Social identification in collective climate activism: predicting participation in the environmental movement, extinction rebellion

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**Social Identification in Collective Climate Activism: Predicting Participation in the
Environmental Movement, Extinction Rebellion**

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Abstract

Human-induced climate change poses an unprecedented global threat. Researchers agree that dealing with climate change requires international collective action and widespread social transformation. This study integrates insights from the Social Identity Model of Collective Action (SIMCA) and the Encapsulated Model of Social Identity in Collective Action (EMSICA) to explain participation in the environmental movement, Extinction Rebellion (XR). Structural equation models of data from a survey of 203 current or potential XR activists supported two identity-based pathways to collective action behaviour and future intentions: *moral convictions* → *anger* → *XR identification* → *collective action* and *global identification* → *participative efficacy* → *XR identification* → *collective action*. Perceived group efficacy predicted collective action intentions but not behaviour. Fear, guilt/shame, and hope did not significantly predict collective action behaviour or intentions. We discuss the interplay of personal and social identity processes underlying climate change activism, as well as the need for longitudinal and experimental studies to disentangle causal relations. We propose that environmental campaign groups could foster group identification and thence collective action by communicating moral outrage about climate change, together with the potential efficacy of individuals' actions towards achieving the group's goals.

Keywords: collective climate action; Extinction Rebellion; group efficacy and participative efficacy; perceived injustice and moral outrage; social identity

Social Identification in Collective Climate Activism: Predicting Participation in the Environmental Movement, Extinction Rebellion

Climate change is a global public health threat and a risk to human systems (IPCC, 2018; Wight & Middleton, 2019). Moreover, human activity has been recognised as the prevailing cause of environmental catastrophes (IPCC, 2018). Campaigns to motivate individuals towards pro-environmental behaviour have had unreliable success and unclear long-term effects (Abrahamse, Steg, Vlek & Rothengatter, 2005). Researchers argue that individual behaviour change does not meet the threshold of social change needed to reduce the problem of climate change (Bamberg, Rees & Schlute, 2018; Esty & Moffa, 2012; Fritzsche, Barth, Jugert, Masson & Reese, 2018; Rees & Bamberg, 2014). Climate change is understood as a collective problem; environmental disasters are caused and appraised collectively and can only be prevented by collective action (Esty & Moffa, 2012; Fritzsche et al., 2018). Research into the predictors of collective climate activism could help promote necessary collective action and reduce the threat of climate change.

Collective action refers to any activity that individuals participate in as part of a group, in order to advance conditions of their group or another group (Wright, Taylor & Moghaddam, 1990; van Zomeren, 2013). A recent example is the environmental activist movement, Extinction Rebellion (XR; 2020a). Founded in 2018, the movement uses “non-violent civil disobedience”, to protest about climate change. XR’s strategy is based on collective action. Communities come together to form local XR groups, and thousands have participated in “rebellions” worldwide. In April 2019, XR activists blockaded roads in London, New Zealand and Pakistan, resulting in over 1,100 arrests (BBC, 2019). In a short period of time, XR has successfully united thousands in climate collective action, yet the psychological underpinnings of participation with XR are unknown.

We report a correlational study among XR activists examining the potential role of

two forms of social identification—*identification with global humanity* and *identification with the XR movement*—in accounting for individual differences in collective action. To explain these associations, we combined predictions of the Social Identity Model of Collective Action (SIMCA; van Zomeren, Postmes & Spears, 2008), and the Encapsulated Model of Social Identity in Collective Action (EMSICA; Thomas, Mavor & McGarty, 2012). Concurrently, we tested several proposed extensions of these models, evaluating the role of various identity-based emotions, as well as different forms of efficacy, in statistical models predicting XR identification and participation (see Figure 1 for our initial model).

Identity, Injustice and Efficacy in Collective Climate Action

Both SIMCA (van Zomeren et al., 2008), and EMSICA (Thomas et al., 2012) maintain that people engage in collective action when they identify with a group, experience emotional responses to injustice, and believe that joint efforts to address the injustice can be effective. Based on Social Identity Theory (Tajfel & Turner, 1979), both models maintain that *social identification* is a strong predictor of collective action, since group membership moulds behaviour through shared beliefs and group norms (Turner, Hogg, Oakes, Reicher & Wetherell, 1987). SIMCA claims that social identification sensitises people to injustice and facilitates perceptions of collective efficacy, resulting in two theorized causal pathways involving injustice and efficacy: *social identification* → *perceived injustice* → *collective action* and *social identification* → *collective efficacy* → *collective action*. EMSICA, in contrast, posits that social identification emerges from—and so “encapsulates”—experiences of injustice and collective efficacy. Thus, EMSICA proposes the reverse causal direction between social identification and perceptions of injustice and efficacy, resulting in an alternative causal sequence: *perceived injustice* → *social identification* → *collective action* and *collective efficacy* → *social identification* → *collective action*.

Social Identification with Different Categories

SIMCA and EMSICA have been studied as competing models of the role of particular social identities in predicting collective action (e.g., Thomas et al., 2015; Włodarczyk, Basabe, Páez &, Zumeta, 2017). Nevertheless, the two models do not necessarily contradict each other. Instead, they may be differentially relevant to different identity categories: pre-existing identity categories for SIMCA and emergent opinion-based group identities for EMSICA (Bamberg, Rees, & Schulte, 2018). Based on SIMCA, an individual might be sensitised to the injustice of climate change by a pre-existing sense of shared identity with global humanity, which leads them to identify with geographically or temporally distant others who are victims of climate change; this sense of shared identity may also help them to believe that collective action could be effective. Based on EMSICA, these experiences of injustice and collective efficacy may then motivate this person to identify with a social movement, such as XR, that campaigns against climate change.

No previous study in our knowledge has tested an integrated model, whereby a pre-existing social identification arouses experiences of injustice and collective efficacy which, in turn, motivate identification with an emergent opinion-based group and thus collective action. Here, we combined predictions from SIMCA and EMSICA, as well as later extensions of these perspectives, to explore the roles of social identifications with global humanity and with XR, together with experiences of injustice, collective efficacy and additional theorised constructs, as potential predictors of collective climate action (see Figure 1).

We are aware of no previous research linking global identification to climate change protest actions. Studies have shown that individuals who identified more strongly with global humanity showed greater concern about global and humanitarian issues (McFarland, Webb, & Brown, 2012), felt more connected to nature (Lee, Ashton, Choi, & Zachariessen, 2015), and were more likely to accept scientific evidence regarding climate change (Bliuc, McGarty,

Thomas, Lala, Berndsen, & Misajon, 2015). Extending these findings, we expected based on SIMCA that global identification would be associated with greater perceived injustice regarding climate change, as well as greater collective efficacy; thus, global identification would indirectly predict participation in collective action (see Figure 1).

Nor has XR received attention in published studies of social identity and collective action. Identification with a social or politicized movement often predicts collective action more strongly than identification with a broad, social category (Simon et al., 1998; Simon & Klandermans, 2001; Thomas, McGarty, & Mavor, 2009). Identification with an opinion-based-group was a stronger predictor of environmental collective action than “identification with Americans” (van Zomeren, Pauls, & Cohen-Chen, 2019). Consistent with EMSICA, Thomas, McGarty, and Mavor (2016) found that opinion-based group identification predicted collective action in a social movement, whereby the opinion-based group *emerged* from group-efficacy and injustice to predict collective action. Similarly, Włodarczyk et al. (2017) found that social identification with the 15-M political movement in Spain mediated effects of injustice and efficacy on collective action, and Yustisia, Shadiqi, Milla and Muluk (2020) found that social identification with Mujahidin mediated effects of group efficacy and perceived injustice on support for Islamist terrorism among terrorism detainees in Indonesia. Thus, based on EMSICA we expected that, compared to global identification, identification with XR would be a more proximal predictor of collective action, mediating the predictive effects of perceived injustice and collective efficacy (see Figure 1).¹

¹ Previous research has explored the role of other identity categories: Bamberg, Rees and Seebauer (2015) found that efficacy beliefs, injustice and community identification predicted pro-environmental collective action. van der Werff, Steg & Keizer (2013) found that boosting individuals’ environmental identity increased their environmental action.

Perceived Injustice and Emotional Responses: Anger, Guilt/Shame, and Fear

According to both SIMCA and EMSICA, perceptions of group-based *injustice* are a powerful predictor of collective action, in order to restore justice. Indeed, environmental officials perceive environmental protection as a matter of “global justice” (Waldron, Ruane, Oberman & Morris, 2019), since communities that contribute least to global warming are often the worst affected, and future generations will suffer the greatest consequences (Limon, 2010; Rosen, 2015). However, researchers have found that affective responses to injustice—specifically *group-based anger*—predicted collective action more strongly than cognitive perceptions of injustice (e.g., van Zomeren et al., 2008). Anger about perceived injustices has predicted action in social movements (Thomas et al., 2015; Włodarczyk et al., 2017). Coherent with EMSICA, Stürmer and Simon (2009) found that anger predicted collective action through increasing social identification with a social movement. Based on these findings, we expected that feelings of anger may mediate the relationship between perceived injustice and XR identification—and thence collective action (Figure 1).

Although collective action researchers have most often focused on anger as an emotional response to injustice, other emotions may also be involved. Environmental activism in industrialised societies differs from traditional protests in that the activists typically belong to the perpetrating societies of the injustice. Hence, *guilt* and *shame* have received recent attention (Bamberg et al., 2018; Böhm, 2003). Group-based guilt and shame have been shown to motivate prosocial responses to group moral failures (e.g. Gausel, Leach, Vignoles, & Brown, 2012), and inducing a guilty conscience predicted pro-environmental behaviour (Rees, Klug & Bamberg, 2015). On the other hand, Kleres and Wettergren (2017) concluded from interviews with climate activists that *fear* may be more mobilising than guilt/shame. van Zomeren, Spears and Leach (2010) found that arousing fear encouraged intentions to participate in climate action. XR utilizes fear to mobilize people; their

hourglass-shaped symbol represents time running out for countless species and was designed to inspire urgent action (Extinction Rebellion, 2020b). In sum, perceived climate injustice may incite feelings of anger at the actions (or inaction) of those in power, guilt/shame for being part of the problem, and fear regarding the consequences of climate change; we theorised that each of these emotions might contribute to the formation of a relevant group identity with shared emotions and goals for action, as proposed by EMSICA.

Collective Efficacy, Participative Efficacy, and Hope

According to both SIMCA and EMSICA, collective action depends not just on an emotional response to injustice but also on believing that action could be effective. Rees and Bamberg (2014) observed that *group efficacy* beliefs directly predicted pro-environmental collective action. van Zomeren, Leach and Spears (2010) experimentally manipulated group efficacy, resulting in a causal effect on social identification. Similarly, Thomas et al. (2012) observed that social identity mediated the indirect effect of group efficacy on collective action in a social movement. They stated that social identity symbolized the group efficacy beliefs of individuals to predict collective action. These studies suggest that individuals' group efficacy beliefs foster engagement in collective action—either directly, as predicted by SIMCA, or through social identification, as predicted by EMSICA.

However, Olson (1965) argued that rational actors will not participate in collective action if they believe that group actions will be effective but underestimate the impact of their own contribution. van Zomeren, Saguy and Schellhaas (2013) found that *participative efficacy*—believing that one's individual actions will have an impact—uniquely predicted collective action. Similarly, participative efficacy beliefs predicted collective pro-environmental action (Bamberg et al., 2015), particularly in high identifiers (van Zomeren et al., 2019). van Zomeren et al. (2019) found that participative efficacy reduced the effect of group-efficacy to non-significance when predicting pro-environmental action. They state that

group efficacy may be applicable to collective action in low identifiers, whereas participative efficacy may be relevant to high identifiers. Although participative efficacy has not been incorporated into EMSICA, we theorised in the spirit of Thomas et al. (2012) that when an individual believes their individual actions will be successful, they would be more likely to form alliances with others who share this belief, such that an identity emerges which represents this belief, thereby translating into collective action.

As with perceived injustice, we were interested to test whether predictive effects of efficacy beliefs might be mediated by emotional responses. Research has linked efficacy beliefs to feelings of *hope* (Magaletta & Oliver, 1999). Research supports hope's inspiring function in activism and social movements (e.g. Courville & Piper, 2004; Foster-Fishman, Cantillon, Pierce & van Egeren, 2007), and its addition to EMSICA (Włodarczyk et al., 2017). Kleres and Wettergren (2017) reported that hope was seen as a “fundamental necessity” for climate activists, inspiring activism in people who did not experience first-hand the effects of climate change (“the North”) and those who did (“the South”). Włodarczyk et al. (2017) observed that hope mediated effects of group efficacy on collective action in the EMSICA. Hope has been relatively little studied in social identity models of collective action. Nonetheless, findings highlight the motivational function of hope in climate activism, and the mediating role of hope between group efficacy and collective action. Hope that the problem is solvable may explain how those who feel group actions will be successful will then come to identify with others to take action (Thomas et al., 2012). Thus, we expected that feelings of hope may mediate relationships of both collective and participative efficacy beliefs with XR identification—and thence collective action (Figure 1).

Moral Convictions: An Additional Pathway to Action?

Researchers have long-regarded climate change as a moral and ethical issue (Gardiner, 2004; Hansen, 2010). van Zomeren, Postmes and Spears (2012) discovered that

moral convictions (“strong and absolute stances on moral issues”) improved predictions of collective action, concluding that moral convictions were captured by politicized identities to predict collective action. Moreover, moral convictions were found to predict opinion-based group identification and environmental collective action (van Zomeren et al., 2019). Given the link between moral convictions, politicized identity and collective action, findings suggest that moral beliefs will inspire collective climate action. Hence, we included moral convictions as an additional predictor of XR identification and action in our study. Since guilt and shame are viewed as moral emotions that predict restitutive responses after personal or collective moral failures (Gausel et al., 2012), we theorised that effects of moral conviction might be mediated by experiences of guilt/shame (see Figure 1).

Present Study

To confront climate change, collective action is essential (Rees & Bamberg, 2014). Hence, it is important to understand the social identity processes underlying collective climate activism. Previous studies have recognized the role of established identities in collective climate action, but none has explored the role of a specific activist identity. XR provides a novel, real-world context in which to study motivations behind engagement in environmental activism. Hence, we investigated the utility of the identity-based models and constructs reviewed above for predicting individual differences in collective action and intentions among a sample of UK participants who considered themselves to be associated with XR. In so doing, this is the first empirical study in our knowledge to test predictions of SIMCA and EMSICA within an integrated model involving multiple social identities of different types (see Bamberg et al., 2018), rather than using these theories to predict alternative causal sequences involving a single social identity.

As is common in studies of real-world collective action, we adopted a correlational design with a single wave of data collection. We used structural equation modelling to test

the plausibility of models of causal relations among the variables we measured (see Figure 1 for our initial structural model). Readers should note that one cannot draw firm inferences about causal processes from data of this kind. References to “prediction” in our findings indicate statistical prediction within our models and not prediction of future states or actions. The true pattern of causal relations among the variables we measured is likely to be complex and multidirectional. Nevertheless, we assume that the causal directions portrayed in our models (i.e. directions of arrows in our figures) represent the dominant causal processes underlying the associations among our observed variables, based on prior theorising as well as findings from previous research in settings where researchers were able to use causally or temporally sensitive methodologies. As such, the results of our statistical models are likely to be informative about the origins of individual differences in participation in collective action among our participants, even if they do not provide causal certainty.

As shown in Figure 1, we expected that global identification would indirectly predict collective action and intentions through perceived injustice and group efficacy (as proposed in SIMCA) and that perceived injustice and group efficacy would indirectly predict collective action and intentions through XR identification (as proposed in EMSICA). Moreover, we tested extending the injustice pathway with emotional responses relevant to climate change (anger, fear, guilt/shame), broadening the efficacy pathway to include participative efficacy alongside group efficacy, extending this pathway to include feelings of hope, and including a further pathway involving moral convictions and feelings of guilt/shame.

Method

Participants and Procedure

Two hundred and eighteen participants accessed the online questionnaire and consented to participate. Ten answered only the consent questions, three answered only demographic questions, one requested to delete their data, and one was removed as an error

outlier (see Online Supplement), leaving a final sample of 203 participants (116 women, 75 men, 6 non-binary, and 6 who preferred not to state their gender) aged 18 to 83 years ($M = 46.77$, $SD = 17.45$). Participants indicated an average subjective social status of 6.05 ($SD = 1.80$) on a scale from 1 to 10 (Goodman, Adler, Kawachi, Frazier, Huang, & Colditz, 2001), and a vast majority (91.1%) described their ethnicity as Caucasian. Most participants ($n = 186$) provided complete data, whereas 17 participants provided incomplete data. Missing values were handled in our analyses using full information maximum likelihood, so that we could use all of the available data that participants had provided.

Participants were members of the general population in the UK who either had participated in XR collective action or felt associated with XR in some way. This was clarified in the recruitment materials as including individuals who were actively involved with XR and individuals “who had only joined an XR mailing list”. This allowed us to recruit individuals who could potentially have participated in XR collective actions but may have done so to a greater or lesser extent (see Online Supplement, Table S1). Participants were recruited via XR social media groups, group meetings, poster advertisement, newsletter, and email. Ethical approval was obtained from the School of Psychology at the University of Sussex (ER/CF272/1). Participants completed the questionnaire online individually, in a place of their choosing. All participants read an information page and confirmed their informed consent using a series of checkboxes. Participants were informed that only people over the age of 18 who felt associated with XR in some way were eligible, that the study concerned social identity and collective action with XR, and that their anonymity would be ensured. Participants reported their age, gender, ethnicity, and subjective social status, before proceeding to the main questionnaire. At the end, participants had an opportunity to remove their data. At debrief, participants were thanked for their contribution to research, helping to further our understanding of the motives behind collective climate action.

Materials and Measures

The questionnaire was created online using Qualtrics and consisted of 89 items. Except where specified, a 7-point Likert scale was used (7 = strongly agree ... 1 = strongly disagree). Seventeen items were reverse-coded to adjust for acquiescent responding (Herche & Engelland, 1996). Items were presented in a randomized order within each section.²

Collective action: past behaviour. A self-developed 10-item scale measured participants' past involvement in XR collective actions ($\alpha = .74$). Items were developed using the XR website (Extinction Rebellion, 2020) and informal consultation with XR members. Participants indicated if they had participated in the collective actions listed: e.g. "[Have you] fixed yourself to an object building or place in the name of Extinction Rebellion?" (0 = I have never done this; 1 = I have done this once; 2 = I have done this more than once). The full set of items can be found in Supplementary Table S1.

Collective action: future intentions. This 10-item measure calculated participants' intentions to participate in XR collective action ($\alpha = .82$). Items were adapted from the past behaviour items: e.g. "[I would] attend an Extinction Rebellion group meeting" (7 = extremely likely ... 1 = extremely unlikely).

Extinction Rebellion (XR) identification. Identification with XR was measured using Koc's (2017) 12-item Ingroup Identification Scale ($\alpha = .87$). This measure assessed three facets of identification: solidarity (e.g. "I feel committed to Extinction Rebellion"); centrality (e.g. "Being associated with Extinction Rebellion is an important part of how I see myself") and satisfaction (e.g. "It is pleasant to be associated with Extinction Rebellion") with XR.

² The questionnaire also included measures of social participation norms (adapted from Rees & Bamberg, 2014) and normative conflict (after Packer, 2008). These were not included in the current analyses for reasons of parsimony and sample size.

Global identification. The same 12 items were adapted to measure participants' identification with global humanity (e.g. "I feel solidarity with global humanity"; $\alpha = .92$).

Group efficacy. Six items measured participants' group efficacy beliefs ($\alpha = .78$). Participants rated the perceived likelihood that XR would achieve the goals listed: e.g. "persuade government officials to act now against climate change" (7 = extremely likely ... 1 = extremely unlikely). The item format was adapted from Long and Perkins (2003).

Participative efficacy. Six items measured participative efficacy beliefs: e.g. "I believe that I, as an individual, can provide an important contribution so that, together, Extinction Rebellion can achieve its aims" ($\alpha = .90$). Items were adapted from van Zomeren et al. (2019). An additional reversed item was created to improve validity.

Perceived injustice. Seven items measured participants' perceptions and experiences of injustice in response to climate change (e.g. "When I think about the global climate emergency, I feel an overwhelming sense of injustice"; $\alpha = .89$). Items were self-developed, and adapted from Barth, Jugert, Wutzler, and Fritzsche (2015).

Emotions. Six self-developed items measured participants' *fear* regarding climate change (e.g. "I feel fearful about climate change"; $\alpha = .93$). A 3-item scale developed by Rees and Bamberg (2014) measured participants' feelings of *guilt/shame* (e.g. "I feel guilty about how we humans are treating the environment"; $\alpha = .86$). *Anger* was measured with 4 items, two adapted from Rees & Bamberg (2014) and van Zomeren et al. (2019) (e.g. "I feel angry about how people have treated the environment"; $\alpha = .80$). Five items (four of these adapted from van Zomeren et al., 2019) measured participants' feelings of *hope* (e.g. "I feel hope that Extinction Rebellion will achieve its aims"; $\alpha = .67$).

Moral convictions. van Zomeren et al.'s (2019) 4-item scale was used (e.g. "My opinion on the climate emergency is part of my core moral norms and values"; $\alpha = .73$).

Analytic Approach and Measurement Model

We conducted our main analyses in Mplus 6 software (Muthén & Muthén, 1998-2010) using robust maximum likelihood estimation to adjust for non-normality in the indicator variables (Satorra & Bentler, 1994). We assessed model fit using Standard Root Mean Squared Residual (SRMR), Root Mean Square Error of Approximation (RMSEA), and Comparative Fit Index (CFI). Based on recommendations in the literature, we interpreted $SRMR < .08$ (or $< .10$), $RMSEA < .06$ (or $< .08$), and $CFI < .95$ (or $< .90$) as evidence of “good” (or “acceptable”) fit (Hu & Bentler, 1999; Kline, 2005). Note that these criteria are rules of thumb only, and they should not be misinterpreted as absolute criteria to accept or reject a model (Kenny & McCoach, 2003; Marsh, Hau, & Wen, 2004). Model comparisons were tested using the Satorra and Bentler (2001) robust chi-square (χ^2_{S-B}).

To account for measurement error and thus estimate structural paths more precisely, we modelled all constructs as latent variables, using three indicators per variable to create locally just-identified factors. Indicators were single items or item parcels. Items parcels for identification measures reflected the three facets of the scale. All others were created using the “item-to-construct balance” approach (Little, Cunningham, Shahar, & Widaman, 2002). Item parcels for collective action behaviour and intentions were created in parallel using the corresponding items, and we allowed error covariances between the corresponding parcels. No other error covariances were allowed among indicators. The resulting measurement model showed a mixture of good and acceptable fit indices: $\chi^2(525) = 859.864$; $CFI = .909$; $RMSEA = .056$ (90% confidence interval [CI]: .049, .063); $SRMR = .058$. All indicators loaded as expected on their target factors (all standardized $\lambda \geq .559$; all $p < .001$). Further details of indicators and loadings are reported in Supplementary Table S2.

Results

Descriptive Statistics

Means, SDs and intercorrelations for observed variables, as well as latent correlations from our measurement model, are reported in Table 1. On average, participants had partaken in collective action with XR at least seven times ($M=0.70$, $SD=.35$). A score of 0.70 could signify, for example, that a participant had taken 7 of the listed actions once, or that they had taken 3 actions more than once and another action once. Supplementary Table S1 reports levels of participation in each of the 10 listed actions. Future intentions to participate in collective action were moderately high ($M=4.84$, $SD=1.06$). Participants on average scored above the theoretical midpoint on all predictor variables.

Main Analyses

Our initial structural model was based on the path diagram shown in Figure 1. All constructs were measured as latent variables, as defined in the measurement model. We also included covariances among measures of efficacy, injustice and moral convictions, among the four emotion measures, and between collective action intentions and behaviour. This model showed a marginal fit to the data: $\chi^2(562) = 1009.472$; CFI = .879; RMSEA = .063 (90% CI: .056, .069); SRMR = .086. Model parameters are reported in Supplementary Tables S3 and S4. Modification indices suggested adding four paths that would not lead to feedback loops in the model. We judged all four paths to be theoretically plausible³ and added them

³ Pathways from participative efficacy to XR identification and from group efficacy to collective action intentions were already expected, but in our initial structural model these had been fully mediated by hope and by XR identification respectively. A path from moral convictions to anger was consistent with previous theorizing about “moral outrage” as a basis for collective action (e.g., Thomas & McGarty, 2009). A path from participative efficacy to

into an expanded model. Thus, participative efficacy directly predicted XR identification, as well as lower fear, group efficacy directly predicted collective action intentions, and moral convictions predicted anger. This expanded model fitted the data significantly better than our initial model: $\chi^2_{S-B}(4) = 136.399, p < .001$. Finally, for parsimony, we sequentially removed 4 paths and 7 covariances that did not reach marginal significance ($p < .10$). The resulting final model showed no significant loss of fit compared to the expanded model, $\chi^2_{S-B}(11) = 15.266, p = .171$, and an acceptable or good fit on all indices: $\chi^2(569) = 935.126$; CFI = .901; RMSEA = .056 (90% CI: .050, .063); SRMR = .084. We also re-estimated this model using bootstrapping (10,000 resamples) to obtain CIs for indirect effect estimates.

Figure 2 summarises the significant and marginal paths from our final model. Model parameters are reported in Supplementary Tables S5 and S6. Figure 2 shows two significant indirect pathways towards collective action. The pathway *global identification* → *participative efficacy* → *XR identification* → *collective action* was significant for behaviour (Standardized Parameter Estimate [SPE] = .064, SE = .024, $p = .008$, 95% CI = .017, .112) and for future intentions (SPE = .054, SE = .022, $p = .015$, 95% CI = .011, .098). Although the complete pathway *global identification* → *moral conviction* → *anger* → *XR identification* → *collective action* did not reach significance for behaviour or intentions, the pathway *moral conviction* → *anger* → *XR identification* → *collective action* was significant for behaviour (SPE = .099, SE = .050, $p = .049$, 95% CI = .001, .197) and marginally significant for future intentions (SPE = .083, SE = .045, $p = .062$, 95% CI = -.004, .171).

Perceived group efficacy directly predicted greater hope ($\beta = .628, p < .001$) and collective action intentions ($\beta = .287, p = .001$), but neither group efficacy nor hope showed

lower fear was consistent with Bandura's (1983) claim that fear arises from "perceived inefficacy in coping with potentially aversive events" (p. 465).

any direct or indirect relationship with collective action behaviour. Nor was group efficacy predicted by global identification.

Perceived injustice was significantly predicted by global identification ($\beta = .255, p = .011$), in turn predicting fear ($\beta = .523, p < .001$) but only marginally predicting anger ($\beta = .315, p = .079$). The indirect pathway *perceived injustice* $\rightarrow$ *anger* $\rightarrow$ *XR identification* $\rightarrow$ *collective action* did not reach significance for behaviour ($SPE = .050, SE = .044, p = .249, 95\% CI = -.035, .136$) nor for future intentions ($SPE = .042, SE = .039, p = .275, 95\% CI = -.034, .119$). Thus, perceived injustice did not contribute significantly to predicting collective action behaviour or intentions in our main analyses. However, perceived injustice, moral convictions and anger were highly intercorrelated in our measurement model (ϕ 's from .735 to .844), and so the various pathways involving these three variables are hard to separate statistically. In an alternative series of models excluding moral conviction (see Online Supplement and Figures S1 and S2), we found evidence of a significant indirect pathway *perceived injustice* $\rightarrow$ *anger* $\rightarrow$ *XR identification* $\rightarrow$ *collective action* for behaviour ($SPE = .125, SE = .044, p = .005, 95\% CI = .038, .211$) and for intentions ($SPE = .105, SE = .041, p = .011, 95\% CI = .024, .186$). We ran a further set of alternative analyses treating perceived injustice, moral convictions, and anger as indicators of a single latent variable that we labelled *moral outrage* (see Online Supplement and Figures S3 and S4). Here, we found evidence of a significant indirect pathway *moral outrage* $\rightarrow$ *XR identification* $\rightarrow$ *collective action* for behaviour ($SPE = .162, SE = .052, p = .002, 95\% CI = .060, .264$) and for future intentions ($SPE = .135, SE = .048, p = .005, 95\% CI = .041, .230$).

Discussion

We found evidence of two broad pathways to collective climate action, focused on (1) feelings of moral outrage (perceived injustice, moral convictions, anger) and (2) the belief that one's individual actions could make a difference (participative efficacy). Both pathways

predicted collective action behaviour and future intentions through identification with XR. As expected, identification with global humanity seemingly played a more distal role, predicting perceived injustice, moral convictions and participative efficacy.

Integrating and Extending SIMCA and EMSICA

XR identification showed the strongest relationship with collective action (Table 1) and was the most proximal predictor of collective action in our structural models (Figure 2). This extends previous findings that identification with a politicized or social movement powerfully predicts collective action (e.g., Simon et al., 1998), to include identities in the socio-environmental domain. Global identification, in contrast, showed near-zero correlations with collective action behaviour and future intentions (Table 1), although there was evidence of possible indirect pathways to collective action (Figure 2). Consistent with the logic of the EMSICA model, XR identification “encapsulated” (i.e. mediated) indirect effects of moral outrage and participative efficacy on collective action and intentions.

Both SIMCA and EMSICA refer to perceived injustice as a motivation for collective action, but the authors describe this as an ‘emotional’ pathway that may be measured alternatively by feelings of anger or outrage. Introducing EMSICA, Thomas et al. (2012) theorised about ‘perceived injustice’ but measured this with an item about ‘moral outrage’. Updating SIMCA, van Zomeren (2013) argued that moral convictions should be treated as an additional motivation for collective action, separate from injustice and efficacy. Here, measures of perceived injustice, anger, and moral convictions were highly correlated, and their effects on XR identification and collective action were hard to separate statistically. Thus, we believe it may be fruitful to think of these three constructs as facets of a broader construct of *moral outrage* rather than as separate predictors (see alternative models in the Online Supplement for empirical support). This seemingly contradicts van Zomeren’s (2013) claim that moral convictions form a separate pathway to collective action from perceived

injustice and efficacy. Nonetheless, the finding may be specific to collective action about a ‘moral issue’ such as climate change. Future research should explore the relationship between moral convictions and perceived injustice across a range of issues.

We found inconclusive support for the SIMCA prediction that global identification would sensitise people to the injustice of climate change. In our main path model, global identification was a significant predictor of both perceived injustice and moral convictions. In our main analyses, the pathway *global identification* → *moral convictions* → *anger* → *XR identification* → *collective action* met the ‘joint significance’ criterion for evaluating indirect effects (MacKinnon, Lockwood, Hoffman, West, & Sheets, 2002), as did the pathways *global identification* → *perceived injustice* → *anger* → *XR identification* → *collective action* and *global identification* → *moral outrage* → *XR identification* → *collective action* in our supplementary analyses. However, bootstrap tests did not reach significance. Future research should evaluate these lengthy serial mediation paths with larger sample sizes. Nonetheless, shorter pathways *moral convictions* → *anger* → *XR identification* → *collective action* (in our main analyses) as well as *perceived injustice* → *anger* → *XR identification* → *collective action* and *moral outrage* → *XR identification* → *collective action* (in our supplementary analyses) clearly supported the EMSICA prediction that XR identification would encapsulate feelings of moral outrage and thus predict collective action.

We also explored the possible role of two further emotions—fear and guilt/shame—in mediating effects of moral outrage on XR identification and collective action. As expected, fear was predicted by perceived injustice (as well as negatively by participative efficacy) and guilt/shame by moral convictions. However, neither emotion significantly predicted XR identification or action, unlike in some previous studies (Rees et al., 2015; van Zomeren et al., 2010; Włodarczyk et al., 2017). Although our findings show that individual differences in fear and guilt/shame within the sample did not predict the extent of individuals’ identification

or participation with XR, mean levels of anger, fear and guilt/shame were very high in our study, averaging close to 6 on a 1 to 7 scale. Hence, it remains possible that these emotions could play a role in group-level processes fostering identification and action that were shared among participants in our sample, rather than showing individual differences.

Group efficacy was a strong predictor of hope, and directly predicted future intentions for collective action. However, the lack of direct or indirect pathways from group efficacy or hope to collective action behaviour, raises the possibility that both constructs may serve palliative emotion-focused functions—helping individuals to feel better about the situation—rather than problem-focused functions—mobilising individuals towards action to change the situation (see van Zomeren et al., 2019, for similar results regarding hope).

Consistent with several previous studies (Bamberg et al., 2015; van Zomeren et al., 2019), participative efficacy, rather than group efficacy or feelings of hope, predicted XR identification and action. Participative efficacy was the only unambiguously significant mediator between global identification and XR identification, thus contributing to the only unequivocally significant pathway from global identification to collective action. Thus, participative efficacy, rather than group efficacy or perceived injustice, provided the clearest evidence for SIMCA-like processes starting with a pre-existing social identification and culminating in collective action behaviour.

Beyond Collective Identity Processes: The Political is Personal

Our findings support calls for more attention to the connections between personal and social identity processes (Vignoles, 2019). Theoretical models of collective action have tended to focus on processes of group identity, emphasising perceptions of *collective* injustice and *collective* efficacy to address them. Our findings suggest a need to expand these models to focus additionally on *personal* identity processes. Significant pathways involving moral convictions highlight the importance of personal beliefs and values as a basis for shared

identity, with items referring to a moral imperative to act, based on “my beliefs” or “my core moral norms and values”. Similarly, we found that participative efficacy (i.e., perceiving one’s *personal* capacity to affect the group’s desired outcomes) was a more convincing predictor than group efficacy of XR identification and collective action. Together, these findings suggest that the experiences of social identity involved in XR collective action are not those of a *depersonalised* self who thinks, feels, and acts as an “interchangeable” group member—as described in the classic social identity theorising of Turner and colleagues (1987). Instead, these findings indicate a group member who is aware of their personal and *non-interchangeable* individual qualities, including their individual capacity to affect the group’s desired outcomes, as well as their personal moral beliefs or values.

Limitations and Future Directions

Our findings are correlational and cannot demonstrate causal direction. Longitudinal studies are extremely rare in the collective action literature (for a very recent exception, see Thomas, Zubielevitch, Sibley, & Osborne, 2020). Causal directions in our path model were based on theory (Thomas et al., 2012; van Zomeren, 2013), as well as previous experimental findings (e.g., van Zomeren, Leach, & Spears, 2010; van Zomeren, Spears, & Leach, 2010). Nonetheless, longitudinal studies are needed to untangle the temporal sequencing among the variables studied here in naturalistic contexts. Self-report measures of behaviour are not always accurate (Prince et al., 2008). To mitigate this, we measured collective action using a checklist of specific and concrete actions that individuals would be likely to remember, rather than estimating the frequency of habitual behaviours, but this would ideally be corroborated with observational or peer-report data. Our sample size of 203 was relatively small for the complexity of our structural models. Although samples of 100 or more are considered acceptable for modelling latent variables with three or four indicators per factor (Boomsma, 1982), future studies with larger samples would have greater statistical power to test the

significance of indirect effects with chains of up to five latent variables.

Previous research has shown that perceived social norms play a role in motivating collective and environmental actions (e.g., Carrus et al., 2009; Fritzsche et al., 2018; Packer, 2008; Rees & Bamberg, 2014). Measures of norms in the current study were not adequate for inclusion in our analyses, but future studies should explore these constructs further. Finally, studies should consider a range of different environmental identities, as XR represents only one of many socio-environmental groups dedicated to climate action.

Implications for Environmental Campaigners

Environmental campaigners can learn from social psychological models of collective action. Campaign groups and social movements should focus on boosting a sense of shared identity among their members to ensure that individuals feel part of the group, as this would be expected to translate into action. Our findings suggest that social movements should try to harness the motivational power of moral outrage as a basis for shared identity and thence action. Interestingly, the slogan “Love. Rage. Rebellion” (Extinction Rebellion, 2020a) seems perfectly suited for this, concisely linking moral outrage (“rage”), identification (“love”) and action (“rebellion”). Environmental campaigns could benefit further by emphasising the impact of individuals’ personal actions for achieving the group’s goals—i.e., participative efficacy. This would be expected further to strengthen identification with the movement and its members, which in turn would be expected to predict action.

Data Availability Statement

The data that support the findings of this study are openly available in the OSF repository at [web link will be confirmed on manuscript acceptance].

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Table 1. Means, SDs, and intercorrelations for all variables.

Variable	1	2	3	4	5	6	7	8	9	10	11	12
1. Collective action: behaviour	-	.63***	.45***	.35***	.26**	.31***	.28**	.12	.03	.07	.29**	.07
2. Collective action: intentions	.59***	-	.45***	.46***	.45***	.37***	.30***	.12	.15	.30**	.28**	.00
3. XR identification	.40***	.36***	-	.58***	.30**	.34***	.38***	.11	.29**	.24*	.43***	.39***
4. Participative efficacy	.33***	.43***	.51***	-	.51***	.20**	.17*	-.11	.06	.62***	.24**	.29***
5. Group efficacy	.27***	.41***	.27***	.48***	-	.14†	.20*	-.04	.22*	.79***	.17*	.13
6. Perceived injustice	.28***	.34***	.31***	.19**	.13†	-	.78***	.51***	.43***	.11	.74***	.26*
7. Anger	.23**	.25***	.34***	.16*	.18*	.66***	-	.60***	.58***	.12	.84***	.14
8. Fear	.10	.11	.14†	-.09	-.05	.46***	.51***	-	.53***	-.15*	.38***	.01
9. Guilt/shame	.06	.15*	.29***	.07	.17*	.40***	.52***	.48***	-	.18*	.48***	.03
10. Hope	.10	.26***	.21**	.48***	.63***	.13†	.12	-.08	.17*	-	.12	.24*
11. Moral conviction	.25***	.24**	.38***	.20**	.16*	.59***	.65***	.33***	.43***	.11	-	.28**
12. Global identification	.07	.02	.31***	.27***	.16*	.23**	.13†	.01	.03	.23**	.24**	-
Mean	0.70	4.84	5.51	5.28	5.54	6.56	6.33	5.96	6.02	5.47	6.30	5.51
SD	0.35	1.06	0.91	1.10	0.96	0.66	0.83	1.15	1.21	0.90	0.79	1.05
n	203	199	194	188	188	187	187	187	187	187	187	186

Note. Total $N = 203$. Observed scores had a theoretical range from 0 to 2 for past behaviour; and 1 to 7 for all other variables. Means, SDs and correlations above the diagonal are calculated with observed scores. Correlations above the diagonal are standardized covariances among latent variables from our measurement model ($N = 203$). *** $p < .001$; ** $p < .01$; * $p < .05$; † $p < .10$.

Figure 1. Summary of hypothesised path model.

Figure 2. Summary of significant paths from our final model. Straight lines represent hypothesised paths. Curved lines represent additional paths based on modification indices. Dashed line is marginally significant. Paths that do not lead indirectly to collective action behaviour or intentions are shown in grey. Indicators, loadings, error variances, and covariances are omitted for ease of reading. Numbers are standardized path coefficients. *** $p < .001$; ** $p < .01$; * $p < .05$; † $p < .10$.

Online Supplement

Data Screening

Initial data screening used observed scores for the study variables. Participants were detected as outliers via boxplots and z-scores (± 3 ; Kannan, Manoj & Arumugam, 2015). One participant was identified as an error-outlier and was excluded. This participant had high multivariate z-scores for the main study variables. Based on inspecting their data, we concluded that the participant did not reflect the target population of persons associated with XR, thus omission was justified (Aguinis, Gottfredson & Joo, 2013). All other outliers were not excluded as they reflected the variability of the sample.

Assumptions of the linear model were explored numerically and visually. All variables showed significant deviations from normality ($p < .01$). Several kurtosis and skewness values exceeded ± 2 (George & Mallery, 2010). Due to sample size, skewness and kurtosis were explored via histograms and Q-Q plots (Field, 2009); violations of normality were observed. Probability-probability plots indicated linearity was met (Field, 2016). Multiple standardized residuals exceeded ± 3 , and scatterplots identified heteroscedasticity (Tay, Parrigon, Huang, & LeBreton, 2016). Cook's distances were all < 1 (Cook & Weisberg, 1982). We used robust maximum likelihood estimation (Satorra & Bentler, 1994) to adjust for non-normality in the indicator variables, and we re-estimated models with bootstrapping (10,000 resamples) to estimate confidence intervals for indirect paths.

Descriptive Statistics, Measurement Model and Structural Models

Table S1 reports the frequencies of engagement in each of the 10 measured XR actions. Table S2 shows the composition of item parcels for our measurement model, with standardized loadings. Tables S3 and S4 report the main structural parameters from our initial model. Tables S5 and S6 report the main structural parameters from our final model.

Alternative Models

High latent correlations among moral convictions, perceived injustice, and anger raised an issue of possible multicollinearity. To address this, we ran two series of alternative models, adopting parallel analytic procedures to our main analyses.

Omitting moral convictions. The first series of alternative models omitted moral convictions—reflecting the original formulations of SIMCA and EMSICA. Our initial model (Figure S1) showed a marginal fit to the data: $\chi^2(468) = 843.659$; CFI = .890; RMSEA = .063 (90% CI: .056, .070); SRMR = .088. Based on modification indices, we sequentially added three theoretically sensible paths to the model (shown as curved lines in Figure S2), resulting in a significant improvement in model fit, $\chi^2_{S-B}(3) = 154.851$, $p < .001$. We then sequentially trimmed the model, removing 4 paths and 4 covariances. The resulting model showed no significant loss of fit compared to the expanded model, $\chi^2_{S-B}(8) = 11.824$, $p = .159$, and an acceptable or good fit on all indices: $\chi^2(473) = 787.806$; CFI = .907; RMSEA = .057 (90% CI: .050, .064); SRMR = .084. We re-estimated this model using bootstrapping (10,000 resamples) to obtain CIs for indirect effect estimates.

Figure S2 shows two significant indirect pathways towards collective action. As in our main analyses, the pathway *global identification* $\rightarrow$ *participative efficacy* $\rightarrow$ *XR identification* $\rightarrow$ *collective action* was significant for behaviour ($SPE = .065$, $SE = .025$, $p = .008$, 95% CI = .017, .113) and for future intentions ($SPE = .055$, $SE = .022$, $p = .014$, 95% CI = .011, .099). Although the complete pathway *global identification* $\rightarrow$ *perceived injustice* $\rightarrow$ *anger* $\rightarrow$ *XR identification* $\rightarrow$ *collective action* did not reach significance for behaviour or intentions, the pathway *perceived injustice* $\rightarrow$ *anger* $\rightarrow$ *XR identification* $\rightarrow$ *collective action* was significant for behaviour ($SPE = .125$, $SE = .044$, $p = .005$, 95% CI = .038, .211) and for future intentions ($SPE = .105$, $SE = .041$, $p = .011$, 95% CI = .024, .186).

Moral outrage latent factor. The second series of alternative models used observed

scores for moral convictions, perceived injustice, and anger as indicators of a single latent variable that we labelled *moral outrage*, rather than modelling these three constructs as separate latent variables as in our main analyses. Our initial model (Figure S3) showed an acceptable fit to the data: $\chi^2(382) = 666.223$; CFI = .907; RMSEA = .061 (90% CI: .053, .068); SRMR = .090. Based on modification indices, we sequentially added three theoretically sensible paths to the model (shown as curved lines in Figure S4), resulting in a significant improvement in model fit, $\chi^2_{S-B}(3) = 172.178$, $p < .001$. We then sequentially trimmed the model, removing 4 paths and 1 covariance. The resulting model showed no significant loss of fit compared to the expanded model, $\chi^2_{S-B}(5) = 7.491$, $p = .187$, and an acceptable or good fit on all indices: $\chi^2(384) = 605.227$; CFI = .928; RMSEA = .053 (90% CI: .045, .061); SRMR = .071. We re-estimated this model using bootstrapping (10,000 resamples) to obtain CIs for indirect effect estimates.

Figure S4 shows two significant indirect pathways towards collective action. As in our main analyses, the pathway *global identification* $\rightarrow$ *participative efficacy* $\rightarrow$ *XR identification* $\rightarrow$ *collective action* was significant for behaviour ($SPE = .062$, $SE = .024$, $p = .009$, 95% CI = .016, .109) and for future intentions ($SPE = .052$, $SE = .022$, $p = .016$, 95% CI = .010, .094). Although the complete pathway *global identification* $\rightarrow$ *moral outrage* $\rightarrow$ *XR identification* $\rightarrow$ *collective action* did not reach significance for behaviour or intentions, the pathway *moral outrage* $\rightarrow$ *XR identification* $\rightarrow$ *collective action* was significant for behaviour ($SPE = .162$, $SE = .052$, $p = .002$, 95% CI = .060, .264) and for future intentions ($SPE = .135$, $SE = .048$, $p = .005$, 95% CI = .041, .230).

Supplementary References

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Table S1. *Rates of participation in each of the 10 measured XR collective actions.*

Actions	Frequencies			Mean
	Never	Once	More than once	
Attended an Extinction Rebellion group meeting	23	26	154	1.65
Participated in an Extinction Rebellion demonstration or rebellion	35	29	138	1.51
Signed an Extinction Rebellion petition	41	29	133	1.45
Blocked a road whilst demonstrating for Extinction Rebellion	75	26	102	1.13
Organized an Extinction Rebellion demonstration or rebellion	130	26	47	0.59
Drawn graffiti in the name of Extinction Rebellion	170	13	20	0.26
Have been arrested in the name of Extinction Rebellion	175	15	12	0.19
Fixed yourself to an object, building or place in the name of Extinction Rebellion	191	5	6	0.08
Participated in Tour de Rebel	192	8	3	0.07
Participated in an Extinction Rebellion global hunger strike	199	3	1	0.02

Note. Total $N = 202$ to 203 across actions. Means for each action are based on scoring never = 0, once = 1, and more than once = 2.

Table S2. *Composition of indicators and standardized loadings from our measurement model.*

Latent variables and indicators	λ	Wording of survey items
<i>Collective action behaviour</i>		<i>Below are statements regarding your participation with Extinction Rebellion. Please indicate on the scale below if you have participated in any of the following actions. (0 = I have never done this; 1 = I have done this once; 2 = I have done this more than once)</i>
PB_P1	.819	<ul style="list-style-type: none"> • Participated in an Extinction Rebellion demonstration or rebellion • Fixed yourself to an object, building or place in the name of Extinction Rebellion • Drawn graffiti in the name of Extinction Rebellion
PB_P2	.795	<ul style="list-style-type: none"> • Blocked a road whilst demonstrating for Extinction Rebellion • Have been arrested in the name of Extinction Rebellion • Participated in Tour de Rebel
PB_P3	.727	<ul style="list-style-type: none"> • Organized an Extinction Rebellion demonstration or rebellion • Attended an Extinction Rebellion group meeting • Signed an Extinction Rebellion petition • Participated in an Extinction Rebellion global hunger strike
<i>Collective action intentions</i>		<i>The statements below refer to your future intentions in Extinction Rebellion collective action. Please indicate on the scale below, how likely it is that you would do the following actions in the future. (1 = extremely unlikely ... 7 = extremely likely)</i>
FB_P1	.832	<ul style="list-style-type: none"> • Participate in an Extinction Rebellion demonstration or rebellion • Fix yourself to an object, building or place in the name of Extinction Rebellion • Draw graffiti in the name of Extinction Rebellion
FB_P2	.833	<ul style="list-style-type: none"> • Block a road whilst demonstrating for Extinction Rebellion • Get arrested in the name of Extinction Rebellion • Participate in Tour de Rebel
FB_P3	.759	<ul style="list-style-type: none"> • Organize an Extinction Rebellion demonstration or rebellion • Attend an Extinction Rebellion group meeting • Sign an Extinction Rebellion petition • Participate in an Extinction Rebellion global hunger strike

Latent variables and indicators	λ	Wording of survey items
<i>XR identification</i>		
<i>Below are statements regarding your relationship with Extinction Rebellion. Please select the response that comes closest to your level of agreement or disagreement with each one:</i>		
XRID_P1 (solidarity)	.851	<ul style="list-style-type: none"> • I feel a distance between myself and Extinction Rebellion (reversed) • I have nothing in common with Extinction Rebellion (reversed) • I feel committed to Extinction Rebellion • I feel solidarity with Extinction Rebellion
XRID_P2 (centrality)	.664	<ul style="list-style-type: none"> • The fact that I am associated with Extinction Rebellion is not core to my identity (reversed) • Being associated with Extinction Rebellion has nothing to do with how I see myself (reversed) • The fact that I am associated with Extinction Rebellion is an important part of my identity • Being associated with Extinction Rebellion is an important part of how I see myself
XRID_P3 (satisfaction)	.724	<ul style="list-style-type: none"> • I am unhappy about being associated with Extinction Rebellion (reversed) • Being associated with Extinction Rebellion gives me a bad feeling (reversed) • I am glad to be associated with Extinction Rebellion • It is pleasant to be associated with Extinction Rebellion
<i>Participative efficacy</i>		
<i>Please indicate on the scale below, your level of agreement or disagreement with each statement.</i>		
PTEFF_P1	.924	<ul style="list-style-type: none"> • I believe that I, as an individual, can provide a significant contribution so that, through joint actions, Extinction Rebellion can achieve its aims • I believe that my contribution will not make a significant difference to whether Extinction Rebellion can achieve its aims (reversed)
PTEFF_P2	.880	<ul style="list-style-type: none"> • I believe that I, as an individual, can contribute greatly so that Extinction Rebellion, as a group, can achieve its aims • I believe that my personal actions will make little or no difference to whether Extinction Rebellion ultimately succeeds in its goals (reversed)
PTEFF_P3	.853	<ul style="list-style-type: none"> • I believe that I, as an individual, can provide an important contribution so that, together, Extinction Rebellion can achieve its aims • I believe that I, as an individual, can contribute meaningfully so that Extinction Rebellion can achieve their common goal of persuading the government to act justly on the Climate and Ecological Emergency

Latent variables and indicators	λ	Wording of survey items
<i>Group efficacy</i>		<i>Using the scale below, please rate how probable you think it is that Extinction Rebellion will reach the following goals.</i> <i>(1 = extremely unlikely ... 7 = extremely likely)</i>
GREFF_P1	.847	<ul style="list-style-type: none"> • Persuade government officials to act now against climate change • Motivate others to campaign with Extinction Rebellion
GREFF_P2	.803	<ul style="list-style-type: none"> • Persuade government officials to create a citizens' assembly • Motivate others to behave more environmentally friendly
GREFF_P3	.730	<ul style="list-style-type: none"> • Improve the physical impact of climate change • Persuade the government to declare a state of climate emergency
<i>Moral convictions</i>		<i>The statements below concern your feelings, emotions and beliefs towards the environment, climate change, Extinction Rebellion, and the government or those in power. Please select the response which best reflects your level of agreement or disagreement with each one.</i>
MORAL_P1	.741	<ul style="list-style-type: none"> • My opinion on climate change is deeply connected to my beliefs about “right” and “wrong”
MORAL_P2	.584	<ul style="list-style-type: none"> • I believe that doing nothing to stop climate change is immoral
MORAL_P3	.741	<ul style="list-style-type: none"> • My opinion on the climate emergency is part of my core moral norms and values • I believe that the issue of climate change is a moral issue
<i>Perceived injustice</i>		<i>(as above)</i>
INJ_P1	.874	<ul style="list-style-type: none"> • When I think about the current situation of the planet, I feel an overwhelming sense of injustice • It is extremely unjust that some of the world's richest corporations are causing climate change when they will not suffer the consequences • It is extremely unjust that future generations will suffer most from climate change when our current generation is causing it
INJ_P2	.863	<ul style="list-style-type: none"> • When I think about the global climate emergency, I feel an overwhelming sense of injustice • When I think about how those in power have responded to the climate emergency, I feel an overwhelming sense of injustice
INJ_P3	.779	<ul style="list-style-type: none"> • It is extremely unjust that the poorest countries will suffer most from climate change when the richest countries are causing it • It is extremely unjust that those who suffer from climate change are not those responsible for it

Latent variables and indicators	λ	Wording of survey items
<i>Fear</i>		<i>(as above)</i>
FEAR_P1	.832	<ul style="list-style-type: none"> • When I think about the current state of the planet, I feel frightened • I do not feel fearful about the future of the planet (reversed)
FEAR_P2	.922	<ul style="list-style-type: none"> • I feel fearful about climate change • When I think about the global climate emergency, I feel scared
FEAR_P3	.957	<ul style="list-style-type: none"> • I feel frightened about the state of the environment • When I think about the future of the planet, I feel scared
<i>Anger</i>		<i>(as above)</i>
ANGER_P1	.748	<ul style="list-style-type: none"> • When thinking about environmental protection, I feel angry with the government
ANGER_P2	.704	<ul style="list-style-type: none"> • When thinking about environmental protection, I feel angry towards those responsible for climate change
ANGER_P3	.833	<ul style="list-style-type: none"> • I feel angry about the current state of the planet • I feel angry about how people have treated the environment
<i>Guilt/shame</i>		<i>(as above)</i>
SHAME01	.726	<ul style="list-style-type: none"> • I feel guilty about how we humans are treating the environment
SHAME02	.912	<ul style="list-style-type: none"> • Sometimes, I feel ashamed when I realize what we are leaving behind for future generations
SHAME03	.831	<ul style="list-style-type: none"> • I am ashamed of what future generations might think of us because of our treatment to the environment
<i>Hope</i>		<i>(as above)</i>
HOPE_P1	.740	<ul style="list-style-type: none"> • Extinction Rebellion's attempts to achieve its aims are without hope (reversed)
HOPE_P2	.687	<ul style="list-style-type: none"> • Even if things look bleak, I do not lose hope for dealing with climate change • I feel hope that Extinction Rebellion will achieve its aims
HOPE_P3	.559	<ul style="list-style-type: none"> • Attempts to implement policies for climate change are without hope (reversed) • I feel hopeful that changes in policy would help the environment

Latent variables and indicators	λ	Wording of survey items
<i>Global identification</i>		
<i>This section explores your relationship with global humanity. By this, we mean your connection to all human beings in the world – past, present and future. Please read the following statements and select the response that comes closest to reflecting your level of agreement or disagreement with each one.</i>		
GLID_P1 (solidarity)	.971	<ul style="list-style-type: none"> • I feel a distance between myself and global humanity (reversed) • I have nothing in common with global humanity (reversed) • I feel committed to global humanity • I feel solidarity with global humanity
GLID_P2 (centrality)	.766	<ul style="list-style-type: none"> • The fact that I am a part of global humanity is not core to my identity (reversed) • Being a part of global humanity has nothing to do with how I see myself (reversed) • The fact that I am a part of global humanity is an important part of my identity • Being a part of global humanity is an important part of how I see myself
GLID_P3 (satisfaction)	.772	<ul style="list-style-type: none"> • I am unhappy about being a part of global humanity (reversed) • Being a part of global humanity gives me a bad feeling (reversed) • I am glad to be a part of global humanity • It is pleasant to be a part of global humanity

Note. Except where indicated, all items were rated on a 7-point Likert scale from 1 = strongly disagree to 7 = strongly agree. Item parcels were calculated as the mean of listed items. Values of λ are standardized factor loadings. All loadings are statistically significant at $p < .001$.

Table S3. *Standardized paths and modelled variance estimates from our initial structural model.*

Predictors	Outcomes																					
	Group efficacy		Participatory efficacy		Perceived injustice		Moral conviction		Hope		Fear		Anger		Guilt/shame		XR identification		Collective action behaviour		Collective action intentions	
	β	<i>SE</i>	β	<i>SE</i>	β	<i>SE</i>	β	<i>SE</i>	β	<i>SE</i>	β	<i>SE</i>	β	<i>SE</i>	β	<i>SE</i>	β	<i>SE</i>	β	<i>SE</i>	β	<i>SE</i>
Global identification	.143	.095	.295	.071	.253	.101	.280	.106	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Group efficacy	-	-	-	-	-	-	-	-	.613	.084	-	-	-	-	-	-	-	-	-	-	-	-
Participatory efficacy	-	-	-	-	-	-	-	-	.388	.120	-	-	-	-	-	-	-	-	-	-	-	-
Perceived injustice	-	-	-	-	-	-	-	-	-	-	.500	.079	.835	.061	.252	.191	-	-	-	-	-	-
Moral conviction	-	-	-	-	-	-	-	-	-	-	-	-	-	-	.267	.198	-	-	-	-	-	-
Hope	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	.394	.152	-	-	-	-
Fear	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-.096	.135	-	-	-	-
Anger	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	.416	.137	-	-	-	-
Guilt/shame	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	.049	.149	-	-	-	-
XR identification	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	.449	.084	.478	.091
R ²	2.0%		8.7%		6.4%		7.9%		76.9%		25.0%		69.7%		23.9%		34.1%		20.2%		22.9%	

Note. Values of β are standardized path estimates. Statistically significant parameters at $p < .05$ are in bold.

Table S4. *Standardized latent variable covariances from our initial structural model.*

	Group efficacy		Participatory efficacy		Perceived injustice		Moral conviction		Hope		Fear		Anger		Guilt/Shame		Collective action behaviour		Collective action intentions	
	ϕ	<i>SE</i>	ϕ	<i>SE</i>	ϕ	<i>SE</i>	ϕ	<i>SE</i>	ϕ	<i>SE</i>	ϕ	<i>SE</i>	ϕ	<i>SE</i>	ϕ	<i>SE</i>	ϕ	<i>SE</i>	ϕ	<i>SE</i>
Group efficacy	-	-																		
Participatory efficacy	.494	.074	-	-																
Perceived injustice	.111	.079	.132	.081	-	-														
Moral conviction	.161	.089	.171	.089	.760	.083	-	-												
Hope	-	-	-	-	-	-	-	-	-	-										
Fear	-	-	-	-	-	-	-	-	-.193	.154	-	-								
Anger	-	-	-	-	-	-	-	-	-.220	.184	.370	.125	-	-						
Guilt/shame	-	-	-	-	-	-	-	-	.172	.171	.410	.114	.324	.150	-	-				
Collective action behaviour	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Collective action intentions	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	.533	.081	-	-

Note. Values of ϕ are standardized covariances. Statistically significant parameters at $p < .05$ are in bold.

Table S5. *Standardized paths and modelled variance estimates from our final structural model.*

Predictors	Outcomes																			
	Participatory efficacy		Perceived injustice		Moral conviction		Hope		Fear		Anger		Guilt/Shame		XR identification		Collective action behaviour		Collective action intentions	
	β	<i>SE</i>	β	<i>SE</i>	β	<i>SE</i>	β	<i>SE</i>	β	<i>SE</i>	β	<i>SE</i>	β	<i>SE</i>	β	<i>SE</i>	β	<i>SE</i>	β	<i>SE</i>
Global identification	.254	.067	.255	.100	.238	.105	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Group efficacy	-	-	-	-	-	-	.628	.081	-	-	-	-	-	-	-	-	-	-	.287	.083
Participatory efficacy	-	-	-	-	-	-	.294	.079	-.199	.062	-	-	-	-	.550	.072	-	-	-	-
Perceived injustice	-	-	-	-	-	-	-	-	.523	.078	.315	.180	-	-	-	-	-	-	-	-
Moral conviction	-	-	-	-	-	-	-	-	-	-	.618	.180	.509	.097	-	-	-	-	-	-
Anger	-	-	-	-	-	-	-	-	-	-	-	-	-	-	.346	.080	-	-	-	-
XR identification	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	.461	.078	.389	.083
R^2	6.5%		6.5%		5.7%		65.9%		30.0%		77.6%		25.9%		44.5%		21.3%		29.3%	

Note. Values of β are standardized path estimates. Statistically significant parameters at $p < .05$ are in bold.

Table S6. *Standardized latent variable covariances from our final structural model.*

	Group efficacy		Participatory efficacy		Perceived injustice		Moral conviction		Hope		Fear		Anger		Guilt/Shame		Collective action behaviour		Collective action intentions	
	ϕ	<i>SE</i>	ϕ	<i>SE</i>	ϕ	<i>SE</i>	ϕ	<i>SE</i>	ϕ	<i>SE</i>	ϕ	<i>SE</i>	ϕ	<i>SE</i>	ϕ	<i>SE</i>	ϕ	<i>SE</i>	ϕ	<i>SE</i>
Group efficacy	-	-																		
Participatory efficacy	.500	.076	-	-																
Perceived injustice	-	-	-	-	-	-														
Moral conviction	-	-	-	-	.742	.086	-	-												
Hope	-	-	-	-	-	-	-	-	-	-										
Fear	-	-	-	-	-	-	-	-	-.183	.091	-	-								
Anger	-	-	-	-	-	-	-	-	-	-	.497	.134	-	-						
Guilt/shame	-	-	-	-	-	-	-	-	-	-	.444	.108	.341	.154	-	-				
Collective action behaviour	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Collective action intentions	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	.538	.076	-	-

Note. Values of ϕ are standardized covariances. Statistically significant parameters at $p < .05$ are in bold.

Figure S1. Summary of alternative path model without moral convictions.

Figure S2. Summary of significant paths from alternative final model without moral convictions. Straight lines represent hypothesised paths.

Curved lines represent additional paths based on modification indices. Paths that do not lead indirectly to collective action behaviour or

intentions are shown in grey. Indicators, loadings, error variances, and covariances are omitted for ease of reading. Numbers are standardized

path coefficients. *** $p < .001$; ** $p < .01$; * $p < .05$.

Figure S3. Summary of alternative path model with moral outrage latent factor.

Figure S4. Summary of significant paths from alternative final model with moral outrage latent factor. Straight lines represent hypothesised paths. Curved lines represent additional paths based on modification indices. Paths that do not lead indirectly to collective action behaviour or intentions are shown in grey. Indicators, loadings, error variances, and covariances are omitted for ease of reading. Numbers are standardized path coefficients. *** $p < .001$; ** $p < .01$; * $p < .05$.