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A Multiple Method Analysis of Appraisal-Emotion Relationships: The Case of the Prosocial
Intergroup Emotions

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Abstract

Despite its status as a prominent set of theories for explaining the elicitation and differentiation of emotions, much appraisal theory and research offers little indication of the nature of the relationship expected between appraisals and emotions. Here we present a three-study, multiple method analysis in which we examine numerous ways of testing appraisal-emotion relationships using the ‘prosocial’ intergroup emotions - sympathy, anger and guilt – as an example. Results show that the set of appraisal dimensions that appears strongly characteristic of an emotion varies depending upon the kind of appraisal-emotion relationship hypothesised and the experimental methodology/ statistical analysis used. These findings demonstrate the utility of explicit theorising about the nature of the relationship between emotions and appraisals, and show how the hypothesised appraisal-emotion relationship and choice of methodology can affect the structure of appraisal theories. We recommend an analysis across multiple methods to provide a more complete picture of a given set of appraisal-emotion relationships.

Keywords: emotion; appraisal; sympathy; anger; guilt; intergroup

Many appraisal theories of emotion have been developed (e.g. Arnold, 1960; Lazarus, 1991; Leach, Snider & Iyer, 2002; Ortony, Clore & Collins, 1988; Roseman, 1991; Scherer, 1984; Smith & Ellsworth, 1985; Tracy & Robins, 2004; Weiner, 1985), tests of which show that the experience of different emotions tends to be associated with different patterns of appraisal. Despite extensive research and theory in this area, there are elements of appraisal theory left implicit or which lack clarity. Here we illustrate those areas through a multiple method analysis of the appraisal basis of the so-called prosocial emotions: sympathy, anger and guilt (see Thomas, McGarty & Mavor, 2009). Our purpose is to examine the appraisals characteristic of those emotions using several methodologies which test different kinds of appraisal-emotion relationships. By comparing different methodologies, we demonstrate how appraisal theory often overlooks issues related to the specific nature of the hypothesised relationship between appraisals and emotions, and the frequent assumption of a single set of appraisal dimensions applicable to all emotions. We also show the potential for integrating the results of multiple analyses to form more complete pictures of appraisal-emotion relationships. These will inform us not only about the specifics of the appraisal basis of the prosocial emotions, but also have implications appraisal research in general. In the section which follows we will first present a brief critical discussion of existing appraisal research and theory, followed by a review of the prosocial emotions.

Appraisal Theories: Typical Assumptions

In a recent paper, Fernando, Kashima and Laham (2017) articulated several shortcomings of extant appraisal research and theory. First, the common assumption of what they call the ‘fixed set’: that appraisal theories contain a single set of appraisal dimensions, and specify the position of each emotion (usually high or low) on each dimension. A strong version of this theory (e.g. Leach et al., 2002) allocates a fixed position to each emotion on every appraisal dimension. Most appraisal theories begin from this assumption but may weaken it in certain cases (see Fernando et al., 2017). Second, most appraisal theories are silent or unclear on the nature of the relationship expected between appraisals and emotions (see Kuppens, van Mechelen, Smits & de Boeck, 2003). There are numerous ways in which appraisals and emotions can be associated – necessary, sufficient, modulating, typical – so it is difficult to evaluate empirical support for an appraisal theory without a clear statement of the hypothesised relationship. Third, since in a fixed set structure different emotions are characterised by different configurations of the same appraisal dimensions, it is difficult to account for the experience of multiple or blended emotions¹. Several studies have reported

multiple or blended emotions (e.g. Ellsworth & Smith, 1988; Fernando, Kashima & Laham, 2014; Williams & Aaker, 2002); thus, appraisal theories should provide some account of this phenomenon, and some recent attempts have been made to accomplish this (Shuman, Sander & Scherer, 2013; Tong & Jia, 2017).

These criticisms appear to have been recognised - if not always explicitly - in some appraisal research and theory, which has diverged from the fixed set structure by: 1) making reference to 'core' or 'central' appraisals (Ellsworth & Smith, 1988; Scherer, 1984), or 'core relational themes' (Lazarus, 1991); 2) making comments implying that emotions can be experienced without reference to the full appraisal set (Frijda, 2013; Moors, Ellsworth, Scherer & Frijda, 2013; Roseman, 2013; Scherer, 1984); and 3) selecting smaller subsets of appraisal dimensions from larger theories for research on specific emotions (e.g. Silvia, 2008; Turner & Silvia, 2006). In few cases, however, have explicit statements been made that some emotions do not require the appraiser to fix values on all dimensions (e.g. Ortony, et al., 1988; Tracy & Robins, 2004; Weiner, 1985).

Appraisal Theories: Empirical Validation

The lack of clarity in theorizing has been transferred to empirical tests of appraisal theories. Most research seeking to validate appraisal theories has used a small set of techniques which fall into three categories (see Ellsworth & Scherer, 2003). First, studies in which participants are asked to recall a situation in which they experienced an emotion and rate that situation on various appraisal dimensions (e.g. Frijda, Kuipers & ter Schure, 1989; Gehm & Scherer, 1988; Roseman, Antoniou & Jose, 1996). A relationship between an appraisal and emotion is inferred if that appraisal's mean rating is high or low for that emotion compared to other emotions. This methodology shows some association between the presence of an emotion and agreement with an appraisal but the nature of that association is unclear. Is that appraisal always made when the emotion is experienced, is it typical of that emotion, or does it increase its intensity²?

The second common methodology – often used in intergroup emotion research – is to use regression-based data analytic techniques to examine the relationship between appraisal and emotion ratings of some real-life situation (e.g. Branscombe & Miron, 2004; Iyer, Schmader, & Lickel, 2007; Siemer, Mauss & Gross, 2007). This analysis will identify the unique, linear relationship between agreement with an appraisal and emotion intensity.

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Again, no distinction is made between appraisals which elicit, and those which intensify, an emotion.

The third common methodology is to use vignettes to systematically manipulate combinations of appraisals (e.g. Roseman, 1991; Smith, Haynes, Lazarus & Pope, 1993; Tracy & Robins, 2006, 2007; Weiner, Graham & Chandler, 1982). While this allows appraisal researchers to examine the effects of combining multiple appraisals, these studies typically compare mean ratings of emotion intensity across different appraisal combinations, without necessarily making clear which appraisal combinations determine whether the emotion was experienced or not, and those that intensify the emotion experience.

Appraisal researchers have also devised novel methodologies which offer advantages over these common methods, but these have only been used in a small number of studies: for example, appraisal necessity and sufficiency indices (Kuppens et al., 2003; Tong, 2010); reaction time techniques (Siemer & Reisenzein, 2007); and ecological momentary assessment/experience sampling (e.g. Nezlek, Vansteelandt, van Mechelen & Kuppens, 2008; Tong, 2010; Tong et al., 2007).

All of the techniques reviewed above contain advantages and drawbacks (as noted by Goetz, Frenzel, Stoeger & Hall, 2010; Moors, 2013; Smith & Ellsworth, 1987), and each can be combined with statistical analyses which test for specific types of appraisal-emotion relationships. Thus, any one methodology will provide only a partial account of the appraisal basis of an emotion, but an analysis across multiple methods may allow for the development of a more complete picture of these relationships. Here, we apply a number of the techniques reviewed to a small set of emotions and attempt thereby to build a profile of the appraisal bases of those emotions.

Prosocial Emotions

The set of emotions chosen for this analysis are intergroup sympathy, anger and guilt. These emotions have been designated the ‘prosocial emotions’ - three primary emotions implicated in the desire to help another (Thomas et al., 2009). These emotions are a subset of the group of emotions experienced by relatively advantaged groups in relation to other people’s deprivation (Leach et al., 2002), as well as the broader category of moral emotions (Haidt, 2003). In this context, sympathy (for the deprived), anger (at the perpetrator or the

moral violation) and guilt are responses to inequality which tend to motivate prosocial behaviour.

Earlier we articulated three broad critiques of extant appraisal theory: 1) the fixed set model; 2) lack of clarity regarding the nature of the appraisal-emotion relationship; 3) not accounting for the possibility of multiple or mixed emotions. Considering past research on the appraisal basis of the prosocial intergroup emotions with reference to those three critiques suggests that they lend themselves well to our proposed analysis across multiple methods.

First, these emotions are typically elicited by the same types of situations (i.e., intergroup inequalities and injustices) and are likely to entail some overlapping appraisal content. This suggests that a small set of appraisal dimensions may account for the elicitation of these emotions, which allows us to test between a fixed appraisal set (where each emotion would be elicited by a unique combination of values on a the same set of appraisal dimensions) or a more variable appraisal set (where the eliciting appraisals may overlap, but some appraisals are irrelevant to some emotions). Consistent with a fixed appraisal set, Leach et al. (2002) hypothesised that different configurations of values on four appraisal dimensions - self-other focus, perceived legitimacy, perceived stability and perceived controllability – would characterise the three prosocial (among other) emotions. We hypothesise, however, that while these appraisals are likely to show some relationship to the prosocial emotions, they will not all be related to all three emotions, or not related in the same manner.

Second, most tests of the appraisal bases of these emotions have used the same methodology entailing the same assumptions regarding the nature of the appraisal-emotion relationship. Studies in this area (Cehajic, Brown & Gonzalez, 2009; Iyer & Ryan, 2009; Iyer et al., 2007; Leach et al., 2006; Lickel, Schmader, Curtis, Scarnier & Ames, 2005; Pagano & Huo, 2007; Satrzyk & Ross, 2008) have typically used regression-based analyses to test the extent to which the presence or intensity of an appraisal predicts the intensity of an emotion. Thus, our knowledge of the appraisal basis of these emotions is limited to only one kind of appraisal-emotion relationship, such that a multi-method analysis would clarify the validity of, and greatly extend, knowledge of the appraisal bases of these emotions.

Finally, there is ample evidence that these emotions are correlated (e.g. Leach et al., 2006; Montada & Schneider, 1989; Pagano & Huo, 2007), and are reported in combination, with different effects on action orientations depedent upon those combinations (Fernando et al., 2014). Further support for the notion that these emotions can be elicited simultaneously

comes from research on so-called ‘empathic anger’, in which greater anger was elicited when greater empathy for the victim was induced (Batson et al., 2007). These findings present a challenge to theories entailing a fixed appraisal set and suggest that the experience of simultaneous emotions is consequential and should be accounted for by appraisal theories. Thus, these emotions provide an ideal situation in which to test the capacity for appraisal theory to account for simultaneously-reported emotions.

We now outline the hypothesised appraisal bases of each of the three prosocial emotions.

Sympathy

Numerous accounts of sympathy emphasise the centrality of ‘suffering’ to the appraisal basis of sympathy (Goetz, Keltner, & Simon-Thomas, 2010; Lazarus, 1991; Starzyk & Ross, 2008), or similar appraisals of ‘need’ or ‘struggling’ (Lishner, Batson & Huss, 2011). Previous studies have also shown empirical associations between sympathy and appraisals of injustice (Starzyk & Ross, 2008), illegitimacy (Branscombe & Miron, 2004; Iyer & Ryan, 2009), and ingroup responsibility (Cehajic et al., 2009), but the theoretical basis of these associations is not well established.

Anger

The primary appraisal associated with intergroup and interpersonal anger is illegitimacy (e.g. Iyer et al, 2007; Iyer & Ryan, 2009), or similar appraisals of unfairness (Kuppens et al., 2003; Kuppens, Van Mechelen, Smits, De Boeck, & Cuelemans, 2007) or injustice (Averill, 1983; Montada & Schneider, 1989). Shaver, Schwartz, Kirson and O’Connor (1987) found an appraisal of illegitimacy to be present in 95% of participants’ accounts of anger experiences.

Guilt

Common to many accounts of guilt are variants of an appraisal that one is responsible for an illegitimate act: rule transgression (Tangney, Miller, Flicker & Barlow, 1996), being in the wrong (Roseman, Wiest & Swartz, 1994), or responsibility for the suffering of others (Baumeister, Stillwell, & Heatherton, 1994). Numerous studies have shown intergroup and interpersonal guilt to be most strongly predicted by appraisals of self-blame (Nezlek et al., 2008), ingroup responsibility (Iyer, et al., 2007) or personal/group control over events (Lickel et al., 2005; Montada & Schneider, 1989). As implied by these findings, the ingroup

responsibility characteristic of guilt is often related to an illegitimate act, or the suffering of others. Thus, it is likely that those appraisals will show some association with guilt.

In addition to the appraisal-emotion associations cited above, Leach et al., (2002) hypothesised that each of these emotions occupies a position of high or low on appraisals of illegitimacy, control (similar to responsibility), stability and self/other-focus³, so we can expect an association with these appraisals as well. In that theory, sympathy was hypothesised to be associated with high illegitimacy, other-focus, low control and high stability; moral outrage with high illegitimacy, other-focus, high control and low stability; and guilt with high illegitimacy, self-focus, high control and low stability.

Study 1

Study 1 used an approach common in intergroup emotion research, in which participants rated their emotions about existing intergroup inequalities involving prominent ingroups (e.g. Brown, Gonzalez, Zagefka, Manzi & Cehajic, 2008; Doosje, Branscombe, Spears, & Manstead, 1998). Here Australian participants rated their emotions and appraisals about the mandatory detention of asylum seekers.

Method

Participants. 100 Australians completed an online questionnaire in response to an e-mail seeking those interested in completing a survey about attitudes toward asylum seekers (participants were requested to pass the questionnaire link on to others). To ensure that participants included themselves in the Australian ingroup, 3 non-citizens were excluded from the sample. The remaining participants were 39 females and 46 males (12 participants did not specify their gender) aged between 19 and 80 years ($M = 30.64$, $SD = 12.04$). A sensitivity power analysis for multiple regression analyses with five predictors (see below) using G*Power 3 software indicated a minimum detectable effect size of $f^2 = .14$ (medium effect) where $\alpha = .05$ and $1 - \beta = .80$.

Materials and procedure. Participants read a description of Australia's asylum seeker policy (see Appendix A), and then completed measures of emotions and appraisals.

Emotions. Participants were presented with several emotion words and asked to rate (1=strongly disagree, 7=strongly agree) the extent to which they agreed that they experienced each emotion regarding the mandatory detention of asylum seekers. Three items measured

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sympathy (empathetic, sympathetic, compassionate); four measured anger (furious, outraged, offended, angry); and four measured guilt (blameworthy, culpable, guilty, remorseful)⁴.

Appraisals. Participants rated the extent to which they agreed with several statements about Australia's treatment of asylum seekers on a 7-point scale (1=strongly disagree, 7=strongly agree). Three items measured suffering (e.g. *'The mandatory detention of asylum seekers causes them to suffer'*); three items measured illegitimacy (e.g. *'The conditions of asylum seekers in detention are unjust'*); four items measured ingroup responsibility (e.g. *'Australia is primarily responsible for the detention of asylum seekers'*); three items measured stability (e.g. *'The situation of asylum seekers in detention is one which could be changed'*⁵ (reverse scored)); and a single item measured outgroup responsibility (*'Asylum seekers are responsible for their own situation'*).

Results

The means, standard deviations and reliabilities of all study variables, and the correlations between them, are shown in Table 1.

Insert Table 1 about here

The data were analysed in three ways; the first two were designed to simulate common forms of analysis in appraisal research as described above: 1) point-biserial correlations (categorical emotions and dimensional appraisals) to simulate designs in which participants rate a variety of appraisals about an emotion they had experienced, and 2) regressions of emotions on appraisals (dimensional appraisals and emotions) as commonly employed in studies of intergroup emotion. The results of these were compared to a relatively less frequently used appraisal analysis using necessity indices (categorical appraisals and emotions). Since some analyses required categorical variables, high/low scores were created by coding scores of 1 to 3.5 as 1 (low) and scores of 4.5 to 7 as 2 (high). Scores between 3.5 and 4.5 were excluded as ratings around the midpoint of the scale were considered not to clearly denote the experience of the emotion or not (a rating of 4 denoted 'neither agree nor disagree').

Table 2 displays point-biserial correlations between the binary emotion variables and continuous appraisal ratings. In almost all cases, significant correlations were observed

between appraisals and emotions, typically in the direction predicted by previous research and theory; however, a near-significant negative relationship between stability and sympathy was the opposite of that predicted by Leach et al. (2002).

Insert Table 2 about here

Next, each of the emotions was regressed on the set of five appraisals.⁶ In each case the overall regression model was significant and there were two significant or near-significant predictors (see Table 3). The predictors of the greatest intensity for sympathy were suffering and (low) outgroup responsibility; for anger, suffering and illegitimacy; and for guilt, illegitimacy and ingroup responsibility.

Insert Table 3 about here

To test the necessity of appraisals for emotion experience we employed a phi-index (Kuppens et al., 2003). This is an index of the probability that an appraisal is made, given that an emotion is experienced. The equation for the index is:

$$\phi = \frac{P(\text{appraisal} | \text{emotion}) - P(\text{appraisal})}{1 - P(\text{appraisal})}$$

Absolute necessity of an appraisal is indicated if $\phi = 1$. Figure 1 displays the necessity indices for each appraisal-emotion combination.

Insert Figure 1 about here

Several appraisal-emotion combinations produced necessity indices equalling or approaching $\phi = 1$. The suffering appraisal produced a perfect necessity index for all three emotions. Illegitimacy and ingroup responsibility also produced high indices ($> .7$) for anger and guilt, but low indices ($< .2$) for sympathy. Outgroup responsibility produced necessity

indices approximating zero for all emotions, and while stability appraisals were made slightly more often when anger and guilt were experienced, the indices did not approach $\phi = 1$.

Discussion

Study 1 showed that depending upon the analysis strategy very different interpretations could be made about appraisal-emotion relationships. Firstly, the point-biserial correlations showed significant relationships between almost all appraisals and emotions, which would support a fixed-set appraisal theory in which each emotion occupies a position on every appraisal dimension. The regression and necessity analyses, however, suggest that only a small number of appraisals were strongly related to each emotion. These latter analyses in turn differed from one another in the specific appraisal-emotion relationships identified. For example, the suffering appraisal achieved the criterion for necessity for sympathy and was also a significant predictor in regression, whereas the outgroup responsibility appraisal was a significant predictor of sympathy in regression, but produced a necessity index approximating zero. Thus, while suffering seems vital to the elicitation of sympathy, outgroup responsibility may modulate the intensity of sympathy, but is far from necessary. This result underscores the importance of specifying the nature of the hypothesised appraisal-emotion relationship, and how this can inform the structure of appraisal theories.

Regarding the use of necessity indices, we note that while the phi index allows for the examination of appraisal necessity lacking in much appraisal research, it may be difficult to interpret when emotions are correlated. Under these conditions, appraisals necessary for one emotion appear necessary for other, correlated, emotions. Furthermore, we have regarded high phi indices as 'necessary', although they do not meet the standard of $\phi = 1$. This is because factors that would not ordinarily obscure overall trends (e.g. careless responding) exert an inordinate influence when trying to establish absolute necessity. It is, therefore, noteworthy that the indices observed in this study were generally higher than those in previous studies (e.g. Kuppens, et al., 2003; Tong, 2010).

Study 2

Study 2 investigated the same appraisal-emotion relationships using a judgement facilitation paradigm (see Bassili & Racine 1990; Siemer & Reisenzein, 2007). The paradigm rests on the assumption that if in the process of deciding if one experiences an

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emotion, information about an appraisal is activated, a subsequent judgement about that appraisal should be made faster than if that appraisal judgement was made without the prior emotion judgement. While in Study 1 we tested the necessity of fixing a value on each appraisal dimension, this paradigm assesses whether information about an appraisal is activated at all when making an emotion judgement. Since the outgroup responsibility and stability appraisals showed relatively weak associations with the three emotions, these are henceforth excluded from the analysis.

Method

Participants. 225 Australian psychology students volunteered as part of a course requirement, 145 of whom were female. Ages ranged from 17 to 51 ($M=19.70$, $SD=4.45$). A sensitivity power analysis for repeated measures t-tests using G*Power 3 software indicated a minimum detectable effect size of $d = .40$ (small to medium effect) where $\alpha = .05$ and $1 - \beta = .80$.

Materials and procedure. Six scenarios were constructed for this study, each of which described a fictional situation in which Australians caused suffering to members of another group. These were designed such that participants - Australian citizens - were likely to answer 'yes' when they made each of the appraisal (suffering, illegitimacy, ingroup responsibility) and emotion (sympathy, anger, guilt) judgements. Participants were told that each story was transcribed from a newspaper somewhere around the world⁷ (see Appendix B for full text).

Participants read each scenario and then made either an appraisal judgement, or an emotion judgement followed by an appraisal judgement. Participants were assigned to one of three groups, and each group was asked to make three emotion-appraisal judgements (one for each emotion paired with a different appraisal). Across the three groups, all possible appraisal-emotion combinations were presented. To ascertain the facilitation effect, each participant was also presented with three scenarios after which they made only an appraisal judgement.

To ensure that the results were not affected by specific scenarios, a Latin square design was employed such that each of the six judgements was paired with each of the six scenarios. Furthermore, each study version was duplicated to counterbalance responding 'yes' and 'no' with left and right hands. To prevent the adoption of a response set (i.e. all

‘yes’ answers), eight unrelated judgement tasks were interspersed with the experimental trials. Participants completed a dot-counting task as a distractor between trials.

First, participants were given a list of the appraisals and emotions as they would be worded in the experiment, along with a definition for each appraisal, and were asked to familiarise themselves with the list and clarify any difficulties they had in understanding. For each trial, participants were presented with a scenario, and asked to press the space bar when they had finished reading it. They were then presented with either an appraisal judgement, or an emotion judgement followed by an appraisal judgement. Each judgement was displayed on the screen one word at a time: one word every 100ms to control for reading speed. Participants were instructed to press either the ‘z’ or ‘/’ keys (for ‘yes’ or ‘no’) once the entire statement was displayed. Their reaction time was recorded from the presentation of the last word of the statement.

Results

The data were collapsed across the six scenario conditions and the two left-hand/right-hand conditions. The scenarios were designed such that a ‘yes’ response was likely for all judgements. In more than 90% of cases, participants agreed that the scenario involved suffering, but for the other appraisal judgements agreement was between 65% to 80%. For the emotion judgements, a large majority of participants felt sympathy (81.8%) and anger (73.3%), but in only 44.4% of trials did participants report guilt.

Outliers were identified by standardising RTs within subjects and standardizing the resulting scores within questions (see Siemer and Reisenzein, 2007). Any RTs with a score greater than 2.5 (1.3% of responses), and very rapid responses ($RT < 200\text{ms}$; 1.6% of all responses), were replaced using multiple imputation (i.e. missing values were estimated five times using observed data, and the pooled estimated used in the final analysis).

The data were analysed excluding cases where participants answered ‘no’ to the emotion judgement⁸. The mean RT differences between isolated appraisal judgements and appraisal judgements preceded by emotion judgements (e.g. suffering alone RT minus suffering RT after sympathy judgement) are presented in Figure 2 along with the results of repeated-measures t-tests comparing RTs for the two judgements. A positive difference score indicates a facilitation effect (i.e. that the appraisal judgement was made faster when preceded by the emotion judgement than when only the appraisal judgement was made).

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Large average facilitation effects (> 150 ms) were observed for sympathy/illegitimacy, anger/suffering, anger/illegitimacy, guilt/suffering, guilt/illegitimacy and guilt/ingroup responsibility. Of these, effect sizes were all $.24 \leq d \leq .48$ (except for guilt/illegitimacy; $d = .11$) compared to $d \leq .04$ for all other facilitation effects. Statistically significant effects were found for guilt/suffering and guilt/ingroup responsibility, and near-significant effects ($p \leq .06$) for sympathy/illegitimacy and anger/illegitimacy.

Insert Figure 2 about here

Discussion

Of the nine appraisal-emotion associations tested in Study 2, six produced large facilitation effects, and of those, five were consistent with the necessity indices in Study 1. Since different emotions were facilitated by different sets of appraisals, these results do not support a fixed-set appraisal model because processing some appraisal information was not required for the experience of some emotions.

Despite substantial consistency between studies, some findings require further consideration. The main area of inconsistency with Study 1 was in relation to sympathy, which facilitated illegitimacy judgements, but did not facilitate suffering judgements (the opposite of Study 1). Regarding illegitimacy, it is important to consider the difference in relationship being tested; while Study 1 tested the necessity of fixing a position on each appraisal dimension, the judgement facilitation paradigm tests only the activation of appraisal information. Thus, certain appraisal dimensions may be assessed even when there is no necessity to fix a position on that dimension. In this case, illegitimacy information would likely be activated since situations in which one feels sympathy often entail illegitimacy; however, while it is necessary to consider illegitimacy when one experiences sympathy (perhaps as a modulating appraisal), the elicitation of sympathy does not require a position to be fixed on that dimension.

The absence of facilitation for suffering judgements is less easily accounted for, but may be a result of the relative complexity of that appraisal. When one experiences sympathy, one may make an appraisal of misfortune, struggle, need or loss (see Lishner et al., 2011) which does not exactly match the subsequent judgement regarding 'suffering'.

Finally, the absence of a facilitation effect for anger-ingroup responsibility was unsurprising since the Study 1 result can be accounted for by the tendency for participants to report both anger and guilt, and therefore for the ingroup responsibility appraisal associated with guilt to appear associated with anger.

Study 3

In Study 3 we manipulated appraisals using vignettes. This methodology allows for an examination of both the position fixed on a particular appraisal dimension (Study 1) and whether information about an appraisal is processed at all (Study 2). It also allows for a test of whether multiple emotions are reported when their appraisal bases overlap.

In Study 3a we manipulated appraisals of suffering and illegitimacy. We expected that a vignette describing high suffering (without other appraisal information) would elicit sympathy, but would have no effect on anger or guilt. If a vignette described high suffering and high illegitimacy, we expected anger and sympathy to be elicited, but not guilt; however, given the results of the previous studies, we wished to explore whether anger would be elicited by situations containing low suffering and high illegitimacy.

Study 3a

Method.

Participants. Eighty-two first-year psychology students from the University of Melbourne volunteered to participate as part of a course requirement (56 females, 26 males; age range 17-55 ($M=20.18$, $SD=5.48$)). A sensitivity power analysis for a ($2 \times 2 \times 2$) repeated measures factorial ANOVA using G*Power 3 software indicated a minimum detectable effect size of $\eta_p^2 = .01$ (small effect) where $\alpha = .05$ and $1 - \beta = .80$.

Materials and procedure. Participants read four stories, each consisting of two parts, and answered a series of questions after each part (see Appendix C for full text). The first part of each story described a situation in which a group of people experienced either high or low suffering. Participants rated the extent to which they agreed (1=strongly disagree, 7=strongly agree) that they experienced three emotions (sympathy, anger, guilt) and their level of agreement with three appraisals (suffering, illegitimacy and ingroup responsibility). Since, the scale midpoint was labelled 'neither agree nor disagree', a rating lower than 4 was interpreted as indicating that the participant did not experience that emotion or make that

appraisal. The second part of the story then described the first part as occurring either as a result of some illegitimacy or not, after which participants made the same set of appraisal and emotion judgements.

Four story themes were created, each of which was modified to create four versions reflecting the different appraisal combinations (i.e. 16 stories total). There were four participant groups, and a Latin square design was employed such that each group would read a different set of four stories (one for each appraisal combination), but that across the four groups each story theme was presented in each of the four versions.

Results. The data were analysed using 2 x 2 x 2 repeated measures ANOVAs. The three factors were the suffering and illegitimacy manipulations, as well as a ‘phase’ factor which referred to whether the rating was made after the first or second part of the scenario. Phase was included because we were interested not only in the effects of the manipulated appraisals, but also when in the story that appraisal information was available.

These analyses were first carried out on each of the appraisals as manipulation checks (see Table 4). As expected, there was a significant effect of the suffering manipulation on suffering ratings ($F(1,81) = 10.36, p < .01, \eta_p^2 = .113$), but no effect of illegitimacy ($F(1,81) = 0.08, p = .79, \eta_p^2 = .001$). There was also a significant effect of phase ($F(1,81) = 39.52, p < .01, \eta_p^2 = .328$), indicating that suffering ratings were higher after the second part of the scenarios, regardless of the appraisal manipulation. For illegitimacy, there were significant effects of illegitimacy ($F(1,81) = 46.36, p < .001, \eta_p^2 = .364$) and, as expected, an illegitimacy x phase interaction ($F(1,81) = 59.69, p < .001, \eta_p^2 = .424$). Mean ingroup responsibility ratings were below the midpoint of the scale in all conditions.

Insert Table 4 about here

The ANOVA for sympathy showed a marginally significant effect of suffering ($F(1,81) = 6.64, p = .050, \eta_p^2 = .047$), indicating that sympathy was higher in the high suffering conditions. There was also a significant effect of phase ($F(1,81) = 21.23, p < .001, \eta_p^2 = .228$), suggesting that sympathy ratings were higher after the second phase of the scenarios, regardless of the illegitimacy manipulation (see Table 5).

 Insert Table 5 about here

For anger there was a significant main effect of illegitimacy ($F(1,81) = 63.22, p < .001, \eta_p^2 = .438$), as well as an illegitimacy x phase interaction ($F(1,81) = 77.60, p < .001, \eta_p^2 = .489$), indicating that anger was higher in the high illegitimacy conditions, but only after the second phase of the scenarios (see Figure 3). In all conditions mean guilt ratings were below the midpoint of the scale (see Table 5).

 Insert Figure 3 about here

Study 3b

Study 3b contained a manipulation of illegitimacy and ingroup responsibility. Phase one of each story described a situation of high or low illegitimacy and phase two described either high or low ingroup responsibility. All stories in this study described a high degree of suffering, so we predicted that sympathy would be elicited in all conditions. Anger was expected to be elicited by the illegitimacy manipulation in phase one of the scenarios, while guilt should only be elicited in the high illegitimacy/high ingroup responsibility condition after phase two.

Method.

Participants. Thirty-six University of Melbourne first-year psychology students volunteered to participate as part of a course requirement (7 males, 29 females; age range 17-39 years ($M = 19.37, SD = 3.64$)). A sensitivity power analysis using G*Power 3 software indicated a minimum detectable effect size of $\eta_p^2 = .04$ (small to medium effect) where $1 - \beta = .80$.

Materials and procedure. The method employed was similar to Study 3a, however, to manipulate ingroup responsibility while still allowing us to construct hypothetical stories, participants were asked to imagine that they were citizens of a fictional country named Mahna, and that they were members of the dominant ethnic group, the

Lubbocks. After reading about Mahna, participants were asked to answer several questions about Mahna and wrote a brief description of their life in Mahna. The scenarios containing high ingroup responsibility involved actions carried out by Mahnaians or Lubbocks (see Appendix C).

Results. Manipulation checks were conducted using 2(illegitimacy) x 2(ingroup responsibility) x 2(phase) repeated measures ANOVAs. The ANOVA for suffering showed significant effects of both the illegitimacy manipulation ($F(1,35) = 44.91, p < .001, \eta_p^2 = .562$) and phase ($F(1,35) = 7.18, p = .011, \eta_p^2 = .170$), indicating that suffering ratings were higher when there was high illegitimacy as well as after the second part of the scenarios (regardless of the ingroup responsibility manipulation). Significant main effects of the illegitimacy manipulation ($F(1,35) = 28.41, p < .001, \eta_p^2 = .448$) and phase ($F(1,35) = 14.24, p < .01, \eta_p^2 = .289$) were also obtained for the illegitimacy appraisal. The ingroup responsibility appraisal showed significant effects of the ingroup responsibility manipulation ($F(1,35) = 20.81, p < .001, \eta_p^2 = .373$) and an ingroup responsibility x phase interaction ($F(1,35) = 41.04, p < .001, \eta_p^2 = .540$), as expected. There were, however, also significant effects of illegitimacy ($F(1,35) = 27.14, p < .001, \eta_p^2 = .437$) and an illegitimacy x ingroup responsibility x phase interaction ($F(1,35) = 22.42, p < .001, \eta_p^2 = .390$), indicating that the highest levels of ingroup responsibility were perceived when there was also high illegitimacy (see Table 6).

Insert Table 6 about here

The same analyses were then conducted on the emotion ratings. For sympathy there was a significant main effect of the illegitimacy manipulation ($F(1,35) = 61.42, p < .001, \eta_p^2 = .637$), indicating higher sympathy ratings after the high illegitimacy, which is consistent with the effect of the illegitimacy manipulation on suffering ratings.

There was, as expected, a significant effect of the illegitimacy manipulation on anger ($F(1,35) = 39.87, p < .001, \eta_p^2 = .532$), indicating higher anger ratings after the high illegitimacy scenarios (see Figure 4). In addition, there was a significant illegitimacy x ingroup x phase interaction effect ($F(1,35) = 4.23, p = .047, \eta_p^2 = .108$). To decompose this effect, 2(illegitimacy) x 2(ingroup) ANOVAs were run separately for each phase. There was a near-significant effect of ingroup responsibility ($F(1,35) = 7.56, p = .096, \eta_p^2 = .077$) after

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phase one, but no effect of ingroup responsibility in phase two ($F(1,35) = .06$, $p = .806$, $\eta_p^2 = .002$). Since ingroup responsibility was not manipulated in phase one, this seems a chance result.

Insert Figure 4 about here

For guilt, there were significant effects of illegitimacy ($F(1,35) = 29.05$, $p < .001$, $\eta_p^2 = .454$), ingroup responsibility ($F(1,35) = 6.72$, $p = .014$, $\eta_p^2 = .161$), phase ($F(1,35) = 12.03$, $p < .01$, $\eta_p^2 = .256$), and an ingroup $\times$ phase interaction ($F(1,35) = 26.56$, $p < .001$, $\eta_p^2 = .431$), as expected. Guilt ratings were only significantly higher than the scale midpoint in the high illegitimacy/high ingroup responsibility condition (see Figure 5)⁹.

Insert Figure 5 about here

Discussion

These studies show, firstly, that sympathy can be elicited by a suffering appraisal alone. Although there was an effect of illegitimacy on sympathy in Study 3b, in Study 3a sympathy was experienced when there was no information provided about illegitimacy. This result is consistent with Studies 1 and 2 in that although it was not necessary to fix a position on illegitimacy for the experience of sympathy, illegitimacy appeared to modulate the intensity of sympathy. This result exemplifies the advantage of systematically manipulating appraisals, since although an appraisal may increase the intensity of an emotion, it may not determine whether that emotion is elicited in the first place.

Secondly, these studies strongly confirmed the necessity of the illegitimacy appraisal for anger, but cast some doubt on the necessity of suffering. If suffering was necessary, anger should only have been experienced when suffering and illegitimacy were both high; however, anger was significantly higher than the scale midpoint in the low suffering/high illegitimacy condition as well. It may be that suffering appeared to be necessary in Studies 1 and 2 because suffering so frequently co-occurs with illegitimacy.

Finally, the clearest result of these studies was that both illegitimacy and ingroup responsibility are necessary appraisals for guilt. Ingroup responsibility was also unrelated to the elicitation of anger and sympathy, underscoring the notion that certain appraisals are irrelevant for some emotions.

Study 3 also provided evidence that since anger, sympathy and guilt were experienced concurrently, the appraisal bases of those emotions must be compatible with one another. This would be unlikely under the fixed set appraisal theory in which each emotion is allocated a unique configuration of values on the same set of appraisal dimensions. We should note, however, that a limitation of this methodology is that experimentally manipulating appraisal content entails having participants respond emotionally to hypothetical situations. Thus, while this method allows for greater experimental control than the others, it is possible that the appraisal-emotion relationships identified at least partly reflect participants' knowledge or reasoning about the emotions they 'should' feel in particular situations.

General Discussion

In this paper we have presented an analysis across several methods of the appraisal basis of the three prosocial intergroup emotions: sympathy, anger and guilt. We present this as an example of how appraisal researchers may overcome some limitations of existing appraisal research and theory (see Fernando et al., 2017); especially the lack of clarity regarding the nature of the appraisal-emotion relationship tested. Across three studies we employed several methodological and statistical techniques which assess different kinds of relationships between appraisals and emotions. Table 7 contains a summary of the appraisal-emotion relationships that would have been inferred from each of our studies. Depending upon the methodology, the size of the appraisal set, and the specific appraisals associated with an emotion differed, at times dramatically. This supports our contention that any one methodology entailed assumptions as to the nature of the appraisal-emotion relationship, and that the type of relationship tested will inform not only one's conclusions about specific appraisal-emotion associations, but also the structure of appraisal theories. While we have only tested one small set of emotions here, we argue that the general findings could fruitfully be applied to other appraisal-emotion relationships, given that this research was motivated by an analysis of appraisal research and theory in general (see Fernando et al., 2017).

Implications

Throughout we have referred to a prevalent assumption in appraisal research: that the set of appraisals along which emotion-eliciting situations are evaluated is fixed, and that it is the configuration of values that changes between emotions. Here we have shown that that assumption was only upheld by one method of statistical analysis: the point biserial correlations in Study 1. All other analyses supported a variable-set appraisal theory in which particular appraisal dimensions are relevant only to certain emotions. This finding may shed some light on the persistence of the fixed set in appraisal research. A common method for testing appraisal theories, especially in earlier studies (Frijda et al., 1989; Gehm & Scherer, 1988; Roseman et al., 1996), has been for participants to rate an emotion-eliciting event on a range of appraisals which, like a point-biserial correlation, assumes a binary emotion (presence or absence) and a continuous appraisal rating. This kind of analysis seems to overestimate the number of important appraisal-emotion relationships compared to when other kinds of association (e.g. necessity) are tested. Thus, a key feature of appraisal research must be an explicit statement of the nature of the relationship being examined and whether a given appraisal-emotion relationship satisfies those criteria.

In turn, the structure of appraisal theories has implications for issues such as mixed or multiple emotions. When a fixed (or weakened fixed) appraisal set is assumed, more than one emotion could only occur in a very limited set of circumstances. The prevalence of the fixed set may account for the relative lack of attention paid to mixed or multiple emotions in appraisal research. In Study 3, we showed that multiple emotions were reported in a predictable way in response to appraisal manipulations. We welcome recent research which has begun to address the notion of overlapping appraisal bases (e.g. Tong & Jia, 2017).

Limitations and Future Directions

A limitation of the present research is that, unlike most appraisal research, it only considers a very small set of emotions. Thus, our specific findings are literally relevant only to those emotions (indeed, only to the intergroup – rather than interpersonal – forms of sympathy, anger and guilt). However, as noted above, given that this analysis was motivated by criticisms relevant to most appraisal research, we believe our broader conclusions are more generalisable. A next step in establishing this would be to expand the multiple method style analysis to logically related sets of emotions; for example, emotions elicited by relative advantage (Leach et al., 2002), moral emotions (Haidt, 2003), or the interpersonal forms of the prosocial emotions.

It should also be noted that the results presented here regarding the prosocial intergroup emotions are primarily intended to exemplify the broader issues in appraisal theory, rather than being an exhaustive account of the appraisal bases of those emotions. In many cases our approach using multiple methods shed light on why one might obtain discrepant results from different analyses, but some uncertainties remain; for example, the role of the suffering appraisal in anger.

A further issue which we have touched on in this paper, but is deserving of further consideration, is the kind of self-reported emotion assessed in different methodologies. As Robinson and Clore (2002) have discussed, different ways of measuring emotions (i.e. present emotion, past emotion, emotion if X was to happen, emotion in general) provide different kinds of information. In the studies presented here, our first study assessed experiential knowledge of emotions experienced in response to a real situation, while our third study likely assessed semantic emotion knowledge applied to a hypothetical situation. This represents another criterion on which methodologies in appraisal research can vary, and which may drive variability in appraisal-emotion relationships. This potential variability points to a further advantage of the multi-method approach in being able to identify differences driven by the kind of self-reported emotion assessed.

Conclusion

The multiple method analysis presented here has allowed us to obtain an overview of the appraisal basis of a small set of emotions across different hypothesised appraisal-emotion relationships. Using this strategy, we could clarify ambiguities or inconsistencies in any one result, and have shown that a greater focus on the nature of the hypothesised appraisal-emotion relationship is imperative for the formulation and empirical validation of appraisal theories. This kind of analysis could be made more comprehensive by expanding to include further experimental or statistical techniques.

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Endnotes

¹ We raise this criticism cautiously in recognition of the complexity of the issue of multiple or blended emotions given, for example, the potential for extremely rapid switching of emotions.

² The relationship between an appraisal and the intensity of an emotion (rather than its elicitation) has not received a great deal of attention in appraisal theory. It should be noted, however, that Ortony et al., (1988) describe a number of appraisals which might modulate emotion intensity (either of a particular emotion, or of a range of emotions).

³ Please note that self-other focus is not included in our analysis as it has typically been manipulated, rather than measured, in previous research. We recognise that were we to include this appraisal, the results of the regression analysis presented in Study 1 may change. This would be of concern if we were conducting an exhaustive test of Leach et al.'s (2002) appraisal theory, but that is not the purpose of the present investigation.

⁴ Since some of the words used in the guilt measure are strongly related to ingroup responsibility, all analyses were performed again using only 'guilt'. There were no differences in the significance or direction of the correlation and regression coefficients, and still produced a high necessity index for ingroup responsibility ($\phi=.705$)

⁵ In Leach et al.'s (2002) conceptualisation of this appraisal, stability refers to the likelihood of the advantaged group's position changing. Here we have used this appraisal with reference to the position of the disadvantaged group. This was done, firstly, because our other survey items were framed in terms of the situation of the disadvantaged group, and secondly, because a change in the situation of the disadvantaged group would be equivalent to a change in the advantaged group's position (i.e. less relative advantage).

⁶ Since some of the appraisals in the regression model were correlated, we checked for multicollinearity. All tolerance statistics were greater than 0.1, and the largest VIF was 5.05; we conclude that there were not serious problems with multicollinearity.

⁷ These scenarios were presented as real situations and not merely hypothetical ones because we wished, as much as possible, to assess the appraisals participants would make in a real situation rather than those that they think they should make because they correspond with the emotion in question (employing a kind of folk theory of appraisal). Similarly, if participants do not believe the situations are real, they may be more likely to report the emotion they think they should feel based on the characteristics of the situation.

⁸ This was done because previous research has shown support for the Spinozan notion that merely comprehending a statement entails creating a representation of that statement as true (Gilbert, Krull & Malone, 1990; Gilbert, Tatarodi & Malone, 1993). If the statement is subsequently deemed to be false, it will be recategorised (from 'true' to 'false'); a process which has the potential to confound our reaction time measurements. The effect of recategorisation on reaction times is supported by research showing that the validity of true statements is assessed faster than that of false statements (e.g. Carpenter & Just, 1975). The analysis was also performed with the full sample, which resulted in just four facilitation effects of greater than 200ms. The fact that a majority of average difference scores had an absolute value of less than 100ms suggests that facilitation effects may be dampened when a negative answer is given to the first judgement.

⁹ Due to the effects of the illegitimacy manipulation on ratings of suffering and ingroup responsibility, the analyses were re-run with suffering and ingroup responsibility ratings entered as covariates. In both cases, the significant effects of illegitimacy on sympathy, anger and guilt remained. When controlling for suffering, the ingroup responsibility, phase, and ingroup responsibility x phase effects remained significant. As expected, the ingroup responsibility effects became non-significant when controlling for ingroup responsibility.

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Table 1.

Means, Standard Deviations, Reliabilities of, and Correlations Between, all Study 1 Variables.

	M	SD	1	2	3	4	5	6	7	8
1. Suffering	5.89	1.13	(.73)							
2. Illegitimacy	4.61	1.74	.72**	(.93)						
3. Ingroup responsibility	4.11	1.55	.61**	.82**	(.84)					
4. Stability	2.65	1.24	-.73**	-.76**	-.68**	(.80)				
5. Outgroup responsibility	2.98	1.79	-.48**	-.61**	-.52**	-.42**	--			
6. Sympathy	5.27	1.19	.53**	.49**	.39**	-.44**	-.45**	(.75)		
7. Anger	4.27	1.68	.64**	.76**	.70**	-.62**	-.52**	.44**	(.94)	
8. Guilt	3.84	1.38	.53**	.67**	.63**	-.47**	-.41**	.43**	.82**	(.85)

Note. Alpha reliabilities are on the diagonal.

* $p < .05$ ** $p < .01$

Table 2.

Point Biserial Correlations between Emotions and Appraisals

	Suffering	Illegitimacy	Ingroup Responsibility	Stability	Outgroup responsibility
Sympathy	.38**	.22*	.09	-.19 [†]	-.26*
Anger	.55**	.74**	.65**	-.55**	-.38**
Guilt	.57**	.75**	.70**	-.56**	-.46**

* $p < .05$ ** $p < .01$ [†] $p < .10$

Table 3.

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Regression Analyses Predicting the Prosocial Emotions from the Set of Appraisal Dimensions.

	Sympathy (β)	Anger (β)	Guilt (β)
Suffering	.33**	.17 [†]	.12
Illegitimacy	.11	.47**	.45*
Ingroup Responsibility	-.09	.18	.27*
Stability	.10	<.01	.09
Outgroup responsibility	-.24*	-.06	.03
R ²	.34***	.63***	.48***

*p<.05 **p<.01 ***p<.001 [†]p<.10

Table 4.

Mean Appraisal Ratings by Scenario Type, Study 3a (row headings denote appraisal measured, column headings denote appraisals manipulated).

	High Suffering		Low Suffering	
	High Illegitimacy	Low Illegitimacy	High Illegitimacy	Low Illegitimacy
Suffering				
Phase 1	5.71	5.49	5.32	5.22
Phase 2	6.04	5.94	5.78	5.66
Illegitimacy				
Phase 1	4.18	4.33	4.37	4.27
Phase 2	5.09	3.30	5.16	3.43
Ingroup responsibility				
Phase 1	3.61	3.63	3.55	3.74
Phase 2	3.96	2.99	3.17	3.96

Table 5.

Mean Sympathy and Guilt Ratings by Scenario Type, Study 3a.

	High Suffering		Low Suffering	
	High Illegitimacy	Low Illegitimacy	High Illegitimacy	Low Illegitimacy
Sympathy				
Phase 1	5.53	5.83	5.39	5.56
Phase 2	6.00	6.07	5.83	5.85
Guilt				
Phase 1	3.17	2.98	2.78	2.82
Phase 2	3.63	2.87	2.65	2.76

Table 6.

Mean Appraisal Ratings by Scenario Type, Study 3b (row headings denote appraisal measured, column headings denote appraisals manipulated).

	High Illegitimacy		Low Illegitimacy	
	High Ingroup Responsibility	Low Ingroup Responsibility	High Ingroup Responsibility	Low Ingroup Responsibility
Suffering				
Phase 1	6.24	6.11	4.78	5.00
Phase 2	6.42	6.47	5.03	5.19
Illegitimacy				
Phase 1	5.02	4.77	4.17	4.11
Phase 2	5.61	5.44	4.60	4.22
Ingroup responsibility				
Phase 1	4.03	4.46	3.83	3.20
Phase 2	5.97	2.92	4.29	2.94

Table 7.

Characteristic Appraisals for Each Emotion Across All Studies and Methods

		Study 1		Study 2	Study 3
	Point-biserial correlation	Regression	Necessity Indices	Judgement facilitation	Manipulated appraisals
Sympathy					
Suffering	Yes	Yes	Yes	No	Marginal
Illegitimacy	Yes	No	No	Yes	No
Ingroup responsibility	No	No	No	No	No
Stability	Marginal	No	No	–	–
Outgroup responsibility	Yes	Yes	No	–	–
Anger					
Suffering	Yes	Marginal	Yes	Yes	No
Illegitimacy	Yes	Yes	Yes	Yes	Yes
Ingroup responsibility	Yes	No	Yes	No	No
Stability	Yes	No	No	–	–
Outgroup responsibility	Yes	No	No	–	–
Guilt					
Suffering	Yes	No	Yes	Yes	–
Illegitimacy	Yes	Yes	Yes	Yes	Yes

MULTIPLE METHOD ANALYSIS APPRAISAL-EMOTION

Ingroup responsibility	Yes	Yes	Yes	Yes	Yes
Stability	Yes	No	No	–	–
Outgroup responsibility	Yes	No	No	–	–

Note. Since different methods have different statistical criteria, designations of ‘yes’ or ‘no’ are those we have articulated throughout the paper.

Figure Captions

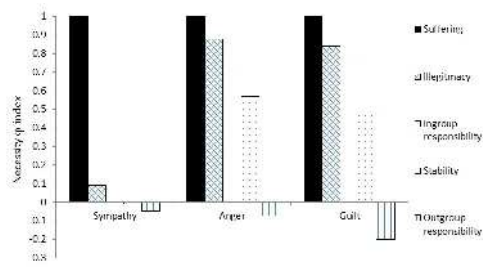
Figure 1. Necessity phi indices for each combination of appraisal and emotion, Study 1.

Figure 2. RT differences between appraisal alone and appraisal after emotion judgements, Study 2. Results of repeated-measures t-tests for significant and marginal results are as follows: sympathy-illegitimacy ($t(51) = 1.90, p = .06$); anger-illegitimacy ($t(49) = 2.07, p = .04$); guilt-suffering ($t(22) = 2.06, p = .05$); guilt-ingroup responsibility ($t(33) = 1.91, p = .06$). For all other tests, $t < 1.40, p > .15$.

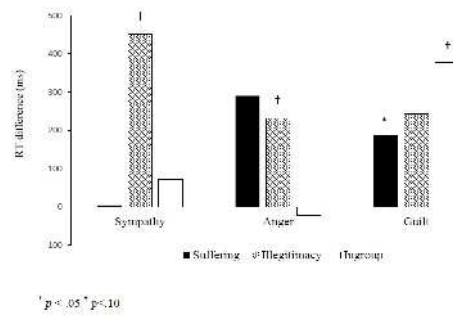
Figure 3. Mean anger ratings (Study 3a) for low (left) and high (right) suffering conditions across scenario phases 1 and 2.

Figure 4. Mean anger ratings (Study 3b) for low (left) and high (right) illegitimacy conditions across scenario phases 1 and 2.

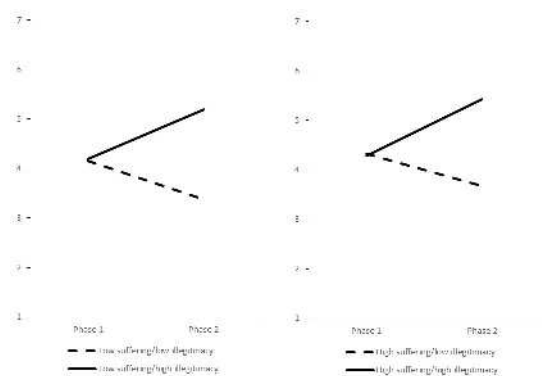
Figure 5. Mean guilt ratings (Study 3b) for low (left) and high (right) illegitimacy conditions across scenario phases 1 and 2.



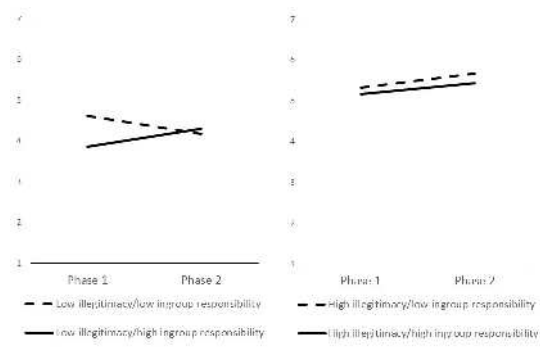
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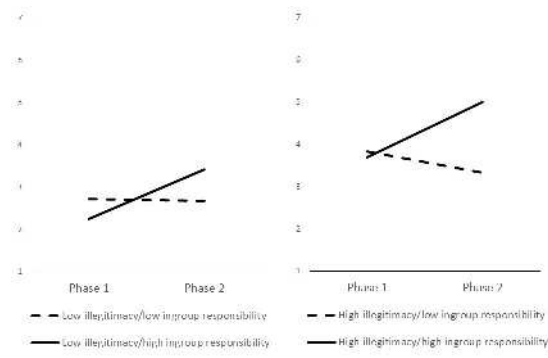
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