs to be defined. According to Kabat-Zinn (2003), mindfulness can be defined as “paying attention on purpose, in the present moment, and non-judgmentally” (p.145). An RFT interpretation of mindfulness put forward by Foody, Barnes-Holmes, and Barnes-Holmes (2012) suggested

that attending to the present moment (i.e., mindfulness) is functionally equivalent to responding to stimuli under the control of the HERE-NOW and not THERE-THEN. It appears, therefore, that mindfulness also involves the perspective-taking frames, but responding is primarily focused on I rather than others. In perspective-taking, on the other hand, responding requires behaving with regard to both I and others.

Given their focus on I, mindfulness exercises are typically used to bring an individual into appetitive contact with her own psychological content, especially that which is painful and has been avoided previously. If, as suggested above, negative attitudes to the elderly emerge through a coordination relation between I and elderly, perhaps because of the transformation of emotionally aversive functions, then in principle a mindfulness-based intervention could be used to alter the avoidance functions of related painful emotions, such that they would no longer transfer from I to elderly. On the other hand, a perspective-taking intervention that facilitates adopting the perspective of the elderly, but lacks mindfulness that would potentially reduce or defuse the aversive functions, may be associated with negative attitudes, as observed previously.

An alternative RFT interpretation of mindfulness and its relationship with the phenomenon of perspective taking is that of the flexible connectedness model (Vilardaga, Levin, & Hayes, 2014). According to this model, perspective-taking and the corresponding transformation of perspective taking functions (e.g., emotionally aversive functions) can consequently lead to experiential avoidance, a process linked to social stigmatization (e.g., Masuda et al., 2009) and psychological suffering (e.g., Hayes, Wilson, Gifford, Follette, & Strosahl, 1996). By contrast, mindfulness practice, which can be conceptualized as the further strengthening of these perspective taking relations through multiple exemplars of I-YOU / HERE-THERE / NOW/THEN relations (i.e., taking the time to quietly observe *multiple* instances of aversive thoughts and sensations about oneself and others over time and in



multiple locations) can lead to increase contextual control over the transformation of stimulus functions of these perspective taking relations and as a result to what we call *flexible connectedness* (e.g., a more balanced experience of the other person's suffering that can flexibly bring the individual back to his own perspective and therefore allow effective action). This model has been applied to different areas related to social behavior. For example, as a framework to understand the connection between empathy and psychopathology (Vilardaga, 2009), the therapeutic relationship (Vilardaga & Hayes, 2011), pathological altruism, and social prejudice (Levin et al., 2016).

In order to investigate the potentially differential outcomes of mindfulness versus perspective-taking *without mindfulness* on implicit attitudes to the elderly, the current study sought to extend the research by Skorinko and Sinclair (2013) using the IAT. We systematically compared perspective-taking (i.e., taking the perspective of an elderly person) and mindfulness (i.e., brief focused attention on breathing) by including both components in each intervention, but altering whether each of the two components (perspective-taking or mindfulness) was active or passive. We also compared these interventions with a control condition, containing both components, but in inactive form. After their designated intervention, each participant completed an Elderly IAT to assess their implicit attitudes to the elderly. Based on existing literature and the suggestions above, we predicted that the active perspective-taking+active mindfulness intervention would be associated with less negativity than active perspective-taking+control mindfulness. As above, the assumption here was that the perspective-taking exercise would transform negative functions by coordinating I with elderly and coordinating elderly with negative, but that the mindfulness intervention could in principle serve to reduce these negative functions, thus being associated with relatively weaker negative attitudes to the elderly.

## **Method**

**Participants.** One hundred and five undergraduates were recruited in exchange for course credit. The mean age was 21.75 (SD 1.23), with 49 males and 56 females. The distribution of males and females in each of the four conditions was approximately equal ( $\leq +/ -4$ ). Two participants were removed from the analyses based on their IAT data (i.e., 10% of their trials had response latencies  $< 300$  ms).

**Procedure.** All participants completed the intervention (both components) prior to the IAT. The IAT consisted of two instruction screens followed by seven blocks, each of which consisted of a number of trials. The pre-block instruction screens contained the following instructions: “For this portion of the study, words will appear one at a time in the middle of the screen. Classify those words into groups which will be designated with labels appearing on the top half of the screen. All words belonging to the groups on the left will be classified with the ‘e’ key. All words belonging to the groups on the right will be classified with the ‘i’ key. Classify the words as quickly as possible while making as few mistakes as possible. Accuracy and speed are both important. Pay close attention to the group labels, they will change from block to block. Direct any questions to the experimenter. For the next portion of this study, you will be asked to classify words into the categories of OLD and YOUNG as well as words related to POSITIVE and NEGATIVE. The words related to each of the categories are shown below. Remember, when the word in the centre corresponds to the category on the left, you will use the ‘e’ key, and when the word in the centre corresponds to the category on the right, you will use the ‘i’ key. Classify the words as quickly as possible while making as few mistakes as possible.” Before each block, the message “Check categories-Press space bar when ready” appeared at the bottom of the screen.

A trial was defined as the time in milliseconds from the onset of a stimulus to the emission of a correct response. The stimulus categories (old, young, positive, negative) remained on the top left and top right of the screen throughout each block. Words relating to

positive and negative categories were presented in white, whereas words relating to old and young categories were presented in green. Each trial presented the to be categorized stimulus in the middle of the screen. Participants responded using the ‘e’ and ‘i’ keys. If an incorrect response was emitted, a red ‘X’ was displayed below the stimulus, and a correct response was required before proceeding to the next trial. After each trial, the stimulus in the middle of the screen was cleared for an intertrial interval of 250 ms.

**Measures. *The IAT.*** The IAT is a computer-based test that assesses reaction time biases (Greenwald, McGhee, & Schwartz, 1998). The Elderly IAT employed here was standardized (see Nosek, Banaji, & Greenwald, 2002, for a review). That is, participants were provided with seven categorization tasks, using the same age-based stimuli as Turner and Crisp (2010). The tasks involved categorizing valenced target words with sample words (e.g., ‘positive’ and ‘negative’). For example, in one task, participants were asked to categorize typical young names (e.g., Brad, Zack, Lucy, etc.) and typical old names (e.g., Cyril, Arthur, Mildred, etc.) with positive (e.g., ‘smile’ and ‘paradise’) and negative sample stimuli (e.g., ‘slime’ and ‘pain’). The rationale of the IAT predicts that participants with a positive bias towards young people will more readily associate a young person’s name with ‘positive’ (than ‘negative’), while participants with a negative bias towards old people will more readily associate an older person’s name with ‘negative’ than ‘positive’.

**Interventions.** All four conditions in the current study presented an intervention that contained a perspective-taking component, followed by a mindfulness component. However, each component had an active or passive/control version (i.e., active versus control perspective-taking and active versus control mindfulness). This generated four conditions referred to as follows: active perspective-taking+active mindfulness (P+M,  $N=28$ ); active perspective-taking+control mindfulness (P+cM,  $N=32$ ); control perspective-taking+active mindfulness (cP+M,  $N=20$ ); and control perspective-taking+control mindfulness (cP+cM,

$N=20$ ). It is important to note that the condition denoted as cP+cM was employed as a control condition, such that participants here were exposed to an intervention that matched the others, but in this case both components were inactive.

***The active perspective-taking task (P).*** The elderly perspective-taking task employed here was identical to Galinsky and Moskowitz (2000). That is, participants were presented with an image of an elderly person in a neutral setting (e.g., not in a hospital bed). They were then asked to write a short narrative about a day in the life of the elderly person in the picture, from the first person's perspective. The instructions were: "Shortly you will be presented with a picture of an individual. You will be given 5 minutes to write a short narrative about a typical day in the life of the individual in the picture." This task was rendered *active* perspective-taking by inclusion of the following instruction: "When writing your narrative, please try to imagine a day in the life of this individual *as if you were that person, looking at the world through his eyes and walking through the world in his shoes.*"

***The control perspective-taking task (cP).*** The control perspective-taking task was also identical to Galinsky and Moskowitz (2000), except that the narrative was *not* to be written from the first person's perspective and thus the final sentence of the instruction was excluded.

***The active mindfulness task (M).*** The mindfulness task was largely identical to McHugh et al. (2010). The task involved listening to a 9-minute voice recording outlining mindfulness techniques, as follows: "Now we're going to do an exercise for 9 minutes. First, settle into a comfortable sitting position. This is an exercise to increase your mindfulness of the present moment so that you can clear away any thoughts about past and future events. Start by focusing on your breathing. Don't try to change anything about your breathing, just notice the air moving in and out of your body. Try to focus all your attention on your breathing. Notice the sensation of breathing air in. Notice the sensation of breathing air out."

As you breathe air into your body, fill your mind with the thought ‘just this one breath’. As you breathe air out of your body, fill your mind with the thought ‘just this one exhale’. Focus on the actual sensation of breath entering and leaving your body. Just this one breath in. Just this one exhale out. If you notice that your awareness is no longer on your breath gently bring your awareness back. Just this one breath. Just this one exhale. Continue focusing only on each breath in and each breath out, do not anticipate anything, even your next breath. Only focus on one breath at a time. If anything else pops into your mind, push it aside and refocus your attention to each breath. Continue focusing on each breath in and each exhale out until you hear the sound of the bell.” These instructions lasted nine minutes because of sizeable pauses between sentences to give participants time to engage in the specified activity. What made this intervention *active* mindfulness is that participants were instructed to focus specifically on noticing their own breathing.

***The control mindfulness task (cM).*** The control mindfulness task was also identical to McHugh et al. (2010), but the task was now rendered a control component by instructing participants to let their minds wander freely. The instructions were as follows: “Now we’re going to do an exercise for nine minutes. First, settle into a comfortable sitting position. Simply think about whatever comes to mind. Let your mind wander freely without trying to focus on anything in particular. Let your mind wander until you hear the sound of the bell.” This task also lasted for nine minutes to control for the length of the active mindfulness component.

**Data analysis.** Microsoft Excel 2013 was used to process the IAT *D* scores from the raw data. The descriptive and inferential statistics were then conducted in SPSS 20.0. Both a two-way (2x2) ANOVA was conducted to explore the interaction between mindfulness and perspective-taking, as well as a univariate ANOVA with condition as the independent

variable. *t*-tests were also conducted to compare a baseline IAT score of 0 with the actual IAT scores.

## Results

All IAT latency data were transformed into *D* scores using the standardized procedure described by Greenwald, Nosek and Banaji (2003). The *D* score reflects the latency difference for old-good/young-bad versus young-good/old-bad associations. In simple terms, this is the standardized difference between old-good blocks and young-good blocks, where a positive *D* score reflects this pro-old/anti-young bias and a negative *D* score reflects an anti-old/pro-young bias.

The mean *D* scores and standard deviations for the four conditions are presented in Table 1. From the outset, four one sample *t*-tests conducted for each condition against baseline *D* scores of zero all yielded significance (all *p*s <0.001), thus showing strong *D* scores in all cases. However, the direction of these effects differed considerably across conditions. Specifically, both cP+cM and cP+M (i.e., control perspective-taking) showed a strong pro-old (positive) bias, while both P+cM and P+M (i.e., active perspective-taking) showed a strong *anti-old* (negative) bias. Hence, opposite effects were observed when the perspective-taking intervention was active (negative bias) or passive (positive bias). It was also interesting that there was a modest difference in the size of the negative bias between the conditions in which perspective-taking was active, but mindfulness was or was not active. That is, the active mindfulness component was associated with a weaker negative bias than control mindfulness (when each was paired with active perspective-taking).

A two-way (2x2) ANOVA was conducted with IAT *D* score as the dependent variable and perspective-taking (i.e., active vs. control) and mindfulness (i.e., active vs. control) as the 2x2 factors. As expected, there was a significant main effect for perspective-taking ( $F(1) =$

151.132,  $\eta_p^2 = 0.612$ ,  $p < 0.01$ ), but not mindfulness ( $p > 0.05$ ), and the interaction effect between perspective-taking and mindfulness was marginally outside of significant ( $p = 0.09$ ). Furthermore, a univariate analyses of variance (ANOVA) was then conducted with  $D$  scores as the dependent variable and condition as the independent variable ( $F(1) = 53.323$ ,  $\eta_p^2 = 0.625$ ,  $p < 0.01$ ).

-----**Table 1 Here**-----

Post-hoc Bonferroni corrected  $t$ -tests thereafter showed a number of significant differences between conditions. P+cM differed significantly from all other conditions (all  $ps < 0.05$ ). That is, the condition in which perspective-taking was active (negative bias) produced a significantly different  $D$  score than when perspective-taking was passive (positive bias in both cP+cM and cP+M). Furthermore, this condition (P+cM) was also associated with a significantly stronger negative bias than when the active perspective-taking component was combined with active mindfulness (i.e., P+M, mindfulness appeared to significantly reduce the negative bias). As expected from the  $D$  scores, the negative bias in P+M also differed significantly from the positive bias observed in both cP+cM and cP+M (both  $ps < 0.001$ , all other  $ps > 0.05$ ). Overall, the statistical analyses supported our two predictions: active perspective-taking was associated with a strong negative bias (relative to inactive perspective-taking), and this negative bias was significantly reduced by active mindfulness (relative to inactive mindfulness).

## **Discussion**

The present study explored the relationship between a combined perspective-taking+mindfulness intervention and implicit biases toward the elderly, as measured by the IAT. However, we systematically investigated the potentially different effects of each of the two intervention components (perspective-taking versus mindfulness) on the  $D$  scores. Based

on findings reported by Skorinko and Sinclair (2013), we predicted that an active perspective-taking component would be associated with a negative bias toward the elderly. While our data replicated this original effect, we also found that presenting an intervention with an *inactive* perspective-taking component (i.e., not emphasizing that participants fully adopt the perspective of an elderly person) produced a significantly different positive bias. This suggested, and our statistical analyses further supported this, that the negative bias was influenced by the active perspective-taking component.

It is important to note that Skorinko and Sinclair (2013) employed a stereotypical image of an elderly person (i.e., in a hospital bed), whereas we employed a neutral image (an elderly person standing by a wall) in the perspective-taking component of the intervention. Yet, a strong negative bias toward the elderly was recorded in both studies. First, this gives greater confidence in the likelihood that this effect, in terms of the relationship between actually taking the perspective of an elderly person and implicit negative bias toward the elderly is robust. However, the overlap in the two effects recorded also undermines the possible argument our effects resulted simply from a negatively valenced picture of an elderly person. On the contrary, the picture employed here was neutral, while it was more stereotypically negative in the original study, and yet similar outcomes were recorded.

Given positive defusion outcomes previously reported for mindfulness interventions, and in the context of reducing age-related bias, we made two further speculations (Lueke & Gibson, 2015; Masuda, Price, Anderson, Schmertz & Calamaras, 2009). First, we hypothesized that the negative bias associated with active perspective-taking toward the elderly may be accounted for by the transfer of negative functions when the perspective of an elderly person was coordinated with the perspective of I. Second, we speculated that if this was the case, a mindfulness intervention may reduce this negative impact by facilitating some level of defusion and flexible connectedness regarding this psychological content. The



difference between the strong negative bias toward the elderly when the mindfulness component was passive, compared with the significantly weaker negative bias when mindfulness was active, supported our hypothesis. In short, mindfulness appeared to ameliorate the negative bias. This likely occurred through defusing some of the negative functions that transfer to I when the perspective of I is coordinated with the perspective of an elderly person or by strengthening these perspective-taking relations and developing a more flexible sense of social connectedness.

The fact that our data supported both of our predictions, especially with regard to the ability of the mindfulness intervention to reduce the negative bias toward the elderly, lends some support to RFT's account of the relationship between perspective-taking and negative implicit bias toward the elderly. Indeed, we argued previously that RFT concepts can account for the differential effects of perspective-taking interventions across different social groups. Recall that Todd et al. (2011, 2012) found that a perspective-taking intervention was associated with a positive bias towards a racial out-group. This begs the question, therefore, about how RFT can explain this effect in terms of the different biases between a racial out-group and an age-based outgroup?

In the language of RFT, temporal relations are another critical feature of perspective-taking, in that perspective-taking does not only involve the interpersonal relations of I and YOU. In short, temporal continuity is a strong feature of Iness. That is, I will be essentially the same person when I am old as I am now and as I was before (then) when I was even younger. As a result, age is a feature of temporal continuity that is just part of Iness. In this sense, I am aware now that at some time in the future (then) I will be old. As a result, while I am now coordinated with youth and distinct from the elderly, I will then be coordinated with the elderly and distinct from youth. As a result, I will, psychologically speaking, switch from

one in-group to another in-group. If this is the case, I now is not fully distinct, nor opposite, to I then, thereby limiting the distinction relations between young and old.

Let us now consider the very different scenario with perceived racial differences. Unlike the temporal continuity of Iness through which I will one day be old, I am unlikely in the future to switch racial groups. That is, for example, a white person is unlikely to become a black person and vice versa. In this case, there is no temporal continuity between white and black and other races participate in many relations of distinction, and even distinction, with Iness. Indeed, many IAT studies have recorded negative biases towards social out-groups.

According to RFT, actively taking the perspective of a member of an out-group reduces some of the existing distinction and opposition relations, while enhancing coordination relations (e.g., I now see what it feels like to be victimized). Doing so could transfer both positive and negative functions. For example, I might feel greater empathy, or I might begin to feel shame at any previous experience in which I behaved in a racially biased way. Indeed, RFT would predict that both either or both types of function could transfer, depending on the individual and the context. If positive functions transferred from the racial other to I, negative bias would be reduced and may even be converted to a positive bias. However, as we observed with the elderly outgroup, the transfer of negative functions may become painful and aversive, thus permitting no reduction in negative bias. Only when an emotion-based intervention is added to enable participants to deal with this painful emotional experience, can this negative bias be reduced. It is in these ways that RFT can account for the opposite effects for perspective-taking interventions on negative biases towards different outgroups.

One way to subject our suggestions above to empirical scrutiny would be to extend the current study with the inclusion of a behavioral approach task (BAT, see Leech, Barnes-Holmes, & Madden, 2016), commonly used in conjunction with implicit measures. In short,

one can argue that mindfulness or other therapeutic interventions only work fully when (a) perspective-taking relations are strengthened, (b) both aversive and appetitive functions of the out-group are repeatedly “noticed” without further cognitive judgment, and (c) an individual shows willingness to experience such range of perspective-taking relations and corresponding derived functions and yet have close proximity with a member of an outgroup. In the current context, one might ask whether participants in our P+M condition would be significantly more willing to assist an elderly person in need than participants in our P+cM condition. Behavioral approach tasks are a useful means of answering this important real-world question.

**Limitations.** As well as the suggestions for study extension, as noted above, we recognize a number of limitations in the current work. First, we can also refer to associations between the intervention and the implicit biases. Without a pre-post experimental design including a baseline IAT measure, we cannot know if the intervention altered pre-existing biases. Second, we did not control for participants’ baseline propensity toward mindfulness, hence participants in the P+M condition may have had stronger pre-existing propensities toward mindfulness than participants, for example, in the condition cP+M. As a result, these pre-experimental effects may have influenced current outcomes. Third, adherence is a notoriously difficult aspect to control in this type of analog research, and we did not include any checks on whether participants were actually following the instructions they received in the various conditions.

In summary, the current work demonstrates two important points. First, the interpretation of these and previous findings using the concepts of RFT illustrates the potential relevance of the theory to the broader context of social psychology. The current extension of previous experimental work, especially the inclusion of the mindfulness intervention, also highlights the potential utility of RFT concepts in clinical and therapeutic

contexts. Second, the study demonstrates the potential benefits of using mindfulness-based interventions in conjunction with perspective-taking in attempts to reduce negative social bias or prejudice. Future research and applications could explore whether methods such as those employed here could be used to reduce age-related stigma.

### **Compliance with Ethical Standards**

Ethical approval: All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. This article does not contain any studies with animals performed by any of the authors. Informed consent was obtained from all individual participants included in the study.

### **Conflict of Interest**

The authors report no conflict of interest.

### **Author Contributions**

DJE: designed and operationalised the study, conducted the data analyses, wrote the majority paper, as well as edited the final draft. CM: collaborated with helping with the wording of the RFT components of the study, and conducted an independent analysis of the raw data which confirmed the findings. YBH: collaborated with CM in the wording of the RFT components of the study and aided in the independent analysis to confirm the findings. RL: helped with some parts of the design and writing of the paper. NE: collected the data and conducted the pre-analysis of *D* scores, as well as assisted in the writing. RV collaborated with the writing and implementation of the RFT theory as part of the conclusions.

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*Table 1*

Mean and standard deviation scores of the *D* scores for all four conditions.

| <b>Condition</b> | <b>Mean</b> | <b>SD</b> | <b>N</b> |
|------------------|-------------|-----------|----------|
| cP+cM            | 0.52        | 0.33      | 21       |
| cP+M             | 0.49        | 0.39      | 22       |
| P+cM             | -0.63       | 0.35      | 32       |
| P+M              | -0.37       | 0.49      | 28       |