“Incidental Fear Reduces Empathy for an Out-group’s Pain” by MT Richins, M Barreto, A Karl, N Lawrence.

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Abstract

Humans generally fear those different to them (i.e. an out-group) in the same way they fear natural predators. But fear pushes us to derogate others, whether they constitute a threat or not. Research has examined how fear associated with specific intergroup relations interferes with how individuals relate to in-group and out-group members. However, we know relatively little about how intergroup relations might be affected by incidental emotions. We tested how incidental fear affects empathy towards in-group and out-group members. We found that exposing participants to fearful imagery was sufficient to reduce empathy, but only in response to out-group suffering. We discuss how these findings provide insight into how fear is often leveraged to encourage social tribalism.

Keywords

Empathy; Social Identity; Fear; Intergroup Relations; Pain

Incidental Fear Reduces Empathy for an Out-group's Pain

> "Neither a man nor a crowd nor a nation can be trusted to act humanely or to think sanely under the influence of great fear"
>
> (Russell, 1952, p. 106)

Empathy is a social glue that promotes pro-social behaviour towards others (Batson & Powell, 2003). There are many factors that influence the extent to which one feels empathy towards another, among which group membership. It is now well established that empathy is shaped by group membership, with people reporting less empathy for others if they belong to an out-group than if they belong to an in-group (see Vanman, 2016; Molenberghs & Louis, 2018). It has also been demonstrated that it is not the in-group/out-group distinction *per se* that drives empathic biases, but whether or not we perceive "them" as threatening to "us" (Richins, Barreto, Karl, & Lawrence, 2018). That is, the presence of an intergroup threat is an important determinant of the extent to which we express empathy towards another. In this paper, we aim to extend these insights by examining whether threats that are unconnected to the specific intergroup context can have a similar effect on empathic biases.

Responses to Fear

Fear provokes automatic responses that aid survival (i.e. fight or flight; Rachman, 2004). But such rapid responding sometimes leads to retaliation against particular groups in society. Fear causes otherwise liberal thinkers to adopt more authoritarian perspectives (Nail, McGregor, Drinkwater, Steele, & Thompson, 2009), possibly to restore structure to one's perception

of society (Jost, Glaser, Kruglanski, & Sulloway, 2003). Research also shows that reminding people of their mortality can encourage them to vote for far-right political candidates, support aggressive counter-terrorism policies, and endorse harm to those with a different worldview (Landau et al., 2004; McGregor et al., 1998; but cf. Burke, Kosloff, & Landau 2013). Events that threaten our safety often foreshadow periods when a hard line is drawn between who is one of “us” (i.e. the in-group) and who is one of “them” (i.e. an out-group; Rothgerber, 1997). For example, UK government records show that hate crimes more than doubled following a number of terrorist attacks during 2017 (Home Office, 2018). Also, simply reading about a terrorist attack can cause individuals to express more prejudicial attitudes (Das, Bushman, Bezemer, Kerkhof, & Vermeulen, 2009) and fewer pro-social intentions towards out-group others (Tamborini et al., 2017). Politicians often use this fear of the other to stoke ethnic or cultural tensions, thereby mobilising constituents towards right-wing nationalism (Valentino, Hutchings, & White, 2002).

The group is a benefit to those who contribute to it (Yamagishi & Mifune, 2008). It provides nourishment, resources, and protection as well as basic psychological needs such as self-esteem, status, and positive distinctiveness (Brewer, 1999; Tajfel, 1982). But there are costs as well: While there is “us”, there is also “them.” Just as we seek out the in-group to restore control, so too do we pull away from out-groups (Heine, Proulx, & Vohs, 2006). At a young age, we develop a strong preference towards similar others and tend to treat dissimilar others poorly (Hamlin, Mahajan, Liberman, & Wynn, 2013). Fear of the other is so deeply seated that it likely

shapes behaviour at an unconscious level. As such, it is important to be cognisant of how fear can bias perception and encourage discrimination of the socially distant. Indeed, we often attribute our fears to the out-group whether they are the source of it or not (Cain, 2012; Hodson et al., 2013)—responding instinctively, as if to a natural predator such as a snake (Navarrete et al., 2012).

The out-group however is not a homogenous concept; out-groups are not all perceived equally and they elicit discrete emotions. Cuddy, Fiske, and Glick (2007) described how groups are perceived along dimensions of warmth and competence, eliciting discrete emotions. For example, the elderly and disabled tend to be perceived as warm but incompetent, eliciting pity whereas Asians and Jews are often perceived, in Western societies, as cold but competent, and associated with envy. These perceptions and the emotions they accompany have behavioural consequences: We typically seek to help the pitied and actively harm the envied (Cuddy, Fiske, & Glick, 2007). The Intergroup Emotions Theory developed by Mackie, Devos, and Smith (2000) suggests that such emotional reactions are based on appraisals of the in-group *vis-á-vis* other groups; in a broad sense, specific patterns of appraisal are related to perceptions and appraisals that reflect specific intergroup relationships and lead to specific emotions. With the above example, Asian and Jews elicit envy not simply because they are competent but because they are more competent than ‘us’ and could constitute a threat (symbolically, in terms of status positions or realistically, in terms of access to resources). In this case, emotions are often *integral* to

the intergroup context; they are irrevocably tied to the relationship between the in-group, the specific out-group, and what they represent to us.

The Role of Incidental Fear in Intergroup Relations

Though these insights have contributed to a much improved understanding of intergroup relations, the role of *incidental* emotions in intergroup relationships is a lot less understood. Incidental emotions are emotions or feelings that arise independently from the judgement that needs to be made (e.g., sadness due to a bereavement is incidental to the decision to give up on a work project) (Loewenstein & Lerner, 2003). *Integral* emotion, on the other hand, is the emotion that is part of the individual's embodied representation of the decision, such as when one experiences frustration about a work project and therefore decides to give up on it (Schwarz & Bohner, 2001).

Incidental emotions are important because they drive heuristic or 'mental short-cut' judgements (Schwarz, 2012). Incidental emotions can therefore be considered a source of bias or undesired influence (Vohs, Baumeister, & Loewenstein, 2007). The more salient the incidental emotion is, the greater the bias will be (Schwarz & Bohner, 2001). The central assumption for this misattribution is that the affective system cannot distinguish between real (*integral*) and false (*incidental*) feelings and thus any experienced emotion is inextricably associated with the present context (Schwarz, 2012).

There is already some evidence that emotions that are incidental to the intergroup context can subtly influence how we treat others. For example, merely thinking about a time one became angry can produce an automatic bias against an out-group, as if from 'thin-air' (DeSteno, Dasgupta, Bartlett,

& Cajdric, 2004). Negative emotions can also exacerbate prejudice towards groups for whom the emotion is stereotypically relevant (e.g. disgust towards homosexuals or anger towards Arabs; Dasgupta, DeSteno, Williams, & Hunsinger, 2009). The precise mechanism through which incidental emotions affect intergroup attitudes is not yet fully understood, but research suggests that negative emotions interfere with a number of top-down control processes like attention (Nikolla, Edgar, Catherwood, & Matthews, 2018) or object recognition (Baumann & DeSteno, 2010).

Importantly, negative incidental emotions do not necessarily lead to enhanced negativity towards out-groups—they can instead (or in addition) lead to positivity towards in-groups. For example, during the London Bombings, many survivors, though likely scared and distressed, stopped to help each other, driven by a sense of shared fate and psychological grouping (Drury, Cocking, & Reicher, 2009). Work on the effects of incidental emotions has also shown that fear, for example, can enhance positive attitudes towards the in-group (Bukowski, Dragon, & Kossowska, 2014). Our focus in this paper is on how incidental fear might affect a specific positive emotion—empathy for another's pain. Others have shown that interacting with an out-group target can evoke anxiety (Mendes, Blascovich, Lickel, & Hunter, 2002) and this, in turn, has been shown to inhibit empathy. Indeed, Martin and colleagues (2015) found that for human and non-human (mice) participants, the anxiety from interacting with a stranger correlated negatively with empathic-concern for the other's suffering. Moreover, blocking feelings of anxiety (pharmacologically) or engaging in a collaborative activity together can effectively restore empathy (Martin et al., 2015). This suggests that

fear might play a role in attenuating empathy. The question is, to what extent is the emotion of fear sufficient to elicit empathic biases? We expect that incidental fear will enhance intergroup empathic biases (i.e., the difference between empathy expressed for in-group vs. out-group targets), though we remain open to whether this is driven by increased in-group empathy, decreased out-group empathy, or both.

To be clear, we do not seek to re-establish the role of emotions in empathy, for which there is already substantial evidence (see e.g., Singer & Klimecki, 2014). Rather, we are concerned with the role of *incidental* fear; that which is not directly evoked by the intergroup context. We seek to investigate whether simply being afraid, for reasons unrelated to the intergroup relationship, is enough to elicit empathic bias. One might argue that we already know that (integral) fear affects intergroup attitudes. However, there is added value in examining whether or not this is also the case with incidental fear. If we find that incidental fear increases intergroup biases, we learn that it is not enough to focus on improving specific intergroup relations to eliminate biases, since these will emerge with the occurrence of seemingly unrelated threats. For example, reading about a terrorist attack can cause fear and anger (Das et al., 2009) and those emotions can be misattributed as a genuine reaction to an unrelated target (Schwarz & Clore, 1983). This phenomenon can explain why, in the UK, attacks of individuals with disabilities, or of LGBT individuals, increased after a series of terrorist attacks (Home Office, 2018). Examining this is likely to advance understanding both of the drivers of intergroup biases and of how emotions operate.

Overview of the Research

We conducted two studies measuring the extent to which participants felt empathy for their group vs. an out-group, following induction fear vs. a control condition. In Study 1, we induced fear by showing photographs of objects associated with common phobias such as spiders and snakes. In Study 2, we used images of physical threats such as a gun pointed at the screen (eliminating stimuli that also tapped into other negative emotions such as disgust). We developed this novel paradigm, as opposed to employing autobiographical recall (as others have done), due to the need to ensure that participants were exposed to (the same) incidental fear, rather than fear linked to aspects of intergroup relations. This method enabled us to exert greater control over the emotion elicited, and over the conditions in which we were placing our participants, and did not rely on participants' ability, or willingness, to recall experiences with fear.

In both studies, our core measure of interest was participants' empathic responses towards others' suffering. We predicted that inducing fear would lead to increased biases in empathy, compared to control conditions. It was unclear to us whether bias would manifest as increased ratings of empathy for the in-group or decreased empathy for the out-group. For exploratory purposes, we also measured evaluations of the target groups explicitly (self-other overlap and stereotype content) and implicitly (a pictorial Implicit Association Task; IAT). These measures were included to determine the extent to which participants had prior implicit or explicit perceptions about the target groups. Capturing these responses allowed us to determine whether any change in empathy was associated with incidental emotion (i.e.

the induction task) or by integral emotion (i.e. pre-existing perceptions of the target groups).

Study 1

Method

Design. The study followed a 2 (group membership: in-group vs. out-group) x 2 (incidental fear: fear vs. control) mixed measures design, with group membership varied within participants and fear varied between. The dependent variable was how much empathy participants reported for the target.

Participants. To test for an interaction between target group and fear on empathy we required a sample size of 80 participants (40 in each between groups factor). This was determined by an *a-priori* power analysis (G* Power [Version 3.1], Faul, Erdfelder, Buchner, & Lang, 2009) (Analysis of Variance [ANOVA] mixed effects model; power =.80, α = .05; effect size f = .25). The effect size was chosen using results from the closest conceptual study that the authors could find on the role of incidental emotion in intergroup relations (DeSteno et al., 2004).This effect refers to a within-between interaction between group*emotion. A total of 80 students were recruited from the University of Exeter and remunerated with £3 or 0.5 course credits. Two participants withdrew from the study leaving a total sample of 78 participants (39 at each level of the between-groups factor; M_{age} = 19.42, SD = 2.99, 66 female). The study was approved by the Ethics Committee of the School of Psychology, University of Exeter, and the Ministry of Defence Research Ethics

Committee (funder). Informed consent was obtained according to the Declaration of Helsinki (World Medical Association, 2013).

Stimuli

The main task has been validated to study intergroup empathy (Richins et al., 2018). This involved participants viewing photographs of in-group and out-group targets experiencing painful or innocuous events.[1] Participants were instructed only to memorise the target's group membership (i.e. a student from one of the groups), to observe what the target experienced, and then recall the target's group membership in a simple 1-back task (a simple measure of working memory wherein participants are required to remember information from 1 or more turns back; Gazzaniga, Ivry, & Mangun, 2009). A total of 96 trials, 50% depicting painful events (48), and 33% per group (32), each lasting 10 seconds, were presented in a single run. Photos were matched across conditions for dimension and orientation. The targets themselves were matched across conditions for sex, perceived age, race, and attractiveness. The targets demographics reflected the students at the university where the study was conducted, regarding age, sex, and visible race/ethnicity.

The emotion induction procedure involved showing images on-screen, with a rapid onset and completely at random during the task. This was to simulate a 'jump scare' - an abrupt change in image that is often used in horror

[1] In our analysis, we include only trials that involved painful events. We observed significant floor effects of empathy during innocuous trials, which in retrospect is not surprising—there is no need to feel empathy for an event that is obviously not painful or uncomfortable. The innocuous trials however served as fillers in the main task.

films or video games to surprise the audience. The participants were told that this would happen and that they were not required to respond to those images; they were simply to continue responding to the main task. Before commencing participants were reminded of their right to withdraw should they be uncomfortable with any aspect of the study. To induce fear, half of participants were shown images from the Set of Fear Inducing Pictures database (SFIP; Marchewka, Żurawski, Jednoróg, & Grabowska, 2014; Michałowski et al., 2016; Riegel et al., 2016)[2] of objects that are associated with common phobias (e.g. spiders, snakes). As a control, the other participants were shown images of a non-fearful but content-matched object (e.g. a knitted toy spider). These images were sourced from an image hosting Internet service (www.flickr.com) under a Creative Commons license. There were 12 (fearful vs. non-fearful) images in total in the induction procedure. In each trial, there was a 12.5% chance of an image appearing (in either condition). The image would appear with a rapid onset and for a brief duration (1000ms). A new sequence of trials and timings for the main task was randomly generated for each participant.

Following the main task, participants were presented with a pictorial IAT (Greenwald et al., 1998). The images consisted of the targets from the main task with their group membership visibly denoted by a coloured bracelet. The IAT consisted of 4 blocks. For 2 blocks, participants were asked to distinguish between in-group vs. out-group targets followed by fear- (fear, terror, horror, and panic) vs. positive-related words (calm, relax, peace, and rest; Cain, 2012).

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[2] As per the agreement for access to the SFIP (Michałowski et al., 2016) example images from this database are not included in this manuscript.

For a further 2 blocks, participants were asked to pair in-group targets with positive-related words and out-group targets with fear-related words, followed by the reverse. The order of the latter 2 blocks was counterbalanced.

A new sequence of trials and timings was randomly generated for each participant. Stimuli were presented using E-Prime 2.0 (Psychology Software Tools, Pittsburgh, PA) on an 800x600 LCD monitor.

Measures

Participants were asked to indicate their levels of fear on a set of 7-point scales (1 = not at all to 7 = very much so; adapted from Lerner, Small, & Loewenstein, 2013). The fear subscale consisted of how nervous, anxious, and afraid the participant felt (α = .77) compared to how relaxed, peaceful, and calm on the positive sub-scale (α = .86). The manipulation checks were measured in groups of two at specific intervals (on trial 32, 64, and 96). The two items presented at each phase were randomised

To measure empathy, we asked participants to respond to two items, after each event picture: One that gauged self-focused empathy (i.e. “to what extent was the event painful for you to witness?”) and one that gauged more other-focused empathy (also designated as compassion, i.e., “to what extent did you feel bad for the target?”). Responses were made on a standard keyboard using a visual analogue scale (1 = not at all to 100 = very much so).

In the final part of the study, participants were asked to complete the inclusion of other in the self scale (IOS; Aron, Aron, & Smollan, 1992) as well as a set of group-based evaluations on perceived competence (3 items, “how [competent/capable/intelligent] is [the target group]”; all alphas > .90), sociability

(3 items, “how [warm/friendly/trustworthy]” all alphas > .90; adapted from Fiske, Cuddy, Glick, & Xu, 2002), status (4 items, “how [high status/prestigious/well thought of/respected]”, all alphas > .80), rivalry (2 items, “how much of a [rival/competitor] is the [target group]” all alphas > .80; adapted from Doosje, Ellemers, & Spears, 1995), and similarity (2 items, “how [similar/comparable]” all alphas > .90; adapted from Simon, 1992) in relation to the target groups.

Procedure. After providing written consent, participants were allocated to one of two artificial groups (the red or blue group). To do this, we asked participants to complete a bogus personality questionnaire in which they were required to estimate the amount of dots on the screen. The computer then ostensibly analysed responses and placed participants with others according to the similarity of their scores, forming two groups. In reality, allocation was randomised between participants. To ensure that group membership remained salient, participants were given a coloured bracelet reflecting their group’s colour.

In the main section of the study, participants were shown pictures of individuals experiencing either physical pain (e.g. receiving an injection) or something innocuous (e.g. being touched by an earbud or Q-tip). In each case, the target individual was from either the same or different group as the participant. The target’s group membership was visualised by a coloured box that preceded each trial as well as a coloured bracelet that was either the same or different to the one that the participant was wearing. To ensure that participants would process the target’s group membership, we instructed them to memorise it for a simple 1-back task. Once participants had identified the

target's group, they were asked how much empathy they felt for the target following the observed event.

At intermittent times during the response phase of the empathy task, an image would appear that was designed to induce fear or not—the condition was set by E-Prime at random with experimenter remaining blind to condition to preclude any possibility of influencing the results(i.e. a randomised, double-blind procedure). In the final section, participants were asked to complete a pictorial IAT followed by IOS scales and a set of group-based evaluations.

Results

For a summary of means, standard deviations, and correlations please refer to **Error! Reference source not found.** S1. All results are Bonferroni-corrected unless otherwise indicated. The dataset for this study can be located at the following OSF project page: DOI 10.17605/OSF.IO/AQFS9.

Target recall. Participants successfully identified the target's group membership at a rate of 95.99%. This did not vary by group membership, t (77) = 1.79, p = .08, 95% CI [-.001, .02], d =.17, nor by emotion induction condition, F (1, 76) = .195, p = .660, η_p^2 = .003.

Manipulation check. The emotion induction procedure was successful in producing the expected 2 (fear vs. control) x 2 (scale: fear-related vs. positive-related feelings) interaction, F (1, 76) = 13.38, p < .001, η_p^2 = .15. Participants in the fear condition reported feeling more afraid, t (77) = 3.28, p = .002, 95% CI [6.59, 26.98], d =.75, and less positive than those in the control group, t (77) = -3.15, p = .002, 95% CI [5.90, 26.09], d =.72. Of all items in the fear subscale, the largest effect was in the extent to which they reported feeling

afraid, *t* (77) = 3.41, *p* = .001, 95% CI [9.77, 37.26], *d* = .77, compared to *anxious*, *t* (77) = 2.42, *p* = .018, 95% CI [2.54, 26.29], *d* = .55, and *nervous, t* (77) = 2.08, *p* = .04, 95% CI [.55, 24.33], *d* = .55.

Empathy task. To investigate the effects of fear on intergroup, we ran a 2 x 2 mixed ANOVA with target group as a repeated factor and fear as a between groups factor. We predicted a two-way group*fear interaction on empathy.

There was no main effect of group membership, *F* (1, 76) = 3.29, *p* = .073, η_p^2 = .042, no main effect of fear, *F* (1, 76) = .070, *p* = .792, η_p^2 = .001, nor any interaction between fear and group membership, *F* (1, 76) = .129, *p* = .720, η_p^2 = .002, on self-focused empathy.

Regarding other-focused empathy (i.e. compassion), there was a significant effect of target group, *F* (1, 76) = 8.00, *p* = .006, η_p^2 = .095, qualified by a significant interaction between target group and fear, *F* (1, 76) = 4.52, *p* = .037, η_p^2 = .056: Whereas those exposed to fearful images reported significantly less other-focused empathy for the out-group compared to in-group, *F* (1, 76) = 12.59, *p* = .001, η_p^2 = .142, those exposed to non-fearful images reported equal levels of other-focused empathy for both groups, *F* (1, 76) = .240, *p* = .626, η_p^2 = .003 (Table 1).

Automatic attitudes. D scores were computed using the improved algorithm from Greenwald, Nosek, and Banaji, (2003). The mean of correct latencies was computed for each block as was the difference between blocks. This was then divided by a pooled standard deviation and finally averaged. The fear manipulation had no effect on automatic attitudes, *t* (77) = -.939, *p* = .350, 95% CI [-.88, .32].

Self-reported overlap. Participants reported more overlap with in-group, compared to out-group, targets, F (1, 76) = 36.08, p < .001, η_p^2 = .322. This was qualified by a significant interaction between group membership and fear, F (1, 76) = 4.20, p = .044, η_p^2 = .052. Participants who were exposed to fearful images reported less overlap with the out-group compared to those exposed to non-fearful images, F (1, 76) = 11.49, p = .001, η_p^2 = .131. In response to the in-group, however, fear had no effect, F (1, 76) = .075, p = .785, η_p^2 = .001.

Group perceptions. ***Stereotype content.*** A 2 (fear) x 2 (group membership) ANOVA revealed there was no main effect of group membership on ratings of competence, F (1, 76) = 2.80, p = .098, η_p^2 = .04. There was a main effect of fear, F (1, 76) = 4.49, p = .037, η_p^2 = .06. Participants exposed to fearful images rated individuals from both groups as less competent, compared to the control group, t (77) = -2.12, p = .037, 95% CI [-15.31, -.48], d = .48. There was no interaction between fear and group membership, F (1, 76) = .301, p = .585, η_p^2 = .004.

There was a main effect of group membership on ratings of perceived sociability, F (1, 76) = 17.99, p < .001, η_p^2 = .19. Participants rated the in-group as significantly more sociable than the out-group, t (77) = 4.27, p < .001, 95% CI [5.09, 13.99], d = .46. There was a main effect of fear, F (1, 76) = 5.04, p = .028, η_p^2 = .06: Participants exposed to fearful images rated all targets as less sociable than the control group, t (77) = -2.25, p = .028, 95% CI [-17.11, -1.02], d = .55. There was no interaction between fear and group membership, F (1, 76) = 1.23, p = .271, η_p^2 = .016.

Status. There was no main effect of group membership on ratings of perceived status, F (1, 76) = .586, p = .446, η_p^2 = .016. There was no main

effect of fear, F (1, 76) = .046, p = .831, η_p^2 = .001, nor any interaction between fear and group membership, F (1, 76) = .026, p = .992 η_p^2 = .00.

Similarity and rivalry. There was no effect of fear on reports of perceived similarity, t (77) = .438, p = .662, 95% CI [-6.93, 10.91], d = .09, nor ratings of a perceived rivalry, t (77) = -1.46, p = .148, 95% CI [-22.63, 3.47], d = .33.

Discussion

The goal of the current study was to determine whether incidental fear would exacerbate intergroup biases in empathy. The results revealed that fear exerted a functional influence on other-focused empathy (i.e. compassion). After seeing pictures of spiders and snakes, participants reported lower levels of other-focused empathy for out-group members, compared to in-group members, while in the control group there was no difference in the empathy expressed according to target's group membership. Said another way, intergroup biases in (other-focused) empathy emerged only when participants reported feeling afraid. No parallel effects were found for self-focused empathy. This difference between self- vs. other-focused empathy is consistent with previous research where we found that the perceived threat of an out-group had greater influence on brain regions typically associated with other-focused empathy, over areas associated with self-focused empathy (Richins et al., 2018).

In the current study, we also explored whether explicit or implicit evaluations were similarly affected by fear and potentially explained the effect of fear on empathy. We asked participants to complete an IAT as well as self-report their relationship to the perceived groups. Previously, researchers have

shown that negative emotions, such as anger, induce automatic biases against an out-group on an IAT (DeSteno et al., 2004). Fear did not have any such effect in this study. Fear did, on the other hand, influence explicit perceptions. Fear encouraged participants to judge the groups more negatively (less competent and less sociable), but this happened regardless of group affiliations, so it cannot explain the effect of fear on empathic biases. Interestingly, fear also negatively influenced self-other overlap but this was unique to the out-group, having no influence on the participant's relationship to the in-group.

Previous research suggests that fear enhances positivity towards the in-group (Bukowski et al., 2014), but we found individuals navigated fear by pulling away from the out-group. Fear therefore may encourage us to organise our social worlds not necessarily by coming together, but rather by estranging distant others.

In Study 2, we sought to replicate and extend these findings. We used the same paradigm but eliminated images that may elicit other fear-related emotions (e.g. spiders elicit fear but also disgust; Davey, 1994)—the remaining stimuli consisted of physical threats such as a gun pointed at the screen. The intended effect was to circumscribe the induced emotion more specifically to fear.

Study 2

Method

Participants. Sample size was based on the effect size of the previous within-between interaction between group and fear on other-focused empathy (G* Power [Version 3.1], Faul, Erdfelder, Buchner, & Lang, 2009) (Analysis of

Variance [ANOVA] mixed effects model; power =.80, α = .05; effect size f = .27). A total of 68 healthy students were recruited from the University of Exeter. 3 participants withdrew leaving a total sample of 65 (M_{age} = 19.57, SD = 3.24, 53 female).

Procedure. The paradigm was identical to that of Study 1 with the exception that the induction procedure persisted throughout the study, rather than only during the empathy task.

Results

For a summary of the means, standard deviations, and correlations please refer to Table S2.

Target recall. Participants successfully identified the target's group membership at a rate of 94%. This did not vary by group membership, t (64) = 1.68, p = .096, 95% CI [-.002, .03], d =.11, nor by emotion induction condition, F (1, 63) = 1.39, p = .243, η_p^2 = .02.

Manipulation check. The emotion induction procedure was successful in producing the expected 2 (fear vs. control) x 2 (scale: fear-related vs. positive feelings) interaction, F (1, 63) = 7.15, p = .01, η_p^2 = .10. Participants in the fear condition reported more fear-related emotions, t (64) = 2.50, p = .015, 95% CI [2.84, 25.29], d =.65, and less positive feelings than those in the control group, t (64) = -2.03, p = .047, 95% CI [-25.74, -.20], d =.50. Of all the items, the largest difference between groups was in the extent to which they reported feeling *afraid*, t (64) = 2.73, p = .008, 95% CI [4.72, 30.52], d = .68, compared to *anxious*, t (64) = 2.46, p = .017, 95% CI [2.54, 26.29], d = .55, and *nervous, t* (77) = 2.08, p = .04, 95% CI [.55, 24.33], d = .55.

Empathy. As in Study 1, participants reported more self-focused empathy when the target in pain was an in-group, compared to out-group member, F (1, 63) = 49.62, p < .001, η_p^2 = .441. There was no significant main effect of fear, F (1, 63) = .148, p = .702, η_p^2 = .002, nor a significant interaction between fear and group membership, F (1, 63) = .921, p = .341, η_p^2 = .014.

Participants reported feeling more other-focused empathy (compassion) when the target in pain was an in-group, compared to an out-group member, F (1, 63) = 9.66, p = .003, η_p^2 = .133. This was qualified by a marginally significant interaction between group membership and fear, F (1, 63) = 3.31, p = .074, η_p^2 = .05: Those in the fear condition reported less other-focuses empathy for an out-group, compared to in-group, target, F (1, 63) = 11.95, p = .001, η_p^2 = .159. Those in the control condition, however, reported equal levels of other-focused empathy, irrespective of target group membership, F (1, 63) = .843, p = .362, η_p^2 = .013 (Table 1).

Automatic attitudes. There was no difference in automatic attitudes between groups, t (64) = -.031, p = .975, 95% CI [-.60, .58].

Self-reported overlap. Participants reported more overlap with in-group, compared to out-group targets, F (1, 63) = 21.10, p < .001, η_p^2 = .251. Participants in the fear condition reported greater overall overlap with others compared to those in the control group, F (1, 63) = 3.88, p = .053, η_p^2 = .058. There was no interaction between fear and group membership, F (1, 63) = .428, p = .515, η_p^2 = .007.

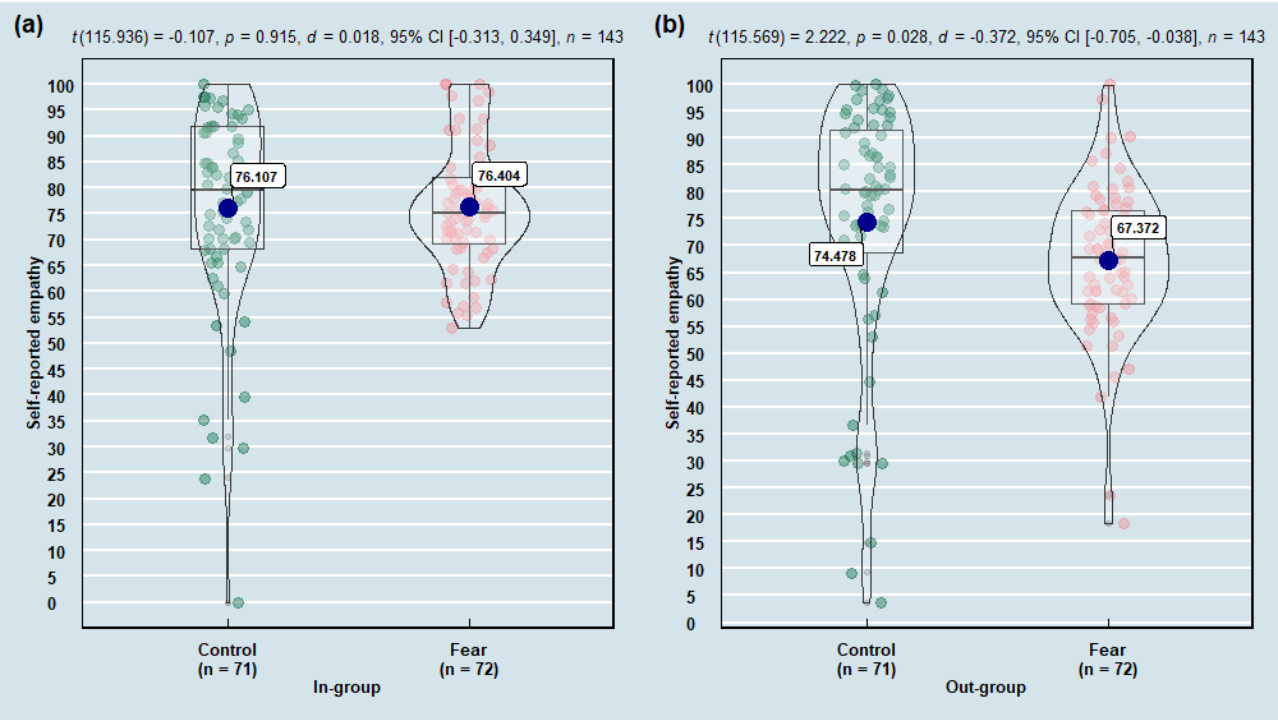
Group perceptions. ***Competence and sociability.*** There was no main effect of group membership on perceived competence, F (1, 63) = 2.33, p = .132, η_p^2 = .04. There was also no effect of fear, F (1, 63) = .223, p = .638, η_p^2 =

.004, nor any interaction between fear and group membership, F (1, 63) = .078, p = .781, η_p^2 = .001.

There was a main effect of group membership on perceived sociability, F (1, 63) = 5.12, p = .027, η_p^2 = .08. Participants rated the in-group as significantly more sociable than the out-group, t (64) = 2.26, p = .027, 95% CI [.63, 10.09], d = .31. There was no main effect of fear, F (1, 63) = .035, p = .852, η_p^2= .001, nor any interaction between fear and group membership, F (1, 63) = .030, p = .863, η_p^2 = .00.

Status. There was a main effect of group membership on perceived status, F (1, 63) = 10.64, p = .002, η_p^2 = .15. Participants rated the out-group as significantly higher in status than the in-group, t (64) = 3.26, p = .002, 95% CI [8.74, 36.36], d = .81. There was no main effect of fear, F (1, 63) = .001, p = .998, η_p^2 = .000, and no interaction between fear and group membership, F (1, 63) = .065, p = .800 η_p^2 = .001.

Similarity and rivalry. There was no effect of fear on perceived similarity, t (64) = -1.19, p = .240, 95% CI [-18.99, 4.84], d = .29, nor on perceived rivalry, t (64) = -.354, p = .724, 95% CI [-18.35, 12.82], d = .09.



Note: Comparing responses to in-group and out-group targets

Figure 1. Results from Study 1 and Study 2, depicting self-reported other-focused empathy towards a) in-group and b) out-group targets in the experimental vs. control group. The figure was created using the R package 'ggstatsplot' (Patil, 2018).

Table 1. Mean Ratings of Self- and Other-focused Empathy In Response to In-group and Out-group Pain Following Inductions of Fear vs. Control

		Fear	Control	Fear	Control
	Measure	In-group		Out-group	
Study 1	Other-focused	81.25_{a} (13.39)	76.70_{a} (15.90)	70.19_{b} (17.34)	75.14_{a} (18.33)
	Self-focused	80.85_{a} (17.29)	82.35_{a} (20.12)	79.11_{a} (17.64)	79.75_{a} (19.33)
Study 2	Other-focused	70.34_{a} (17.18)	75.32_{a} (24.11)	63.84_{b} (7.23)	73.72_{a} (27.78)
	Self-focused	85.03_{a} (12.59)	82.12_{a} (23.75)	76.06_{a} (13.01)	75.29_{a} (25.79)

Note: *Ns* = 78/65. The rating scale ranged from 1 (not at all) to 100 (very much so). Standard deviations are given in parentheses. Within a row, means that do not share subscripts are significantly different with $p < .05$.

Discussion

The goal of Study 2 was to replicate the finding that fear increases empathic bias. As in Study 1, participants reported less other-focused empathy for out-group, compared to in-group, targets in pain, but only following exposure to fear-inducing images. The interaction between fear and group membership did not pass the conventional threshold for significance in this study, but analyses of the effects across studies confirms the consistency of the results. (For the details please see Supplementary Materials).

In Study 1, we primed fear by showing objects associated with common phobias such as spiders and snakes. This led participants to increase distance from the out-group. In Study 2, we primed fear by showing physical threats such as a gun pointed at the screen, controlling for other fear-related emotions like disgust. This led participants to draw towards others more generally (i.e. regardless of group membership). We note that we did not measure disgust directly in this study, so our conclusions are drawn in the absence of direct empirical evidence for this specific point. Future research in this area would benefit from measuring a number of relevant negative emotions in order to disentangle responses emerging from fear as opposed to, for example, disgust.

We recognise that the effects on empathy are not of very large magnitude. However, what is striking is that such brief and simple imagery can influence self-reported empathy at all. Empathy is a highly socially desirable response and, given the opportunity, participants will seek to confirm any presentation of themselves as empathic and compassionate (Decety & Jackson, 2006), for example, by self-reporting more empathy than they might otherwise feel. For that desire to be affected

by the brief (no longer than a second) exposure to a photograph suggests something greater than we might be able to demonstrate with laboratory data. In order to circumvent the issue of social desirability, future work would benefit from measuring empathic responses that are not within a participant's volitional control, for example with physiological responses, or neural correlates. This would prevent participants from being able to respond strategically, by presenting themselves as more empathetic than they may otherwise be. This is still a relatively understudied area and even with results that are not very strong, we feel this paper lays some groundwork for future researchers to exploit.

Conclusion

Fear drives a wedge in society and reshapes the political landscape—it is often even leveraged with that purpose (Boyd, 2012). At the Nuremberg Trials, Herman Goering said that to bring people to 'the bidding of leaders' you need only expose them 'to great danger' and tell them 'they are being attacked' (Gilbert, 1995, p.278-279). It's unsurprising, then, that fear features so prominently in political rhetoric (Gore, 2004). Indeed, Donald Trump garnered support for his candidacy as President by harnessing economic anxieties (Rothwell & Diego-Rosell, 2016). Harnessing these fears can provide the traction to pave way for political movements, allowing candidates who stoke ethnic or cultural tensions to mobilise a populace towards right-wing nationalism (Valentino, Hutchings, & White, 2002).

It is important to recognise how emotions may distort our perception of the world and it is our responsibility to keep our emotions in check. We might not be

able to prevent fear altogether but being aware of its influences may help us regulate how we respond to it.

Across two studies we show, for the first time, that brief cues to incidental fear influenced empathy towards an out-group target.

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Supplementary Material

Study 1

Results. ***Recall task.*** The fear manipulation had no effect on the accuracy, F (1, 76) = .195, p = .660, η_p^2 = .003, or speed, F (1, 76) = .803, p = .373, η_p^2 = .010, with which participants identified the target's group membership. Participants were marginally more accurate at identifying in-group compared to out-group targets overall, t (77) = 1.79, p = .077, 95% CI [-.001, .020], d = .17, but there was no difference in the time taken to do so, t (77) = .382, p = .704, 95% CI [-44.65, 65.82], d = .03.

Study 2

Measures. The same measures were used as those in Study 1. To determine whether incidental fear had any effect on real-world outcomes we included an optional donation game.[3]

[3] The donation game included an entirely voluntary choice of whether or not to donate any money to charity. Not enough of the participants took part in this task to allow for reasonable statistical inferences, therefore these data was not analysed.

Results. ***Recall task.*** The induction procedure did not influence the accuracy, $F (1, 63) = 1.39$, $p = .243$, $\eta_p^2 = .02$, or speed, $F (1, 63) = .336$, $p = .564$, $\eta_p^2 = .005$, with which participants identified the target's group membership. Participants were marginally more accurate at identifying in-group compared to out-group targets, $t (64) = 1.63$, $p = .099$, 95% CI [-.003, .029], $d = .21$, and were significantly quicker at identifying in-group compared to out-group targets, $t (64) = 4.40$, $p < .001$, 95% CI [-113.56, -42.66], $d = .23$.

'Mini' meta-analysis. To determine whether incidental fear reliably influenced compassion, we ran a 'mini' meta-analysis. 'Mini' metas use the same statistical approach as any meta-analysis but can be run on as few as two datasets. The goal of a mini-meta is to draw attention towards effect sizes and away from p-values, highlighting the 'bottom line' of a set of studies within a manuscript (Goh, Hall, & Rosenthal, 2016). In this analysis, we scrutinised the simple effects of the within-between interaction of incidental fear and group membership across Study 1 and Study 2. Group membership was coded as 0 = in-group and 1 = out-group. Any effect size with a negative value would therefore indicate that the out-group received less compassion than the in-group, and any effect size with positive value would indicate that the out-group received more compassion than the in-group.

To produce a summary effect size for the effect of group membership on self-reported compassion for each study, we calculated Cohen's *d* using Formula 1 from Goh et al. (2016) for equal group sizes:

$$d = \frac{2t}{\sqrt{df}}$$

We converted *t* scores to *r* using Formula 3 from Goh et al. (2016):

$$r = \sqrt{\frac{t^2}{t^2 + df}}$$

We then used Formula 5 to create a single weighted mean from the *r* scores:

$$Weighted\ \overline{r_z} = \frac{\sum([N-3]\ r_z)}{\sum(N-3)}$$

Finally, to create a summary *Z*-score for all of the studies in each analysis we used Stouffer's formula (Mosteller & Bush, 1954) where *k* refers to the number of independent *Z* scores being combined:

$$combined\ Z = \frac{\sum Z}{\sqrt{k}}$$

The results revealed that following exposure to fear-relevant stimuli participants reported significantly less compassion towards an out-group target, compared to an in-group target, whereas in the control condition there was no difference (Table S3).

Table S1. Summary of means, standard deviations, and correlations for scores on perceived competence, sociability, status, similarity, and rivalry, self-reported empathy, self-other overlap, and implicit bias score split by the between groups manipulation from Study 1

In-group - Fear											
Measure	*M*	*SD*	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*
1. Competence	70.20	17.31	—								
2. Sociability	71.09	18.73	.77**	—							
3. Status	30.78	27.88	-.36*	-.25	—						
4. Similarity	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	—					
5. Rivalry	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	—				
6. Compassion	81.25	13.39	.29	.33*	-.02	*N/A*	*N/A*	—			
7. Empathy	80.85	17.29	.17	.26	-.04	*N/A*	*N/A*	.87**	—		
8. IOS	4.18	1.55	.009	.06	.19	*N/A*	*N/A*	.21	.26	—	
9. D	.53	1.44	.09	.11	.14	*N/A*	*N/A*	.05	-.02	0.19	—
In-group - Control											
Measure	*M*	*SD*	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*
1. Competence	77.25	16.12	—								
2. Sociability	77.68	16.88	.84**	—							
3. Status	31.97	27.89	-.13	-.14	—						
4. Similarity	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	—					
5. Rivalry	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	—				
6. Compassion	76.70	15.90	.23	.25	-.15	*N/A*	*N/A*	—			
7. Empathy	82.35	20.12	.15	.11	-.17	*N/A*	*N/A*	.42**	—		
8. IOS	4.08	1.55	.009	.04	.13	*N/A*	*N/A*	-.12	-.23	—	
9. D	.24	1.21	.12	.32*	-.03	*N/A*	*N/A*	.04	.20	-.04	—

Out-group - Fear											
Measure	*M*	*SD*	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*
1. Competence	66.77	18.77	—								
2. Sociability	59.14	24.12	.73**	—							
3. Status	28.80	25.84	-.35*	-.37*	—						
4. Similarity	66.14	18.09	.58**	.68**	-.49**	—					
5. Rivalry	32.48	28.34	-.32*	-.37*	.41**	-.37*	—				
6. Compassion	70.19	17.34	.13	.19	.09	.14	.09	—			
7. Empathy	79.11	17.64	-.003	.03	-.09	.16	.03	.71**	—		
8. IOS	2.68	0.79	-.02	.001	.27	.07	-.07	.20	.12	—	
9. D	.53	1.44	-.06	.11	-.05	-.08	.18	.07	-.02	.31	—
Out-group - Control											
Measure	*M*	*SD*	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*
1. Competence	75.51	18.81	—								
2. Sociability	70.68	20.92	.73**	—							
3. Status	29.95	25.22	-.23	-.32	—						
4. Similarity	68.11	21.49	.26	.35*	-.16	—					
5. Rivalry	22.89	29.52	-.22	-.41*	.45**	-.21	—				
6. Compassion	75.14	18.33	.002	.17	-.14	.24	-.43**	—			
7. Empathy	79.75	19.33	.10	.26	-.19	.02	-.29	.60**	—		
8. IOS	3.34	0.94	.02	-.06	-.02	-.30	-.04	-.09	.02	—	
9. D	.24	1.21	.14	.17	.04	.15	-.13	.21	.09	0.21	—

Note: ** correlation is significant at the 0.01 level and * is significant at the 0.05 level (2-tailed)

Table S2. Summary of means, standard deviations, and correlations for scores on perceived competence, sociability, status, similarity, and rivalry, self-reported empathy, self-other overlap, and implicit bias score split by the between groups manipulation from Study 2

In-group - Fear											
Measure	*M*	*SD*	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*
1. Competence	63.59	23.51	—								
2. Sociability	63.76	15.81	.24	—							
3. Status	37.84	23.90	.25	.12	—						
4. Similarity	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	—					
5. Rivalry	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	—				
6. Compassion	70.34	17.18	.03	-.22	-.004	*N/A*	*N/A*	—			
7. Empathy	85.03	12.59	.56**	.26	-.10	*N/A*	*N/A*	.06	—		
8. IOS	3.78	1.99	.07	.31	.28	*N/A*	*N/A*	-.31	.04	—	
9. D	.56	1.06	-.14	.08	.03	*N/A*	*N/A*	-.45*	-.09	.29	—
In-group - Control											
Measure	*M*	*SD*	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*
1. Competence	66.30	19.91	—								
2. Sociability	63.43	18.86	.75**	—							
3. Status	39.61	31.22	.22	.18	—						
4. Similarity	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	—					
5. Rivalry	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	—				
6. Compassion	75.32	24.11	-.03	.23	-.22	*N/A*	*N/A*	—			
7. Empathy	82.12	23.75	-.16	.13	-.21	*N/A*	*N/A*	.95**	—		
8. IOS	2.88	1.65	.35*	.52**	.34	*N/A*	*N/A*	.25	.12	—	
9. D	.57	1.31	-.04	-.06	-.13	*N/A*	*N/A*	-.04	-.05	.03	—

Out-group - Fear											
Measure	*M*	*SD*	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*
1. Competence	59.97	20.15	—								
2. Sociability	58.81	16.93	.86**	—							
3. Status	62.16	23.90	.31	.23	—						
4. Similarity	60.53	26.25	.27	.36*	.23	—					
5. Rivalry	35.81	31.44	.14	.04	-.27	-.37*	—				
6. Compassion	63.84	7.23	.29	.20	.11	.12	.06	—			
7. Empathy	76.06	13.01	.190	.26	.14	.05	-.15	.21	—		
8. IOS	2.81	1.96	.37*	.21	-.11	.15	.06	.13	.08	—	
9. D	.56	1.06	.10	.11	-.03	.12	-.09	-.13	.008	.30	—
Out-group - Control											
Measure	*M*	*SD*	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*
1. Competence	61.06	15.80	—								
2. Sociability	57.67	21.77	.76**	—							
3. Status	60.39	31.22	.19	.09	—						
4. Similarity	67.61	21.67	.21	.15	.52**	—					
5. Rivalry	38.58	31.43	-.39*	-.39*	-.69**	-.55**	—				
6. Compassion	73.72	27.78	.29	.38*	.39*	.22	-.34	—			
7. Empathy	75.29	25.79	.30	.29	.33	.22	-.29	.93**	—		
8. IOS	2.15	1.39	-.09	-.08	-.03	-.26	.29	.12	.16	—	
9. D	.57	1.31	.20	.33	.13	.17	-.16	.02	-.05	.08	—

Note: ** correlation is significant at the 0.01 level and * is significant at the 0.05 level (2-tailed)

Table S3. Summary of results from the meta-analysis

Summary of participant demographics in each study				
		Gender	Age	
	N	f : m	M	SD
Study 1	78	66:12:00	19.42	2.99
Study 2	65	53:12:00	19.57	3.24

Differences in compassion towards In-group – Out-group in the fear condition						
	N	t	df	p	Cohen's d	r
Study 1	78	-3.55	77	0.001	0.71	0.38
Study 2	65	-3.46	64	0.001	0.9	0.4
M r_z						0.41
M r						0.41
Combined Z						4.61***
Differences in compassion towards In-group – Out-group in the control condition						
Study 1	78	-0.489	77	0.626	0.1	0.06
Study 2	65	-0.918	64	0.362	0.07	0.11
M r_z						0.08
M r						0.08
Combined Z						1

Note: In all analyses, in-group targets were coded as 0 and out-group targets as 1.

Correlations in the last column were calculated from t values using Formula 3. M r_z = weighted mean correlation (Fisher's z transformed). M r = weighted mean correlation (converted from r_z to r). Positive Cohen's d and positive correlation coefficients indicate that more compassion is shown for in-group, compared to the out-group, pain. $^{***}p < .001$, two-tailed.

Description of Stimuli Used in Studies 1 and 2 from the Set of Fear Inducing Pictures database (SFIP; Michałowski et al., 2016)

- [Animals_069_h] A large spider set to pounce towards the camera
- [Animals_035_h] A snake slithering towards the camera
- [Animals_004_v] A dog snarling towards the camera
- [Objects_148_h] A gun pointing towards the camera