

# Moral outrage, not instrumental reasoning, drives extreme commitment among armed groups in civil war

Nils Mallock<sup>1\*</sup>, Broderick McDonald<sup>2</sup>, Rahaf Aldoughli<sup>3</sup>, Nafees Hamid<sup>1\*\*</sup>

<sup>1</sup>King's College London, Department of War Studies, London WC2R 2LS, United Kingdom

<sup>2</sup>Oxford University, Department of Politics and International Relations, Oxford OX1 3UQ, United Kingdom

<sup>3</sup>Lancaster University, School of Global Affairs, Lancaster LA1 4YD, United Kingdom

\*Lead/corresponding author: Nils Mallock ([nils.u.mallock@kcl.ac.uk](mailto:nils.u.mallock@kcl.ac.uk))

\*\*Senior author: Nafees Hamid

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Sociopsychological models identify moral outrage, perceived efficacy, and group identification as predictors of collective action. However, these pathways remain largely untested in contexts of violent conflict, limiting their capacity to explain more extreme forms of commitment to political action. Here we examine these hypotheses among a sample of combatants in armed opposition groups in northwest Syria, during the civil war ( $N = 150$ ), roughly evenly sampled either before or after the late-stage offensive that overthrew the Assad regime in December 2024. In study 1 (pre-offensive), convergent frequentist and Bayesian testing showed that moral outrage strongly predicted combatants' willingness to fight and die ( $d = 0.49$ ) and to make costly sacrifices for the revolution ( $d = 0.52$ ), with limited support for an identity pathway that was fully mediated by moral outrage, and no effect for perceived collective efficacy. Supplementary checks confirm the statistical power and robustness of these findings. By study 2, retrospective perceptions had markedly shifted upwards for identification with the revolution—producing a ceiling effect—and for perceived efficacy, following the successful offensive in which some participants were actively involved. While this prevented a like-for-like comparison of the associations observed in study 1, exploratory tests among inactive combatants replicated the strong and null effects of moral outrage and efficacy, respectively. Together, these studies advance a psychological discourse of moral versus instrumental motives for high-risk political action during violent conflict, while highlighting the importance of temporal context when collecting sensitive field data in hard-to-reach research populations.

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## Transparency Statement

The research was approved by the King's College London Research Ethics Committee, (reference HR/DP-23/24-40502) "Psychosocial Dynamics of Entering & Exiting Armed Groups", approved on 21 February 2024. All participants provided informed consent prior to each interaction; to ensure participant safety and in line with the approved study protocol, consent was provided orally and recorded by the interviewer before each interaction.

We provide study materials, replication code and data access instructions for all studies at the OSF repository

([https://osf.io/qf5ym/overview?view\\_only=07586214443247b1b5eb53a86fedf860](https://osf.io/qf5ym/overview?view_only=07586214443247b1b5eb53a86fedf860)).

The research was not preregistered due to the highly volatile field contexts in which the data collection took place (active civil war during study 1; significant societal upheaval during study 2). This made it difficult to anticipate what materials could be used, the timing of data collection, and which sample of active and former combatants we could reach. However, the project ethics application details the procedures we followed for sampling, fieldwork, and overarching research questions (available at the OSF repository: [https://osf.io/qf5ym/overview?view\\_only=07586214443247b1b5eb53a86fedf860](https://osf.io/qf5ym/overview?view_only=07586214443247b1b5eb53a86fedf860)).

## Introduction

Conventional wisdom holds that individual participation in violent conflict is fundamentally motivated by instrumental incentives. On this account, people take up arms when they expect their ingroup to prevail, and because prevailing delivers the collective benefits of the ingroup assuming more political power. Perceived collective efficacy—the belief that the group can achieve its aims through joint action—thus forms the central motive for engagement. This reasoning should apply most strongly to extreme forms of collective action such as protesting in high-risk environments or joining armed groups during civil war: the greater the costs of participation, the more outsized and probable the benefits must be to overcome free-riding incentives (Bandura, 2000; Klandermans, 1984; Muller & Opp, 1986), and thus the more individuals' commitment tracks their beliefs about the efficacy of the collective to deliver them.

In response to Olson's (1965) formalisation of the collective action problem, group efficacy became understood as a core motivational pathway to participation alongside moral outrage, both integrated with social identity theory in prominent models today (for instance, the social identity model of collective action, SIMCA; van Zomeren et al., 2008; and the encapsulation model of social identity in collective action, EMSICA; Thomas et al., 2012). That is, established theory holds that individuals will engage if they experience negative emotional reactions to perceived injustices *and* believe that these grievances can be effectively redressed by the collective, contingent on shared politicised group

identities. The three pathways are robustly supported empirically, predicting participation in relatively low-risk actions such as demonstrations, labour disputes and environmental activism (Balasubramanian & Sarkar, 2020; Klavina & van Zomeren, 2020; Thomas et al., 2020). For the efficacy-action relationship, meta-analytic evidence finds moderate effect sizes (van Zomeren et al., 2008), and perceived efficacy predicted realised participation rather than intentions in some studies (Finkel et al., 1989; Finkel & Muller, 1998). Applied to armed movements, cross-national and micro-level studies point to recruitment through collective and selective incentives and the material resources of groups (Collier & Hoeffler, 2004; Humphreys & Weinstein, 2008; Weinstein, 2007). Nor is an expectation of success unreasonable in all cases: campaigns of mass collective action do topple entrenched regimes (Stephan & Chenoweth, 2008). Moreover, in practice, policy responses to political violence tend to rest on the assumption that armed mobilisation can be deterred through instrumental incentives—sanctions, interventions and reintegration programmes (see Humphreys & Weinstein, 2007)—that aim to reduce the perceived efficacy of violence and reward peaceful alternatives.

Yet the limited evidence from conflict-affected environments and more high-risk action forms suggests that conventional wisdom may be wrong. The link between efficacy perceptions and normative protest does not extend to non-normative action (e.g., Tausch et al., 2011; Shuman et al., 2016; Uysal et al., 2024), and studies of protest in repressive contexts suggest moral psychological motives carry the most explanatory weight (Ayanian et al., 2021; Mallock & Krekel, 2025; Nguyen et al., 2021). Research in protracted conflicts also found that judgements about the use of deadly intergroup violence appear insensitive to expected success and to perceptions of group efficacy, following instead deontic obligations (Ginges & Atran, 2011; Kaufman, 2006), and that combatants' will to fight tracks their side's perceived spiritual rather than material formidability (Gómez et al., 2017). An experimental manipulation of efficacy also did not shift collective action intentions in the Israeli-Palestinian conflict (Cohen-Chen & van Zomeren, 2018). Beyond this fragmentary evidence however, systematic testing of the collective action pathways against each other remains sparse in extreme contexts, such as engagement in armed violence and civil war. This led us to examine this question in the present work, anticipating that such engagement may be driven more by moral outrage than by instrumental beliefs about collective action efficacy.

We conducted this research among a unique and difficult-to-access late-conflict sample of combatants from Syrian armed opposition groups in northwest Syria, consisting of a heterogeneous group including SNA- and HTS-linked networks ( $N = 150$ ). Data collection coincided with the time period shortly before and after the successful overthrow of the regime under Bashar al-Assad in December 2024. This time frame is noteworthy as a diagnostic case study: 14 years of extreme violence between state and non-state actors had left the opposition militarily cornered and widely disillusioned (Chulov, 2016), so instrumental and moral accounts make sharply divergent predictions about the fighters who remained, with the former specifically predicting lower individual commitment. This context also places some constraints on generalisability, as our findings should be interpreted

primarily as evidence from late-conflict opposition combatants, which we will critically discuss.

The reported research provides rare quantitative insights that contribute to the field in several ways: first, by examining the role of moral outrage, group identity, and collective efficacy (the canonical collective action pathways) in motivating high-risk political action during violent conflict; second, by doing so among a unique sample of combatants who have already demonstrated a readiness to engage in political violence, rather than relying on prospective attitudes or intentions (see Moskalenko & McCauley, 2009, who discuss why this is restrictive); and third, by statistically examining the influence of temporal context in a pre-post analytical design, highlighting potential challenges for collecting sensitive human data in natural field settings.

## What motivated combatants during the Syrian civil war?

The Syrian civil war (2011–2024) stands as one of the 21<sup>st</sup> century's most devastating conflicts. What began as peaceful demonstrations during the Arab Spring transformed into a complex multi-party war that killed over 656 thousand people (SOHR, 2025), displaced more than half of Syria's population, and destroyed the local economy and infrastructure. The conflict evolved in phases from the initial uprising (2011–2012), in which defected military officers formed the Free Syrian Army (FSA). The Assad regime's deployment of extreme violence against protesters and dissidents led to further fragmentation that drew in regional and global powers while spawning extremist movements internally. By 2014, two such groups, Jabhat al-Nusra (an al-Qaeda affiliate) and Islamic State (ISIL) exploited the chaos and at its peak, ISIL controlled roughly a third of Syrian territory (Wilson Center, 2019). Foreign intervention then followed, with Russia, Iran, Turkey, the United States and various other actors all intervening on behalf of either Assad's regime or selected opposition militias (Peel, 2024).

Over time the conflict matured into a protracted territorial split. The FSA, initially the primary opposition force, fragmented due to lack of centralised command, with many fighters joining better-funded Islamist groups. Under Ahmed al-Sharaa (then known under his *nom de guerre* Abu Mohammad al-Jolani), the al-Nusra successor Hayat Tahrir al-Sham (HTS) emerged as most significant, ultimately governing four million people in the Northwestern Idlib province. The Kurdish-led Syrian Democratic Forces (SDF), backed by the United States, established control over northeastern Syria while continuing to fight ISIL cells, who continue insurgent operations until this day. Turkey meanwhile consolidated various factions into a new umbrella organisation, the Syrian National Army (SNA), to counter the growing Kurdish influence (Dagres, 2024).

On November 29, 2024, an HTS-led offensive that also involved SNA and smaller armed groups from Southern provinces captured the city of Aleppo, and Assad's seemingly stable regime collapsed days after (in mid-December), ending 53 years of authoritarian rule. Despite substantial diplomatic efforts domestically and with the international community,

Syria's new HTS-led government faced severe challenges, especially in its first year amidst sporadic violence in the country and territorial disputes with Israel (Mills & Loft, 2025).

The phenomenon of individuals showing extreme commitment, including the will to fight, kill or die for a political cause, is evidently multicausal and likely to be influenced by different contextual factors across conflicts. The social scientific literature reflects this complexity, developing various empirically supported mechanisms: relative deprivation (Gurr, 1970); past trauma or conflict exposure (Horgan, 2014); adherence to non-negotiable values superseding instrumentally rational reasoning (Atran & Ginges, 2012); and personal or collective 'significance quests' (Kruglanski et al., 2022), to name only a few. In Syria, however, the evidence is sparse compared to other, better-studied conflict settings, in large part due to practical difficulties and risks for conducting research under the Assad regime and during violent conflict. Rare insights into combatants' motives are provided by early descriptive surveys, which found that 79% of fighters in FSA and armed Islamist groups cited revenge against the Assad regime as their primary motivation, with only a minority (25%) indicating religious motives (Mironova et al., 2014). Later work suggests a sharper distinction between foreign volunteers, who tended to be ideological hardliners, and local recruits more motivated by instrumental considerations (e.g., Dawson & Amarasingam, 2017), although other accounts emphasise moral reasoning even among local regime defectors trumping material benefits (Ohl et al., 2015). Much of the remaining evidence comes from extensive qualitative interviews and oral histories of rebels and civilians, investigating how shared identities and social grievances have facilitated mobilisation (Baczko et al., 2018; Haid, 2017), sustained commitment as the war dragged on (e.g., Aldoughli, 2024a, 2024b), and led to disengagement in some cases (e.g., Mironova, 2019), while still others highlight the role of material and economic hardship (e.g., Tsurkov, 2022). Qualitative research among Syrian National Army (SNA) fighters provides particularly relevant micro-level evidence on these dynamics. Drawing on in-depth interviews with combatants affiliated with the Third Corps and the Sham Front, Aldoughli (2024a, 2024b) identifies two interrelated pathways through which fighters sustain their commitment. The first centres on 'dysphoric memories'—traumatic recollections of violence, loss, and political persecution under the Assad regime—that are repeatedly revisited through communal rituals such as revolutionary songs and commemorative practices, gradually fusing individual identity with group membership. The second pathway operates through the shared experience of combat itself: fighters who survive dangerous missions together describe their comrades in explicitly familial terms, reporting bonds that eclipse pre-war tribal or regional affiliations. These processes align with the identity fusion framework (Whitehouse & Lanman, 2014), whereby extreme self-sacrifice becomes intelligible as an extension of defending one's closest kin. Crucially, fighters in these studies uniformly identified as 'revolutionaries' rather than soldiers or mujahidin, suggesting that a shared moral framing of the conflict as a struggle against injustice superseded group-specific loyalties. Aldoughli (2024b) further argues that political uncertainties and the prolonged stalemate of the war, rather than eroding commitment, actively contributed to the construction of a distinctive 'revolutionary subjectivity' that sustained engagement even when material incentives were negligible. Complementing this, Bautista et al. (2026) found that the identity fusion generated by shared dysphoric

experiences can attenuate once a conflict turns chronic and its initial arousal subsides, implying that sustained engagement in late-stage settings may come to rest more on the collective moral framing of the struggle than on identity-based processes alone. Together, the abovementioned qualitative work provides a theoretically coherent micro-level account of the motivational landscape that the present study seeks to test quantitatively for the first time.

The lens of collective action theory, with its canonical three predictors of moral outrage, collective efficacy and group identification, may prove useful in harmonising existing findings. As symptom-like ‘proximal psychological explanations’ (van Zomeren et al., 2008), they are compatible rather than competing with different accounts of the underlying antecedents of protest. Yet although sociopsychological models like SIMCA and EMSICA (Thomas et al., 2012) have been broadly tested for lower-risk forms of political action, they have very rarely been applied to the study of political violence (with few notable exceptions, e.g., Setiawan et al., 2020), and never in the context of Syria, which was the goal of the present research.

## Methods

### Participants and recruitment

150 adult participants ( $M_{Age} = 34.3$ ,  $SD_{Age} = 5.1$ ; 98.6% male) were recruited who met inclusion criteria as active or recent combatants in Syrian armed opposition groups. Participants were affiliated with various factions operating in Northwestern Syria primarily as part of the Syrian National Army (SNA, 41%), other elements of the Free Syrian Army (FSA) umbrella (20%), or Hay’at Tahrir al-Sham (HTS, 21%), including precursors or affiliates of these groups<sup>1</sup>; approximately 17% of our sample reported their primary affiliation as other, much smaller groups that were generally aligned with SNA or FSA. All participants had been members of at least one group for several years during the Syrian civil war since 2011, and involved in combat operations against government forces under then-president Bashar al-Assad.

Potential participants were initially identified by local research assistants in the Idlib province in Syria, with funding from the Cross-Border Conflict Evidence, Policy and Trends (XCEPT) project at King’s College London. The research assistants are experienced with a wide sampling of groups, and received additional training in preparation for this study. An eligibility checklist ensured that participants meet the above inclusion criteria, understand either Arabic or English to provide informed consent, and do not self-report serious mental

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<sup>1</sup> As confirmed by this data (see also Jenkins, 2014), combatants frequently left and joined various groups over the course of the civil war, making a unique matching of participants to groups difficult. The description here is focused on what participants identified as the most important group they had been fighting in currently or in the past, as of the time of data collection.

health issues as per the approved study protocol. The surveys were administered in person, electronically on tablet devices and anonymous response data uploaded to encrypted storage. After interviews, a process of participant referrals (snowball sampling) was followed to recruit additional eligible participants.

- 5 Data collection commenced on 24 October 2024 but was interrupted on 1 December 2024 during the launch of the rebel offensive—in which a number of participants in this research reportedly participated—that ultimately overthrew the Assad regime shortly afterwards. Data collection was resumed in July 2025 following updated risk assessments for study participants and researchers. The overall sample thus consists of 150 individuals with  
10 equivalent profile (see [Supplementary Table S1](#)), with participants roughly evenly sampled either before ( $n = 71$ , 47.3%) or after ( $n = 79$ , 52.7%) regime change in Damascus. We exploit this circumstance analytically in several ways (see [Analysis](#)).

## Measures

- 15 Following a qualitative interview section in which participants described their involvement in armed groups during the civil war (including the length and type of involvement; see [Supplementary Material S8](#)), a quantitative survey was administered. All measures were translated into Arabic language using back-translation procedures and pilot tested with native speakers in Syria and the United Kingdom. Unless otherwise noted, all items were  
20 assessed on seven-point Likert scales ranging from 0 ('strongly disagree') to 6 ('strongly agree'), and calculated as mean indices for the analysis.

- Moral outrage* ( $\alpha = 0.94$ ). Three items were adapted to the empirical context from Obaidi et al. (2019) and Smith et al. (2012), measuring affective responses to perceptions of collective injustice before engaging in armed action ('Before I was an active fighter, I felt resentful  
25 about the situation of my community compared to other communities in Syria'; 'Before I was an active fighter, I felt that people in my community in Syria were disadvantaged because the Assad regime kept them down'; 'Before I was an active fighter, I felt furious about the limited opportunities for people in my community in Syria to get ahead in their lives'). For consistency and to reduce noise, retrospective reports were used to mitigate bias from the  
30 fact that some participants had left their active combat role at the time of data collection. Qualitative responses indicated that resentment or disillusionment often motivated disengagement from the revolution, suggesting that current perceptions might differ from those that originally motivated participation. Referencing attitudes prior to joining the fight also strengthens the implied causal sequence from attitudes to outcomes; limitations of  
35 this approach are critically addressed in the general discussion.

- Collective efficacy* ( $\alpha = 0.94$ ). Similarly, we adapted two items from Yeich and Levine (1994) to this empirical setting, measuring collective political efficacy ('Before I was an active fighter, I felt that systemic change could occur in Syria if people banded together and took  
40 action'; 'Before I was an active fighter, I felt that organised groups of citizens could have a significant impact on politics in Syria').

*Group identification.* A visual scale of group identification was used, which was first developed by Aron et al. (1992) and further refined by Swann et al. (2009). The scale depicts the ‘self’ and the ‘group’ as two separate circles, and participants are asked to dynamically move the ‘self’ to the position that best represents their relationship to the target group. The degree of overlap was measured as a continuous value from -1 (full separation) to 1 (full overlap), and rescaled to 0-6 for the purposes of comparability in the analysis. Participants completed the scale twice, once with target group ‘the Syrian revolution’ and a second time for ‘a Syrian revolutionary combatant group you belonged to in the past and that was the most important for you’.

*Willingness to fight and die* ( $\alpha = 0.73$ ). The primary outcome measured willingness to fight and die for the armed revolution during the Syrian civil war. Two items were adapted from Swann et al. (2009), which have been validated and used in various conflict settings (e.g., Atran, 2016; Gómez et al., 2017) (‘When I was an active fighter, I was willing to die for the Syrian revolution’; ‘When I was an active fighter, I was willing to kill for the Syrian revolution’).

*Costly sacrifice* ( $\alpha = 0.91$ ). The secondary outcome measured willingness to make costly sacrifices for the armed opposition during the Syrian civil war. Three items were adapted from Atran et al. (2014): ‘If necessary, when I was an active fighter, I was willing to lose my job or source of income to defend the Syrian revolution’; ‘If necessary, when I was an active fighter, I was willing to go to jail to defend the Syrian revolution’; ‘If necessary, when I was an active fighter, I was willing to let my children suffer physical punishment to defend the Syrian revolution’.

*Covariates.* Demographic characteristics included age, education level, a two-item measure of political religiosity (McEwen et al., 2022), and subjective socioeconomic status (Adler et al., 2000).

## Analytical strategy

All analyses were conducted in RStudio (version 2023.12.1+402), and full replication scripts are provided at OSF (see data availability). The target sample size of  $N = 150$  was determined a priori based on the feasibility of accessing a sufficient number of combatants in Syria. However, the sudden rebel offensive in December 2024 temporarily interrupted data collection, as mentioned earlier. Fieldwork could continue in July 2025, allowing for completing the full sample using equivalent recruitment procedures and materials. However, two notable differences exist between the two groups. First, there was a seven-month gap between data collections. Second, during this time, the fall of Bashar al-Assad and subsequent regime change in Syria, which has since been governed by an HTS-led coalition, introduced a most fundamental shift in the context of the Syrian civil war and beyond. It is entirely plausible that the new political conditions have altered the perceptions examined here, such as individuals’ willingness to fight and die for the revolution—which now many view as being over—especially for those combatants in the 2025 sample that actively participated in the successful offensive.



We exploit this exogeneous split in the sample—approximately half of participants were randomly recruited before or after the regime change—to address these concerns and provide, for the first time, a quantitative account of shifts in combatants’ perceptions surrounding this pivotal event. Specifically, we analysed the first half of the sample as study 1 ( $n = 71$ ), which forms the basis of the main hypothesis tests. Multiple linear regression estimation is used to examine the role of three classical collective action predictors in the following baseline model:

$$y_i = \beta_0 + \delta_1 MOR_i + \delta_2 EFF_i + \delta_3 IDY_i + \beta_1 X_i + \epsilon_i$$

where  $y_i$  denotes the outcome of extreme commitment, either willingness to fight and die or costly sacrifice;  $MOR_i$ ,  $EFF_i$  and  $IDY_i$  are the predictors (moral outrage, collective efficacy and group identification);  $X_i$  is a vector of individual covariates (age, education level, religiosity, and subjective socioeconomic status; we did not include gender as the sample was almost entirely male); and  $\epsilon_i$  is the idiosyncratic disturbance. We further report simplified model estimates with omitted controls ( $X_i$ ). The standardised coefficients of interest are  $\delta_1$ ,  $\delta_2$  and  $\delta_3$ .

In light of study 1’s modest sample size, several steps were taken to ensure validity. First, we report additional tests confirming sufficient statistical power in all regression models (Table S2), and testing for multicollinearity (through variance inflation factors) as well as heteroscedasticity and linearity assumptions through residual plots and model diagnostics. Previewing the findings, these robustness checks were positive.

Second, we supplemented the main analysis with a Bayesian regression approach. This offers important advantages over frequentist methods, including full quantification of uncertainty, better handling of skewed outcome distributions, and the ability to directly estimate mean effect sizes and their probability distributions. This is preferable to relying on p-values, which can become unstable and less informative in small  $N$  studies, whereas Bayesian estimation yields interpretable probability distributions even under limited data conditions (Smid et al., 2020; van de Schoot et al., 2014).

We specified the Bayesian models using a skew-normal family to accommodate the left-skewed distribution of extreme commitment scores, identified during preliminary data inspection, as standard normal error assumptions would have been violated (Arellano-Valle et al., 2008). Priors balanced informativeness with regularisation: weakly informative normal(0, 1) priors were assigned to all standardised predictors, reflecting expectations of moderate effect sizes (Gelman et al., 2017) while allowing the data to guide inference. The intercept received a normal(0, 1) prior as model variables were standardised, the residual standard deviation received an exponential(1) prior to ensure positive values with mild regularisation, and the skewness parameter received a normal(-2, 3) prior to capture the observed leftward skew while maintaining flexibility.

Models were estimated using Hamiltonian Monte Carlo with 4 chains of 4,000 iterations each (including 2,000 warmup iterations), yielding 8,000 post-warm-up samples for statistical inferences. Convergence was assessed through  $\hat{R}$  values (target  $\hat{R} < 1.01$ ),

effective sample sizes ( $ESS > 400$ ), and visual inspection of trace plots. Posterior predictive checks evaluated model fit. We report posterior means, standard deviations, 95% credible intervals, and probabilities of positive effects.

The 2025 sample was then analysed as study 2 ( $n = 79$ ), cautiously examining how key variables in the analysis differ from study 1 and whether detected group differences were in fact attributable to the changed political conditions, rather than to chance. To this end, we conducted permutation-based placebo tests on the three predictor variables—moral outrage, collective efficacy, and group identification—generating 10,000 random permutations of group membership from the combined dataset while keeping group sizes fixed. For each permutation, we computed the absolute mean difference between the pseudo-groups, producing a null distribution against which the observed mean differences (pre- vs. post-regime change) were compared to determine the likelihood of random group differences.

For hypothesis testing in study 2, we explored predictive effects of the three collective action pathways on outcomes among participants who fought in the 2024 offensive, and separately among those reporting no active participation at that time. We compare these groups to each other and to study 1 results to examine whether active fighters may have disproportionately been affected by the regime change. However, findings from this exploratory step can offer only suggestive evidence. All aspects of the original analysis plan, including regression model (1) results for the full study 2 sample, are reported in the main text or in Supplementary Material. Moreover, we directly test the sociopsychological models SIMCA and EMSICA using structural equation modelling (SEM) on combined study data in an exploratory appendix ([Supplementary Material S8](#)). SEM model specification used maximum likelihood estimation with robust standard errors (MLR estimator) to account for non-normality. As a benchmark for sample size adequacy, we follow conservative guidelines of sample size-to-parameter ratios  $\geq 10:1$  (Wolf et al., 2013). Model fit was evaluated using multiple indices: CFI ( $>.90$  acceptable,  $>.95$  good), RMSEA ( $<.08$  acceptable,  $<.06$  good), SRMR ( $<.08$ ), and chi-square test (Hu & Bentler, 1999). We report standardized path coefficients ( $\beta$ ) with bootstrapped confidence intervals in 1,000 replications.

## Study 1 Results

### Preliminary analysis

Descriptive statistics and zero-order correlations for all key measures are reported in [Table 1](#). Participants displayed high but sufficiently distributed levels of extreme commitment ( $M = 4.48$ ,  $SD = 1.36$ ) and willingness to make costly sacrifices ( $M = 3.44$ ,  $SD = 2.20$ ) at the time of active involvement, as well as the tested predictors moral outrage ( $M = 4.46$ ,  $SD = 1.45$ ) and identification (with the Syrian revolution:  $M = 4.74$ ,  $SD = 2.28$ ; with their specific opposition group:  $M = 4.71$ ,  $SD = 2.26$ )—but low levels of efficacy on average ( $M =$

2.54,  $SD = 1.70$ ), mirroring evidence from other late-stage or frozen conflicts where combatants had little practical reason to believe that their own faction or movement more broadly can realise their objectives (e.g., Nussio & Ugarriza, 2021).

The bivariate analysis provides initial support for the hypotheses that moral outrage and group identification are associated with each other, and with higher extreme commitment among fighters in Syria's armed opposition; however, no such direct link is found for efficacy. The two outcomes, willingness to fight and die and costly sacrifices, were moderately correlated. We also find that participants did not report different levels of identification between the two variants (identification with revolution vs. a specific armed group). For the remainder of the presentation of results, we thus focus on specific opposition groups as the more immediate target of identification; all results were equivalent to using the more general measure instead.

**Table 1 | Descriptive statistics and zero-order correlations of key measures.**

| Variable             | Mean | SD   | 2    | 3      | 4      | 5      | 6      |
|----------------------|------|------|------|--------|--------|--------|--------|
| 1. Moral outrage     | 4.46 | 1.45 | -.09 | .75*** | .75*** | .66*** | .45*** |
| 2. Efficacy          | 2.54 | 1.70 | –    | -.05   | -.05   | -.03   | -.29*  |
| 3. ID: Group         | 4.71 | 2.26 |      | –      | .99*** | .59*** | .29*   |
| 4. ID: Revolution    | 4.74 | 2.28 |      |        | –      | .61*** | .29*   |
| 5. Fight and die     | 4.48 | 1.36 |      |        |        | –      | .40*   |
| 6. Costly sacrifices | 3.44 | 2.20 |      |        |        |        | –      |

All variables are on a 0-6 scale. ID = Social identification with specified target group. \*\*\* $p < 0.001$ , \*\* $p < 0.01$ , \* $p < 0.05$ .

## Main analysis

We then tested the three pathways using hierarchical regression estimation separately for willingness to fight and die and costly sacrifices (Table 2). Models 1a and 2a examined the direct effects of moral outrage, collective efficacy, and group identification. Models 1b and 2b additionally accounted for individual-level covariates.

For both outcomes, moral outrage emerged as the dominant pathway, exerting strong and highly significant predictive effects on willingness to fight and die ( $d = 0.49$ ,  $P < 0.001$ ) and

costly sacrifice ( $d = 0.51, P < 0.01$ ). Meanwhile, collective efficacy beliefs explained no meaningful variation except a small—notably negative—association with costly sacrifices ( $d = -0.25, P < 0.05$ ) that lost significance in the full specification, confirming preliminary null results for this factor. Interestingly, despite moderate to large correlations with both outcomes, the degree to which fighters identified with their armed group did not explain either outcome when accounting for the other pathways, especially moral outrage. We confirm this in supplementary mediation tests (Figure S5): moral outrage fully mediated effects of group identity, while the reverse pathway is rejected at 95% confidence intervals. The interpretation of this finding is not that identity was unimportant across Syrian oppositional mobilisation as a whole, but rather that—at least in our late-conflict setting — stronger identify attachment did not uniquely explain extreme commitment beyond the explanatory effects of moral outrage against Syrian authorities at the time. We offer a more in-depth reflection on this issue in the discussion.

Regression model diagnostics ruled out threats of multicollinearity between predictors ( $VIF$  range 1.01–3.77, well below conventional acceptance thresholds of  $VIF < 5$ ), nonlinear patterns in residuals and heteroscedasticity, as well as violations of normality of residuals. Collectively, these tests support the statistical assumptions underlying these findings. Moreover, post-hoc power analysis (at  $\beta=0.05$ ) indicated that the model had 93.1% power to detect the observed effect of moral outrage ( $f^2 = 0.11$ ), and 86.2% power to detect small to medium effects in general, supporting the null findings for the efficacy and identity pathways.

**Table 2 | Estimated effects of sociopsychological predictors of fighter engagement.**

| Dependent variable   | Willingness to fight & die |                    | Costly sacrifices  |                      |
|----------------------|----------------------------|--------------------|--------------------|----------------------|
|                      | 1a                         | 1b                 | 2a                 | 2b                   |
| Moral outrage        | 0.494***<br>(0.138)        | 0.472**<br>(0.139) | 0.508**<br>(0.159) | 0.526***<br>(0.149)  |
| Collective efficacy  | 0.022<br>(0.091)           | -0.043<br>(0.103)  | -0.248*<br>(0.105) | -0.180<br>(0.111)    |
| Group identification | 0.218<br>(0.138)           | 0.269<br>(0.181)   | -0.105<br>(0.159)  | -0.237<br>(0.194)    |
| Religiosity          |                            | 0.040<br>(0.160)   |                    | 0.158<br>(0.171)     |
| Socioeconomic status |                            | -0.149<br>(0.104)  |                    | -0.387***<br>(0.112) |
| Age                  |                            | 0.010<br>(0.019)   |                    | 0.025<br>(0.020)     |
| Education            |                            | 0.208*<br>(0.088)  |                    | 0.040<br>(0.094)     |
| Constant             | -0.000<br>(0.090)          | -0.797<br>(0.657)  | -0.000<br>(0.104)  | -0.873<br>(0.702)    |
| Observations         | 71                         | 68                 | 71                 | 68                   |
| R2                   | 0.451                      | 0.498              | 0.270              | 0.420                |

Standardised coefficients represent multivariate linear estimates (OLS). Standard errors in parentheses and \*\*\*p<0.001, \*\*p<0.01, \*p<0.05.

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## Bayesian analysis

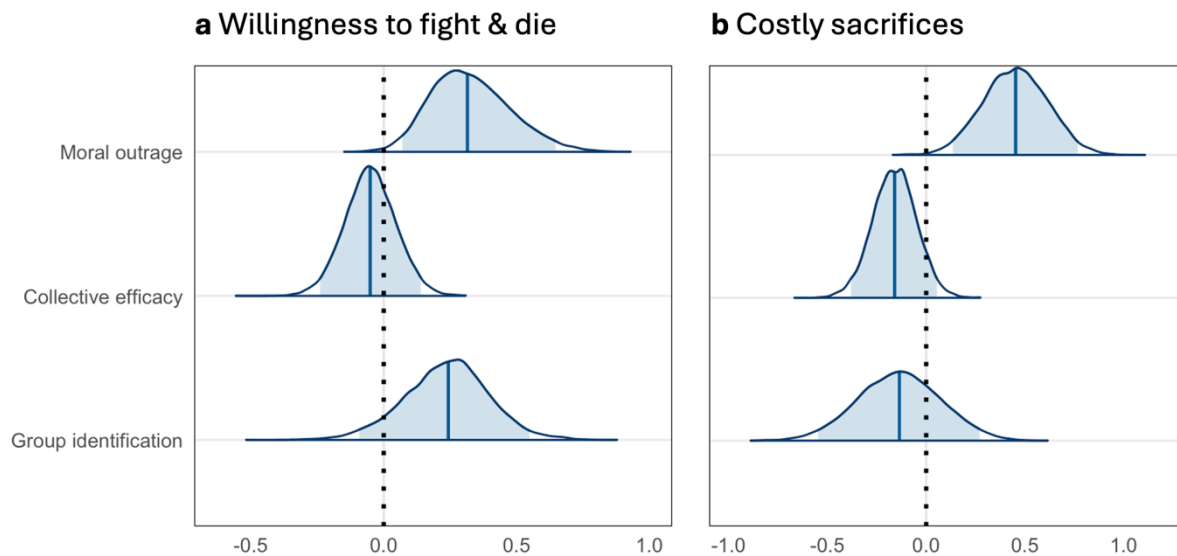
Despite confirmatory results of power analysis on the strong effect sizes, a remaining concern was that the modest sample size may render frequentist results unreliable. In response and as per the original research plan (see [Methods](#)), we conducted Bayesian regression analysis using weakly informative priors for the two fully specified models (models 1b and 2b). Rather than relying on p-values, this allowed for directly estimating effect distributions as shown in [Fig. 1](#); we report full posterior summaries in [Table S3](#).

Consistent with the main results, moral outrage emerged as the only pathway demonstrating reliable predictive effects; this applied equally to fighters' willingness to fight and die ([Fig. 1a](#); Posterior mean = 0.33, 95% CrI [0.07,0.65],  $P(\beta > 0) = 0.995$ ), and to their readiness for costly sacrifices ([Fig. 1b](#); Posterior mean = 0.45, 95% CrI [0.14,0.77],  $P(\beta > 0) = 0.997$ ). Again, collective efficacy showed negative but near-zero effects on extreme commitment (for fighting and dying: Posterior mean = -0.05, 95% CrI [-0.24,0.14],  $P(\beta >$

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0) = 0.296; for costly sacrifices: Posterior mean =  $-0.16$ , 95% CrI  $[-0.38, 0.06]$ ,  $P(\beta > 0) = 0.073$ ). Group identification had a moderate positive relationship with willingness to fight & die but only with borderline probability (Posterior mean =  $0.24$ , 95% CrI  $[-0.09, 0.55]$ ,  $P(\beta > 0) = 0.928$ ), and none with costly sacrifice (Posterior mean =  $-0.14$ , 95% CrI  $[-0.55, 0.27]$ ,  $P(\beta > 0) = 0.259$ ).

Extensive model diagnostics confirmed robust estimation and good fit. All parameters achieved  $\hat{R} < 1.01$ , indicating successful chain convergence, with good to excellent sampling efficiency (effective sample size ratios ranging from 0.51 to 0.74). Trace plots showed good mixing across chains with no signs of autocorrelation or trending; posterior predictive checks (Fig. S4) confirmed excellent fit for the skew-normal specification for outcome distributions, with 98.5% of observed values falling within the 95% posterior predictive interval. Bayesian  $R^2$  indicated that the fully specified models explained approximately 36.1% and 38.0% of variance in the two outcomes, respectively. These results lend much confidence to our central finding: among sociopsychological predictors of collective action, moral outrage most reliably predicts extreme commitment in this sample of armed actors.



**Fig. 1 | Posterior density plots for predictors of extreme commitment.** Shaded areas mark the 95% credible intervals around the posterior means of the standardised coefficients for the three tested predictors of rebels' (a) willingness to fight and die and (b) willingness to make costly sacrifices. The dotted vertical line indicates a null effect; densities lying mostly to the right of this line denote a high posterior probability of a positive association with dependent variables.

## Study 2 Results

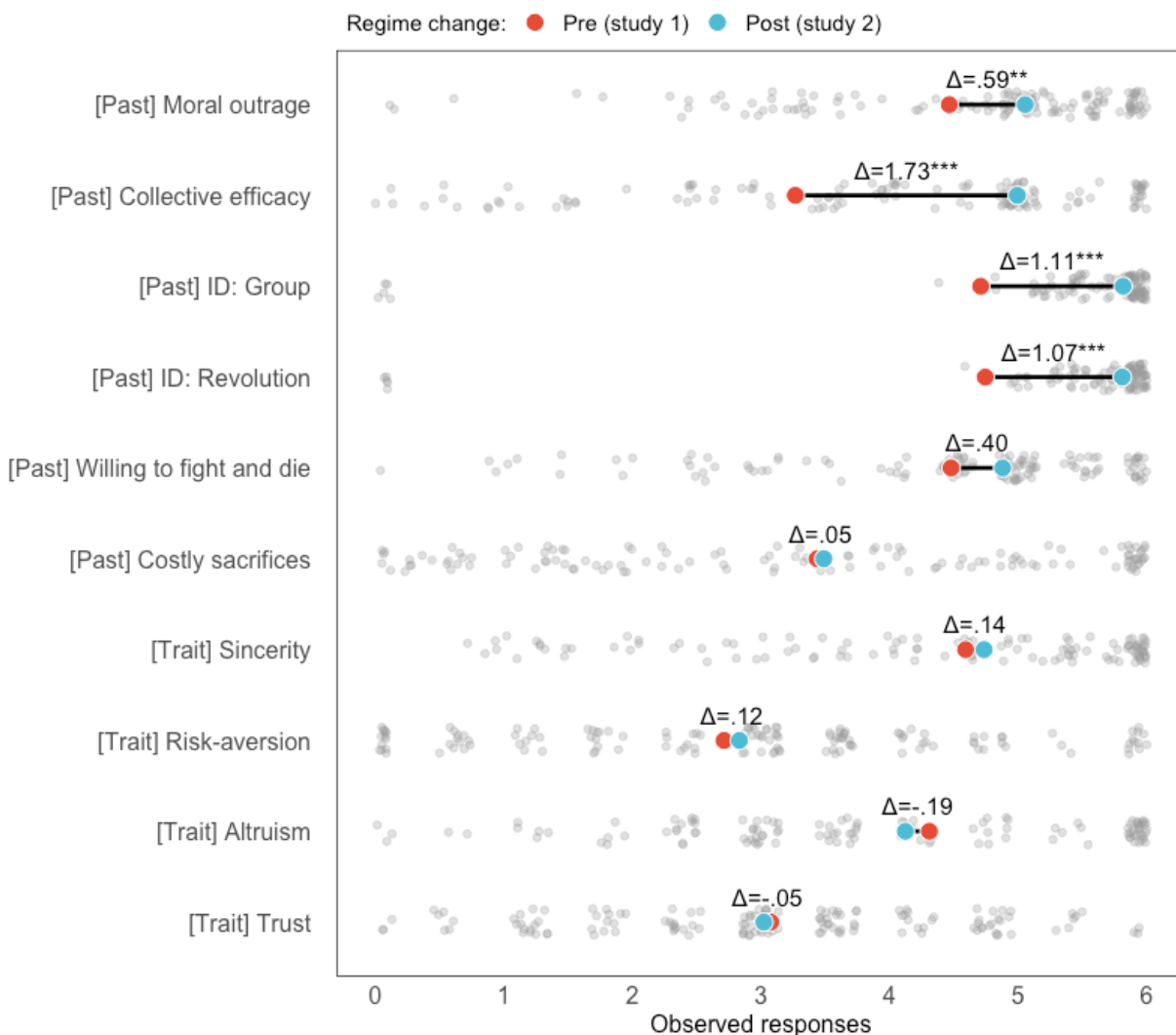
### Sample comparisons

Following study 1 results, we sought to test the same hypotheses in the second wave of the data collection. However, the sudden rebel offensive and fall of the Assad regime in December 2024 introduced a momentous political transformation for combatants and the broader Syrian society, warranting cautious examination of potential implications for the study data. The key variables were not expected to change conceptually, as the items were designed to capture retrospective assessments anchored to combatants' initial engagement ('Before I was an active fighter,...'; 'When I was an active fighter,...') rather than their current perceptions; moreover, both studies used equivalent eligibility criteria and procedures, and samples did not differ across sociodemographic characteristics (Table S1). Contrary to this expectation, responses differed significantly between samples across all three predictors (Fig. 2). Specifically, study 2 participants gave notably higher retrospective reports of collective efficacy. Identification—both with the specific fighting group and the revolution as a whole—similarly experienced upward shifts, such that majorities of participants now indicated maximal identification ('identity fusion'; Gómez et al., 2011) with the group (63.3%) and the revolution (49.4%). This ceiling effect is problematic for our analysis in study 2: Because a large share of respondents placed themselves at the very top of the identity scale, the data captures fewer real differences in identity attachment between individuals. In statistical terms, variance in both identification measures was artificially suppressed from  $SD = 0.76$  in study 1 to  $SD = 0.10$  in study 2 (identical SD decline). Moral outrage also moderately shifted upwards, but notably less extremely.

A plausible social mechanism for these changes in retrospective self-reports is that victory redefined the meaning of affiliation with the revolutionary opposition. Before the offensive, some fighters may have been detached, ambivalent, semi-inactive, or embarrassed by stagnant and reputationally degraded factions. After the movement has proven successful, however, association with those factions carried a different meaning: honour, success, gratitude, and public approval. This may have made respondents more willing to identify with the winning side and to remember stronger prior loyalty than they had reported, or perhaps even felt, before the offensive.

To confirm these differences were not random, we conducted placebo tests: in 10,000 group permutations randomly drawn from the combined dataset (studies 1 and 2), the likelihood of generating the observed mean differences was calculated at  $p < 0.01$  across all predictors (see Fig. S6). Moreover, as Figure 2 shows, several other retrospective and current psychometric measures with less political connotation showed no between-sample divergence; instead, differences were limited to sociopolitical and psychological attitudes directly related to participants' involvement in the revolution. We interpret this as strong evidence that the successful overthrow of the Assad regime indeed introduced significant retrospective attitude updating in combatants' self-reports despite explicit temporal anchoring in measurement items. Study 2 results should thus be interpreted more cautiously compared to study 1.





**Fig. 2 | Retrospective attitude updating introduced with the fall of Assad's regime in Syria.** Red and blue markers indicate mean responses in study 1 ( $n = 71$ ) and study 2 ( $n = 79$ ), respectively sampled pre- and post-regime change in December 2024; grey dots indicate raw participant scores. Presented here are retrospective attitudinal measures from the main analysis and several comparison measures, all of which would be assumed as time-invariant because they represent either retrospective attitudes at the time of first joining an armed group [Past] or stable psychological characteristics [Trait]. While cross-study responses were stable for trait-like measures, statistically significant differences emerged for key attitudinal predictors (shown as  $\Delta$ ; based on two-tailed t-tests, each  $N = 150$ , \*\*\*  $p < 0.001$ , \*\*  $p < 0.01$ , \*  $p < 0.05$ ). Random effects driving these differences are ruled out in Fig. S6.



## Main analysis

Repeating the baseline estimation model from study 1, we again examined the three main predictors, with full results reported in [Table S7](#). For the primary outcome, combatants' willingness to fight and die, moral outrage retained a statistically significant but attenuated predictive effect ( $d = 0.24$ ), and the null finding for collective efficacy was confirmed, controlling for sociodemographic characteristics. For the secondary outcome of costly sacrifice however, this pattern was reversed: moral outrage showed a negligible effect ( $d = 0.13$ ), and collective efficacy emerged as a significant predictor for the first time ( $d = 0.34$ ). In addition, both outcomes were strongly associated with group identification ( $d = 0.46$  and  $d = 0.48$ , respectively). Despite adequate statistical power ([Table S2](#)), these findings require cautious interpretation in light of retrospective attitude updating detected in the study 2 sample. Especially the predictive effect of group identification is likely to be artificially inflated due to low variance. Similarly, the upward shift in retrospective efficacy following the fall of the regime may have distorted its relationship with participants' readiness for costly sacrifice. In line with the analytical strategy (see [Methods](#)), we therefore turn to exploratory comparisons between individuals more and less affected by the changed political situation in study 2.

## Exploring replication among heterogeneous samples of combatants

The samples include both former and active combatants in Syria. Although the political transformation following the collapse of the Assad regime had wide-ranging repercussions, changes to the psychological justifications for extreme commitment may have been stronger among those who actively fought in the offensive that precipitated regime change. Indeed, the two predictors with the largest retrospective attitude updating—perceived efficacy and group identification—seem especially susceptible: For combatants, the offensive represented a sudden and decisive victory after 14 years of brutal civil war and growing frustration with the revolution's failure to achieve its goals (Chulov, 2016). We coded participants' involvement in the offensive based on qualitative responses of their fighting history (see [Supplementary Material S8](#). In study 2, 55 participants (69.6%) were active in one of the armed groups during this period. [Table 3](#) reports predictive effect estimates for this group compared to inactive combatants in, as well as for the pre-offensive study 1 sample. Among inactive fighters, the original results pattern from the main analysis (study 1) was replicated: moral outrage predicted willingness to fight and die ( $d = 0.41$ ) and costly sacrifice ( $d = 0.26$ ), with near-zero effects for collective efficacy ( $d = 0.01$  and  $d = 0.03$ , respectively). Identification continued to show very large effects in this subgroup; by contrast, the effect for collective efficacy observed in the full study 2 sample appeared to be driven entirely by active fighters, who also displayed large identity associations with both outcomes.

For a more robust hypothesis test with sufficient statistical power, we repeated the estimation models in a combined sample comprising all combatants who had not fought in

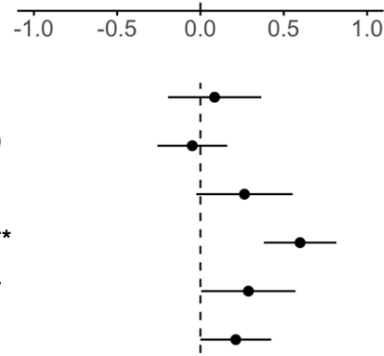
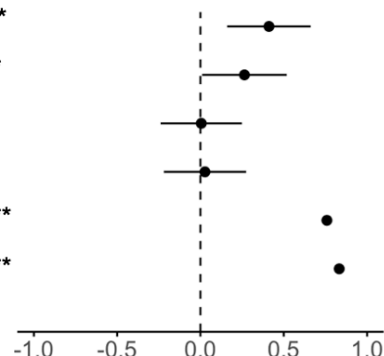
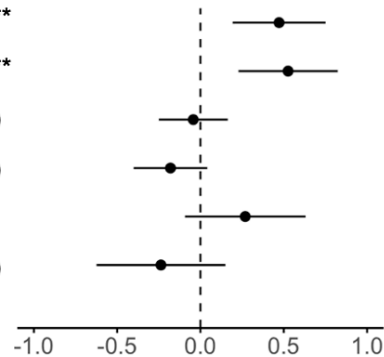
the offensive (i.e. the study 1 sample plus inactive participants in study 2). As reported in [Table S7](#), this pooled analysis confirmed strong and reliable overall effects of moral outrage on willingness to fight and die ( $d = 0.49$ ) and costly sacrifice ( $d = 0.55$ ), with no effects of collective efficacy or group identification.

- 5 Finally, in [Supplementary Material S8](#), we report structural equation modelling to directly test the SIMCA and EMSICA models in their original forms (Thomas et al., 2012; van Zomeren et al., 2008). Both models showed sufficient sample size-to-parameters ratios and met conventional thresholds for model fit for the outcomes willingness to fight and die (for SIMCA,  $CFI = 0.976$ ;  $SRMR = 0.046$ ; for EMSICA,  $CFI = 0.998$ ,  $SRMR = 0.029$ ) and costly  
10 sacrifice (for SIMCA,  $CFI = 0.971$ ;  $SRMR = 0.047$ ; for EMSICA,  $CFI = 0.986$ ,  $SRMR = 0.043$ ), while only EMSICA satisfied guidelines for TLI and RMSEA in the data. Overall, the models support the central finding: Moral outrage, but not efficacy and identity, were the key predictor of extreme commitment to high-cost political action, even when accounting for theoretically justified interactions between these pathways.

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**Table 3 | Estimated effects of sociopsychological predictors of fighter engagement.** Coefficients represent standardised linear estimates (OLS). All models include for age, education level, socioeconomic status and religiosity as individual-level covariates. FD = willingness to fight and die. CS = costly sacrifices. Standard errors in parentheses and \*\*\* $p < 0.001$ , \*\* $p < 0.01$ , \* $p < 0.05$ .

| IV                        | DV | Effect size (standard errors) | Obs | R <sup>2</sup> |
|---------------------------|----|-------------------------------|-----|----------------|
| <b>Study 1</b>            |    |                               |     |                |
| Moral outrage             | FD | 0.472 (0.139)***              | 68  | 0.498          |
| Moral outrage             | CS | 0.526 (0.149)***              | 68  | 0.420          |
| Collective Efficacy       | FD | -0.043 (0.103)                | 68  | 0.498          |
| Collective Efficacy       | CS | -0.180 (0.111)                | 68  | 0.420          |
| Group identification      | FD | 0.269 (0.181)                 | 68  | 0.498          |
| Group identification      | CS | -0.237 (0.194)                | 68  | 0.420          |
| <b>Study 2 (inactive)</b> |    |                               |     |                |
| Moral outrage             | FD | 0.411 (0.118)**               | 23  | 0.803          |
| Moral outrage             | CS | 0.264 (0.120)*                | 23  | 0.798          |
| Collective Efficacy       | FD | 0.005 (0.115)                 | 23  | 0.803          |
| Collective Efficacy       | CS | 0.027 (0.117)                 | 23  | 0.798          |
| Group identification      | FD | 0.759 (0.118)***              | 23  | 0.803          |
| Group identification      | CS | 0.833 (0.120)***              | 23  | 0.798          |
| <b>Study 2 (active)</b>   |    |                               |     |                |
| Moral outrage             | FD | 0.085 (0.139)                 | 55  | 0.213          |
| Moral outrage             | CS | -0.049 (0.105)                | 55  | 0.554          |
| Collective Efficacy       | FD | 0.264 (0.144)                 | 55  | 0.213          |
| Collective Efficacy       | CS | 0.598 (0.108)***              | 55  | 0.554          |
| Group identification      | FD | 0.288 (0.141)*                | 55  | 0.213          |
| Group identification      | CS | 0.212 (0.106)                 | 55  | 0.554          |



Treatment Effect

## Discussion

People willing to fight, kill and die for collective causes with seemingly no regard to their self-interests have long puzzled the social sciences. One popular assumption is that of violence as a predominantly strategic means, that is, that combatants engage or disengage from political violence according to its perceived efficacy in achieving the desired goals.

In one of the first tests of psychological collective action models (SIMCA and EMSICA) during active civil war, we report evidence that challenges this instrumental view of high-risk engagement. Among late-conflict opposition combatants in northwest Syria—individuals who had already demonstrated their willingness and capability to engage in revolutionary violence—extreme individual commitment was not proximally driven by beliefs about the collective efficacy or group identification. Instead, moral outrage tied to perceived collective injustices emerged as a reliable and strong proximal predictor of commitment. We confirmed this central finding across multiple analyses accounting for modest sample sizes, including both frequentist and Bayesian testing; mediation tests further revealed that moral outrage fully mediated the effects of group identity. This finding should be interpreted narrowly: while robust in our data, the lack of direct explanatory power of group identification may reflect the late-stage conditions of the Syrian civil war, which involved deep fragmentation of the opposition movement, reduced legitimacy, and thus weakening individual attachment, rather than suggesting that social identities were unimportant across mobilisation more broadly.

A second study sample collected in 2025 following the fall of the Assad regime in Syria showed significant retrospective attitude updating, which complicated a like-for-like comparison of the measures and relationships (particularly for the role of identification, which had near-zero variance due to ceiling effects). Nonetheless, the original pattern for moral outrage and efficacy was replicated in exploratory tests among the subsample of combatants who did not participate in the offensive that likely caused this shift in retrospective perceptions.

These findings have meaningful implications for theory and practice. Sociopsychological models of collective action have demonstrated robust injustice, identity and efficacy pathways towards moderate forms of political protest in democratic contexts. Suggesting that high-risk political action in settings of violent conflict appears primarily driven by moral outrage motives, this study joins a number of previous works from other contexts (e.g., Ayanian et al., 2021; Fiske & Rai, 2014; Nussio, 2025; van Stekelenburg, 2017). In addition, existing efforts for conflict resolution often rest on assumptions of instrumental rationality, implying that armed actors may be persuaded by economic incentives, deterred through military pressure, or negotiated with over material interests. While these assumptions appear adequate in many cases, increasing evidence such as from this research points to alternative strategies focusing on moral reasoning and symbolic engagement (see also Atran & Axelrod, 2008; Eswaran & Neary, 2021; Schraml, 2024).

If moral outrage remains a salient and powerful proximal motive for extreme commitment even when perceptions of instrumental efficacy have collapsed – as was the case by the time study 1 was conducted – then disengagement and stabilisation efforts cannot rely only on instrumental incentives such as money, coercion, deterrence, or material bargaining. They also, and perhaps primarily, need to address humiliation, betrayal, injustice, and symbolic legitimacy.

Finally, our findings also offer important methodological insights for field research in volatile contexts. The unexpected regime change during the data collection created a unique natural experiment in which approximately half of the survey interviews coincidentally happened before or after this time. This allowed for a rare quantitative demonstration that major exogenous events can not only shift attitudes not only in the present or future-oriented, but also retroactively, reshaping how participants narrated and construe their prior commitments to a political movement. For researchers working with sensitive measures in hard-to-reach populations, this should serve as a reminder to emphasise a temporally-contextual interpretation of their measures and results, especially when dealing with self-reported data.

Related to this insight, we identify a number of technical limitations of this work. First, because the evidence comes from a late-war, SNA-weighted sample, our findings on the motivational drivers of political action are most applicable to fragmented, low-efficacy (“frozen”) conflict settings, with only careful generalisation to mobilisation processes more broadly (note, however, that recent research has found equivalent patterns in separate contexts; e.g., Mallock et al., 2026). As described above, these studies also took place right before and after a major unanticipated victory that fundamentally affected attitudes. We argue that this strengthens the quality of our dataset rather than diminishing it, but it should lead to a more narrow interpretation that invites further replication work.

Another avenue for future study stems from our the cross-sectional study design, which prevents us from firmly establishing temporal sequences and causal directions, a general concern in the collective action literature. Longitudinal research, while challenging in comparable field contexts, could offer meaningful extensions of this work. Our focus on individual psychological factors also does not negate the importance of structural social conditions that have been explored previously (e.g., Shaery-Yazdi & Ümit Üngör, 2022). Similarly, while moral outrage appears to be a powerful intrinsic motive, armed groups are known to employ sophisticated recruitment strategies, ideological persuasion, and social pressure that may interact with individual moral psychology. Research on these complex dynamics will provide substantial refinements to the study of high-risk collective action.

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## Supplementary Material

**Supplementary Table S1 | Sociodemographic characteristics of study samples.** <sup>A</sup>Age was measured as a continuous variable and binned here for simplicity. <sup>B</sup>Reported active fighter status during the offensive in December 2024 that cause the overthrow of the Assad regime; study 1 data was collected before these events. <sup>C</sup>Subjective socioeconomic status.

5

| Variables                            | Total      |              | Study 1 (2024) |              | Study 2 (2025) |              |
|--------------------------------------|------------|--------------|----------------|--------------|----------------|--------------|
|                                      | <i>n</i>   | %            | <i>n</i>       | %            | <i>n</i>       | %            |
| <b>Total</b>                         | <b>150</b> | <b>100.0</b> | <b>71</b>      | <b>100.0</b> | <b>79</b>      | <b>100.0</b> |
| <b>Gender</b>                        |            |              |                |              |                |              |
| Male                                 | 143        | 95.3         | 67             | 94.4         | 76             | 96.2         |
| Female                               | 2          | 1.3          | 1              | 1.4          | 1              | 1.3          |
| Other/NA                             | 5          | 3.3          | 3              | 4.2          | 2              | 2.5          |
| <b>Age<sup>A</sup></b>               |            |              |                |              |                |              |
| 18–27 years                          | 17         | 11.3         | 7              | 9.9          | 10             | 12.7         |
| 28–37 years                          | 87         | 58.0         | 47             | 66.2         | 40             | 50.6         |
| 38–47 years                          | 39         | 26.0         | 13             | 18.3         | 26             | 32.9         |
| ≥48 years                            | 4          | 2.7          | 1              | 1.4          | 3              | 3.8          |
| NA                                   | 3          | 2.0          | 3              | 4.2          | 0              | 0.0          |
| <b>Education level</b>               |            |              |                |              |                |              |
| No basic education                   | 11         | 7.3          | 8              | 11.3         | 3              | 3.8          |
| Primary education                    | 16         | 10.7         | 10             | 14.1         | 6              | 7.6          |
| Secondary education                  | 48         | 32.0         | 17             | 23.9         | 31             | 39.2         |
| Undergraduate                        | 58         | 38.7         | 27             | 38.0         | 31             | 39.2         |
| Master or PhD                        | 9          | 6.0          | 5              | 7.0          | 4              | 5.1          |
| Still studying                       | 7          | 4.7          | 4              | 5.6          | 3              | 3.8          |
| Other/NA                             | 1          | 0.7          | 0              | 0.0          | 1              | 1.3          |
| <b>Nationality</b>                   |            |              |                |              |                |              |
| Syrian                               | 145        | 96.7         | 68             | 95.8         | 77             | 97.5         |
| Other/NA                             | 5          | 3.3          | 3              | 4.2          | 2              | 2.5          |
| <b>Marital status</b>                |            |              |                |              |                |              |
| Single                               | 14         | 9.3          | 8              | 11.3         | 6              | 7.6          |
| Married                              | 121        | 80.7         | 49             | 69.0         | 72             | 91.1         |
| Widowed                              | 4          | 2.7          | 4              | 5.6          | 0              | 0.0          |
| Separated                            | 1          | 0.7          | 1              | 1.4          | 0              | 0.0          |
| Divorced                             | 10         | 6.7          | 9              | 12.7         | 1              | 1.27         |
| Other/NA                             | 0          | 0.0          | 0              | 0.0          | 0              | 0.0          |
| <b>12/2024 Offensive<sup>B</sup></b> |            |              |                |              |                |              |
| Active fighter status                | -          | -            | -              | -            | 55             | 69.6         |
| Did not participate                  | -          | -            | -              | -            | 24             | 30.4         |
| No. of children (mean)               | 3.2        | -            | 3.7            | -            | 2.9            | -            |
| SES (1-10, mean) <sup>C</sup>        | 3.7        | -            | 3.2            | -            | 4.2            | -            |

**Supplementary Table S2 | Model-level statistical power and effect size metrics.**

For each regression model reported in the analysis, the table reports the number of predictors ( $k$ ), model fit ( $R^2$ ), omnibus model power (two-tailed,  $\alpha = 0.05$ ) from the overall F-test, the minimum detectable effect (MDE) for any single 1-df predictor at 80% power, and the actual observed effect ( $f^2$ ) for the central predictor in the results, moral outrage. Omnibus power reflects the ability to detect the combined effect of all predictors, while MDE and  $f^2$  indicate sensitivity and observed effect sizes, respectively.

| Ref.     | Model    | Sample  | DV | N  | k | $R^2$ | Omni | MDE | $f^2$ |
|----------|----------|---------|----|----|---|-------|------|-----|-------|
| Table 2  | 1a (OLS) | Study 1 | FD | 71 | 3 | .451  | 1    | .12 | .19   |
|          | 1b (OLS) | Study 1 | FD | 68 | 7 | .498  | 1    | .13 | .19   |
|          | 2a (OLS) | Study 1 | CS | 71 | 3 | .270  | .993 | .12 | .15   |
|          | 2b (OLS) | Study 1 | CS | 68 | 7 | .420  | 1    | .13 | .21   |
| Table S7 | 3 (OLS)  | Study 2 | FD | 78 | 6 | .287  | .991 | .11 | .07   |
|          | 4 (OLS)  | Study 2 | CS | 78 | 6 | .383  | 1    | .11 | .02   |
|          | 5 (OLS)  | Comb    | FD | 91 | 6 | .400  | 1    | .09 | .18   |
|          | 6 (OLS)  | Comb    | CS | 91 | 6 | .312  | .999 | .09 | .20   |

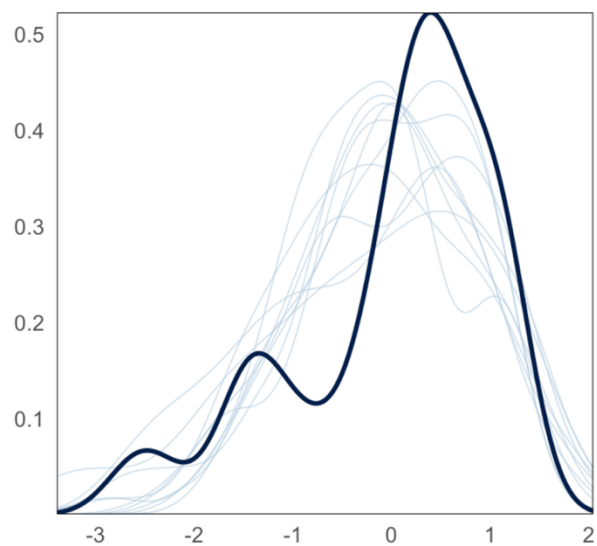
**Supplementary Table S3 | Posterior summaries for Bayesian model predictors.** Reported are the posterior mean, standard error (SE), and 95% credible intervals for each standardised predictor, along with the posterior probability that the effect is positive  $P(\beta > 0)$ . Model 1b DV = Willingness to fight and die. Model 2b DV = Costly sacrifices. All estimates are from a Bayesian regression model using a skew-normal likelihood. <sup>1</sup>Covariates include age, education level, religiosity, and subjective socioeconomic status.

| Model | Coefficient                   | Mean   | SE    | [95% Cred. Interval] |       | $P(\beta > 0)$ |
|-------|-------------------------------|--------|-------|----------------------|-------|----------------|
| (1b)  | Moral outrage                 | 0.328  | 0.149 | 0.071                | 0.647 | 0.995          |
|       | Collective efficacy           | -0.050 | 0.097 | -0.239               | 0.139 | 0.296          |
|       | Group identity                | 0.237  | 0.161 | -0.092               | 0.549 | 0.928          |
|       | Model covariates <sup>1</sup> | Yes    | –     | –                    | –     | –              |
|       | Intercept                     | -0.406 | 0.633 | -1.672               | 0.800 | 0.260          |
| (2b)  | Moral outrage                 | 0.452  | 0.163 | 0.135                | 0.768 | 0.997          |
|       | Collective efficacy           | -0.160 | 0.111 | -0.381               | 0.055 | 0.073          |
|       | Group identity                | -0.136 | 0.209 | -0.547               | 0.271 | 0.259          |
|       | Model covariates <sup>1</sup> | Yes    | –     | –                    | –     | –              |
|       | Intercept                     | -0.648 | 0.712 | -2.070               | 0.704 | 0.182          |

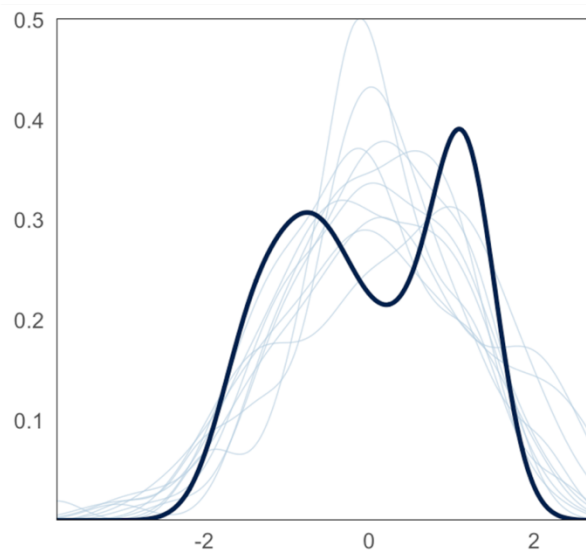
**Supplementary Figure S4 | Bayesian posterior predictive checks (study 1).**

The plot overlays the observed distribution of **(a)** willingness to fight and die and **(b)** willingness to make costly sacrifices, with simulated data drawn from the respective posterior predictive distribution. Close alignment indicates that the Bayesian regression model with a skew-normal likelihood adequately captures the shape and skew of the observed data.

**a** Willingness to fight & die



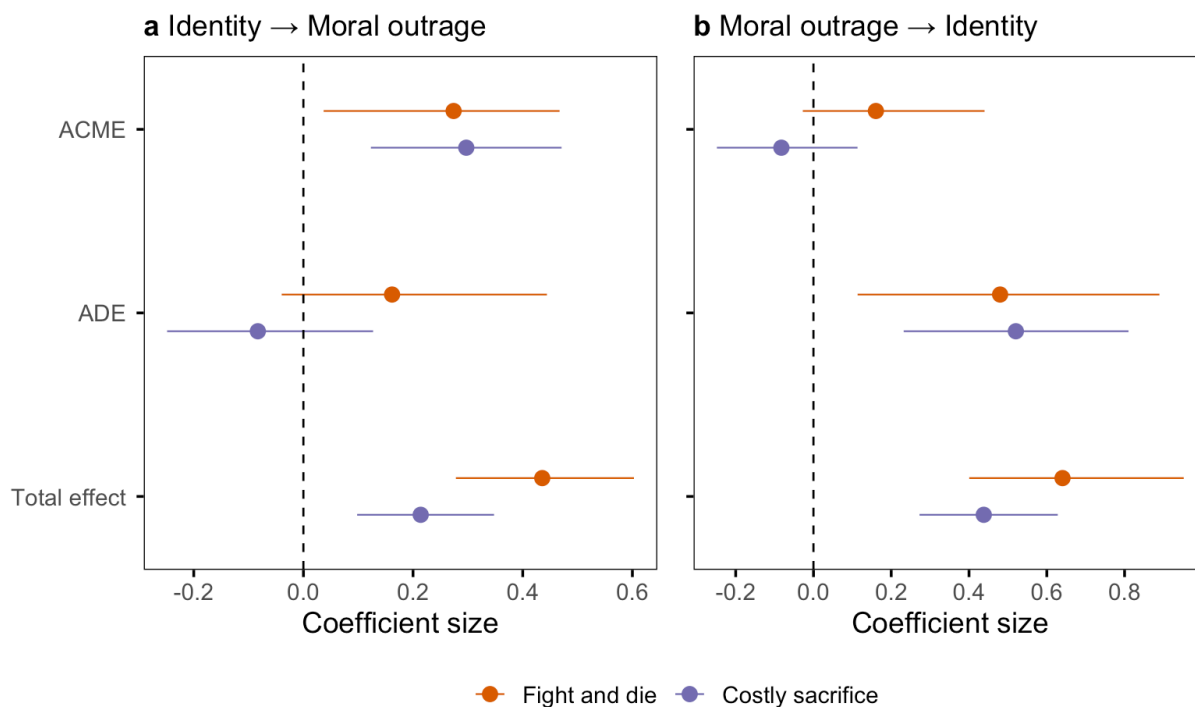
**b** Costly sacrifices





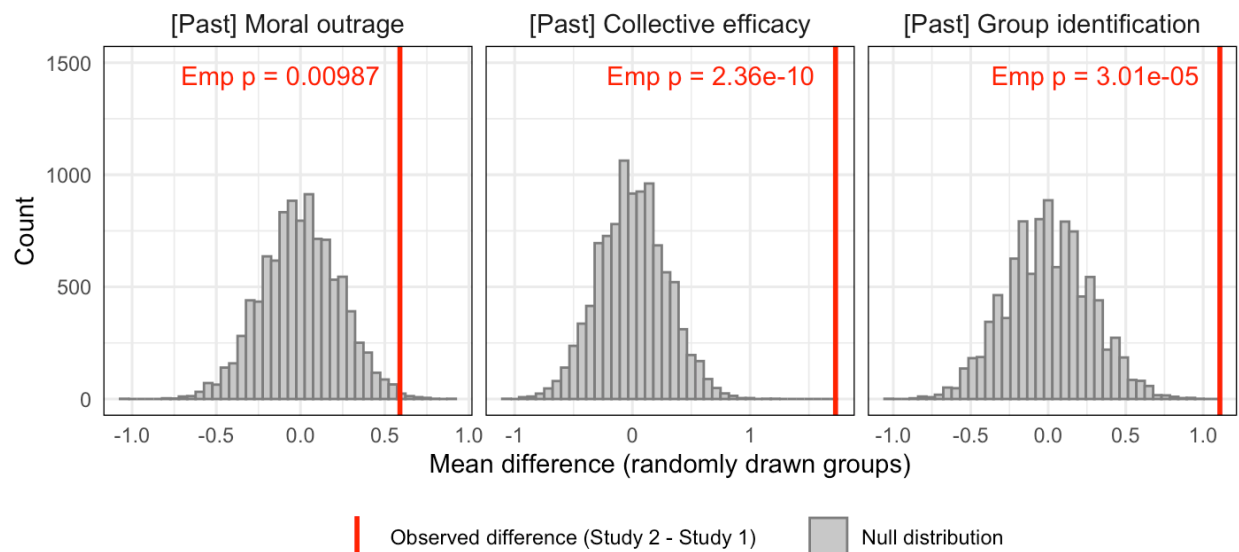
# Supplementary Figure S5 | Mediation test: identity vs. moral outrage.

Average causal mediation effects (ACME), average direct effects (ADE), and total effects are shown for the two dependent variables. **a**, Full mediation pathway confirmed from group identification through moral outrage (mediator). **b**, Mediation pathway rejected from moral outrage through group identification (mediator). Coefficient estimates are based on bootstrapped simulations (1,000 iterations), with 95% confidence intervals shown.



**Supplementary Figure S6 | Permutation-based placebo tests for response differences observed in retrospective self-reports (study 2).**

For three key independent variables, the grey histogram shows the null distribution of mean differences obtained from 10,000 random permutations of groups drawn from the overall dataset, keeping group sizes fixed ( $n_1 = 71$  vs.  $n_2 = 79$ ). The vertical red line indicates the observed mean difference between study 2 and study 1 samples (as per Fig. 2), respectively measured post- and pre-regime change in Syria in December 2024. This threshold is compared to the null distribution to compute the shown permutation p-values (Emp p), representing the proportion of placebo replications where the absolute mean difference was equal or greater than the true observed difference between samples. All Emp  $p < 0.01$ , confirming significant retrospective attitude updating in study 2 retrospective self-reports introduced by the fall of the Assad regime in Syria.



**Supplementary Table S7 | Regression results for study 2 and combined sample.**

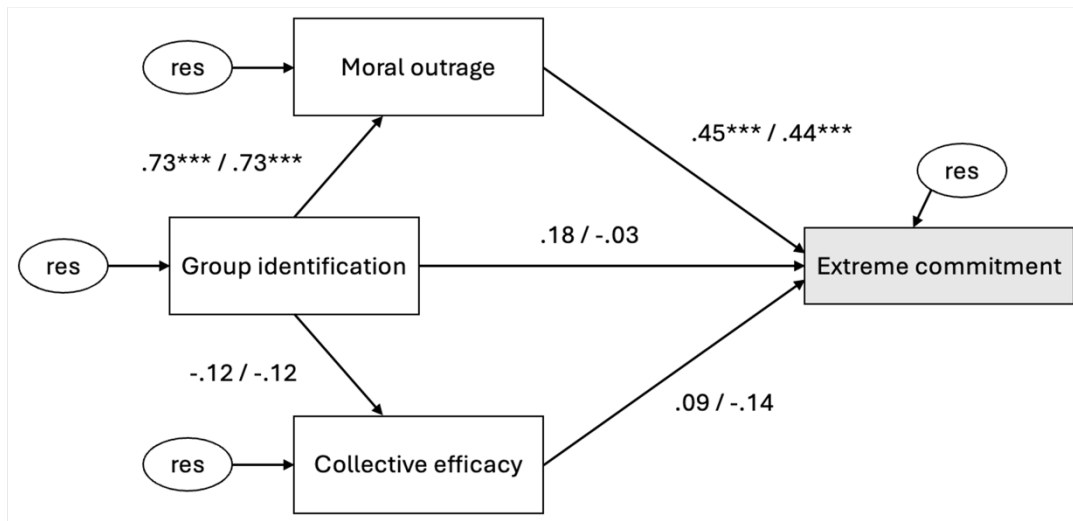
Coefficients represent standardised OLS estimates of dependent variables. <sup>A</sup>Combined sample of all fighters who were not involved in the December 2024 offensive that overthrew the Assad regime in Syria at the time of data collection, that is, the study 1 sample and respondents in study 2 who left their active fighter role before the offensive. FD = willingness to fight and die. CS = costly sacrifices. Standard errors in parentheses and \*\*\*p<0.001, \*\*p<0.01, \*p<0.05.

| Sample               | Study 2             |                     | Not part of offensive <sup>A</sup> |                     |
|----------------------|---------------------|---------------------|------------------------------------|---------------------|
| Dependent variable   | FD                  | CS                  | FD                                 | CS                  |
| Moral outrage        | 0.236*<br>(0.105)   | 0.132<br>(0.101)    | 0.488***<br>(0.125)                | 0.548***<br>(0.135) |
| Collective efficacy  | 0.132<br>(0.109)    | 0.339**<br>(0.104)  | 0.025<br>(0.090)                   | -0.151<br>(0.097)   |
| Group identification | 0.461***<br>(0.102) | 0.476***<br>(0.097) | 0.193<br>(0.128)                   | -0.107<br>(0.137)   |
| Socioeconomic status | -0.165<br>(0.107)   | 0.020<br>(0.103)    | -0.171+<br>(0.091)                 | -0.235*<br>(0.098)  |
| Age                  | -0.010<br>(0.014)   | -0.011<br>(0.014)   | 0.000<br>(0.017)                   | 0.013<br>(0.018)    |
| Education            | 0.039<br>(0.099)    | 0.017<br>(0.095)    | 0.136+<br>(0.076)                  | -0.032<br>(0.081)   |
| Constant             | 0.287<br>(0.548)    | 0.340<br>(0.524)    | -0.289<br>(0.580)                  | -0.295<br>(0.622)   |
| Observations         | 78                  | 78                  | 91                                 | 91                  |
| R2                   | 0.287               | 0.383               | 0.400                              | 0.312               |

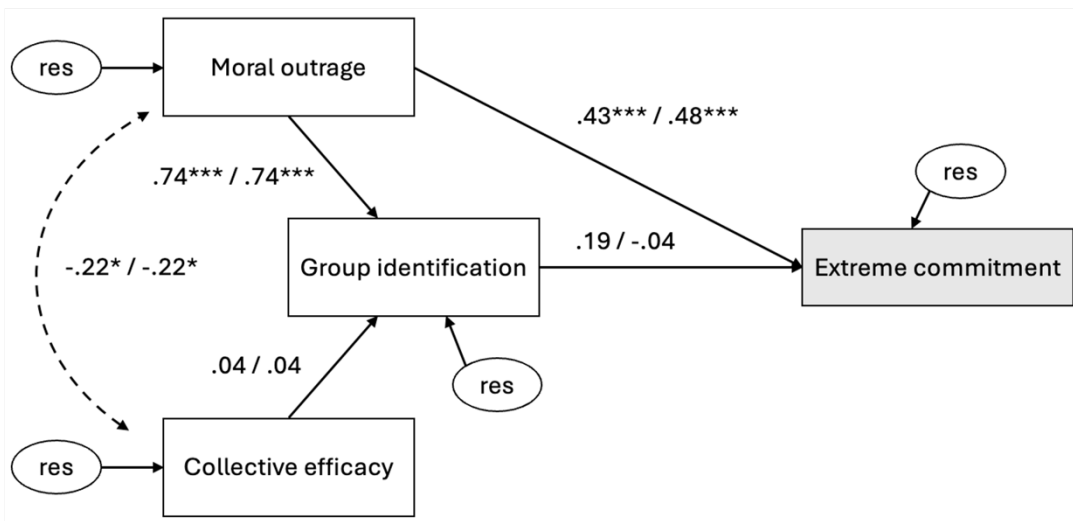
# Supplementary Material S8 | Structural equation modelling (SEM) results for combined sample

We conducted exploratory analysis to directly test the SEM models of **(a)** SIMCA and **(b)** EMSICA in the combined study dataset of combatants that did not participate in the anti-regime offensive in Syria in 2024 ( $n = 95$ ). Models were estimated using maximum likelihood with robust standard errors (MLR) to address non-normality. Standardised path coefficients shown based on 1,000 replications. The values for willingness to fight and die are to the left of the oblique, and costly sacrifice on the right. \*\*\* $p < 0.001$ , \*\* $p < 0.01$ , \* $p < 0.05$ .

**a**



**b**



# Supplementary Material S8 | continued

Both models showed sufficient fit based on conventional indices (chi-square non-significance test;  $CFI > .90$ ;  $RMSEA < .08$ ;  $SRMR < .08$ ), except for RMSEA, which is known to overestimate misfit for small N (Kenny et al., 2014). The sample size-to-parameter ratio (N:k) exceeded conventional guidelines ( $\geq 5:1$ ) and even conservative recommendations ( $\geq 10:1$ ). The good model fit, especially for EMSICA, was driven by strong positive effects of moral outrage, while efficacy and identity parameters were not confirmed.

| SEM | DV | $\chi^2$ | p     | CFI   | TLI   | RMSEA | SRMR  | N:k  |
|-----|----|----------|-------|-------|-------|-------|-------|------|
| (a) | FD | 3.68     | 0.055 | 0.976 | 0.855 | 0.168 | 0.046 | 11.9 |
| (a) | CS | 3.68     | 0.055 | 0.971 | 0.829 | 0.168 | 0.047 | 11.9 |
| (b) | FD | 1.24     | 0.266 | 0.998 | 0.987 | 0.05  | 0.029 | 10.6 |
| (b) | CS | 2.30     | 0.129 | 0.986 | 0.917 | 0.117 | 0.043 | 10.6 |