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When the lens is too wide: the political consequences of the visual dehumanization of refugees

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Abstract

Photojournalistic images shape our understanding of sociopolitical events. How humans are depicted in images may have far-reaching consequences for our attitudes towards them. Here, we focus on the visual depiction of refugees to understand how exposure to the dominant visual framing used in the media, depicting them in large groups of faceless individuals, affects their dehumanization and sets off political consequences. To that end we brought together insights from social psychology, social sciences and the humanities to test a range of hypotheses using methods from social and political psychology. Seeing images of large groups may result in greater implicit dehumanization compared with images depicting small groups. Moreover, after viewing images of large groups, participants showed increased preference for more dominant, less trustworthy political leaders and supported less pro-refugee policies and more anti-refugee policies. Lastly, the extent to which participants felt reduced pity for images depicting large groups mediated the effect of visual framing on the choice of more authoritarian leaders. *What we see in the media and how it is shown has attitudinal, behavioural as well as political consequences.*

Keywords: dehumanization, media, news images, outgroups, photojournalism, politics, refugees, visual framing, visual politics

Introduction

Images in their many different forms, from paintings to photography and beyond, have always been powerful cultural agents. Their performative power has been extensively discussed across disciplines, from art history¹, history of emotions² to media studies^{3,4}, and more recently political sciences⁵. The advent of photojournalism endowed photographs with substantial political power due to their capacity to *frame* reality through the lens, to determine which themes are made visible or not, and to become political forces themselves as they shape our perception of the socio-political events. For instance, Western audiences knew about the Abu Ghraib tortures as news articles were published long before the publication of photographic documentation in 2004 that eventually shifted public opinion⁶. Similarly, in the Syrian refugee crisis that started in 2011, the journeys of thousands of refugees fleeing their home country to cross the Mediterranean were widely documented in Western media. However, it was the photograph of the drowned 3-year-old Alan Kurdi, washed up on a Turkish beach on September 2nd 2015, that prompted international responses, the EU's change of policy on refugees⁷ and a 10-fold increase in donations⁸. The two aforementioned examples highlight the political capacity of 'iconic' images that predominantly depict identifiable victims. Social psychology has described the 'identifiable victim effect' in detail^{9,10}, whereby we engage in more pro-social ways (e.g. increased charity donations¹¹) when textual and visual information concern the suffering of a single individual rather than that of large groups. But are these the kind of images that we most commonly see in the media?

In the context of the refugee crisis, analysis of mainstream media in Australia¹², UK¹³, US and Germany¹⁴ suggest that the majority of images depict refugees in a specific visual framing that is strikingly different from that of the 'identifiable victim'. Refugees are typically depicted in medium to large groups, without recognizable facial features, and medium-to-long distance camera shots^{12,15}. Given that the majority of images shown in the media are not of identifiable victims, what are the consequences of exposing audiences to photographs of large groups?

This question is timely and crucial for societal and scientific reasons. The impact of certain visual framings may be even more pronounced at times of crisis when the number of images displayed in the news almost doubles³. Understanding how dominant visual framings of large groups, rather than the rare depiction of identifiable victims, operate psychologically can explain how our societies respond during crises or fail to do so. While, from a scientific

perspective, the prosocial effects of exposure to identifiable victims¹⁶ alongside the psychic numbing following exposure to the suffering of many¹¹ are widely documented, the potentially adverse effects that the exposure to the dominant visual frames used by the media may have on people's attitudes and behavior remains poorly understood. Exposure to images of large groups may either be ineffective (e.g. elicit numbing) without consequential actions or alternatively they can alter people's dehumanizing attitudes *and* their political behavior.

Here we go beyond the well-known identifiable victim ¹⁶ and the psychic numbing¹¹ effects to test for the first time, across eight main studies and two supplementary studies on European citizens, a series of hypotheses derived from social sciences, media studies and humanities, with methods from social and political psychology. First, we investigated if and how exposure to the dominant visual framings used in the media impacts the viewers' attitudes and their political behaviour towards refugees. Social sciences have suggested that the dominant way of portraying refugees in large groups is inhumane, as it diminishes the perceived vulnerability of the refugees^{10,12,17} and emphasizes the security risks of refugee crises^{12,18}, rather than the humanitarian emergency. We, therefore, set out to investigate whether these dominant depictions lead to the dehumanization of refugees in the eyes of the beholders, in other words, the perception of them as lacking, or possessing to a lesser extent uniquely human traits¹⁹, alongside other groups (e.g. homeless²⁰, Black-Africans²¹, Arabs²², survivors of natural disasters²³, immigrants²⁴⁻²⁶). We hypothesized that exposing audiences to images of large groups of refugees, as opposed to small groups of refugees, would result in greater implicit dehumanization. Second, and in addition to the general hypothesis concerning the dominant visual framing of large groups, certain visual narratives used to depict refugees may also contribute to their dehumanization. One of the most striking depictions of the refugees' journeys has been their crossing of the Mediterranean Sea, showing them in a sea context, being rescued or having drowned. Social sciences have proposed that the visual and linguistic²⁷ portrayal of refugees using metaphors of water, waves, tides and 'floods of water'^{13, 31-32} reinforces a recurring stereotype of refugees as potentially threatening, uncontrollable agents. We therefore tested the effects that exposure to images depicting refugees in the sea, as opposed to land, may have on attitudes. Third, and beyond implicit dehumanization, we also tested how people explicitly judge the humane or inhumane qualities of the depiction itself (i.e. in large groups or in small groups), rather than the depicted people, with and without accompanying textual meta-data. Fourth, we focused on changes in behaviour, rather than attitudes, by testing whether exposure to different visual

framings may change people's support for different policies, as well as their political leader choices and the underlying mechanism of these changes.

To test these hypotheses, we used award-winning photojournalistic images portraying refugees in order to maximize the ecological validity and the transferability of our results to real-life and avoid possible image selection biases. Following the criteria proposed by media studies⁵ each photo was classified according to the number of people depicted and the recognizability of their facial features: photos of small groups (pSG, $n \leq 8$) with recognizable facial features, or of large groups (pLG, $n > 8$) without recognizable facial features. On purpose we did not contrast images of large groups to images of identifiable victims. Given the vast literature on the potency of the identifiable victim effect, we reasoned that a more appropriate approach would be to compare exposure to images of large groups versus small groups. If we find evidence that exposure to large groups as opposed to small groups results in significant differences in people's attitudes and behavior, that would provide a more stringent test of our hypothesis.

Methods

All studies were designed and administered using Qualtrics (<https://www.qualtrics.com>), an online platform for the development and administration of online experiments. These were not pre-registered. Participants were recruited through Prolific (<https://www.prolific.ac/>), an on-demand, self-service data collection platform for recruiting participants for online studies, and they were compensated with ~£7/hour. Participants were informed that we are carrying out a study to investigate how people perceive images depicting different social groups, such as refugees and immigrants, and that they will have to provide subjective ratings and judgments. All studies were carried out according to the Helsinki declaration guidelines and approved by the Ethics committees of the School of Advanced Study, University of London and Royal Holloway University of London. Participants gave their informed consent before taking part. Attention checks were included and are reported in the respective studies. We selected photographs depicting refugees or Survivors of Natural Disasters (SND), which have won photojournalism awards or honorary mentions between 1990-2017 (see Supplementary Material). Following past research^{12,13}, each photo was classified unanimously by two independent coders, as depicting: i) individuals or small groups ($n \leq 8$) of refugees, with recognizable facial features (pSG); or ii) large groups ($n > 8$) of refugees, without clearly recognizable facial features (pLG) (see Supplementary Material). The final stimuli set consisted of 43 pSG and 39 pLG of refugees. For Studies 2 and 8, a further sub-classification

of images was performed according to the visual narrative depicted, namely, whether the refugees were depicted i) on boats and/or near the sea (Sea, n=32) or ii) on land (Land, n=50).

Studies 1-3, including Supplementary Study 1 (see SM), examined whether exposure to different visual framings influenced the viewers' implicit dehumanization. Studies 4-5, including Supplementary Study 5 (see SM), examined whether different visual framings and newspaper headlines influenced the viewers' explicit ratings of humanness of the visual and textual material presented. Studies 6-8 examined whether exposure to different visual framings influenced the viewers' political behaviour. A summary of the research aims and measures used in each study is presented in Table 1 (a summary of the main and secondary findings of each study can be found in Table S1 of SM).

Measures

Dehumanization Questionnaire. To measure the impact of visual framing on the attribution of mental states to refugees, we administered, both before and after exposure to our photographic stimuli (Figure 1A), a standard dehumanization questionnaire^{32,33} that concerns the attribution of primary and secondary emotions.

Visual Exposure and Distress Ratings. Each image was presented for 3 sec. Following the presentation of each image, participants rated how distressing it was for them on a Visual Analogue Scale (VAS; 0- not distressing at all; 100- extremely distressing).

Social Dominance Orientation. Participants' preference for hierarchy and inequality among social groups was assessed with the 16-item version of the Social Dominance Orientation scale (SDO)³⁴. For each statement, participants used a scale ranging from 1 (strongly oppose) to 7 (strongly favour). High scores have been shown to predict dehumanization and negative attitudes against immigrants^{22,25,35}. The presentation of items was randomized.

Political Orientation. Self-reported political orientation was measured with a Likert scale (1 – very Conservative to 7 – Very Liberal).

Warmth & Competence Measures. Ratings of Warmth and Competence were obtained after each image using a slider ranging from 'cold' to 'warm' and from 'incompetent' to 'competent', respectively. The following instructions were given, adapted for each group (refugees vs. SND): "How warm (i.e. friendly, trustworthy, warm)/competent (i.e. capable, skilled, competent) do you think the depicted refugees/ SND are?". The presentation order of the questions was randomized.

Ratings of Humane Depiction (Study 4-5).

Participants were presented with one photo (Study 4), headline (Study S5) or front cover (i.e. Photo/Headline pair; Study 5) at a time, and were asked to judge “How much do you believe the image (Study 4), headline (Study S5) or front cover (Study 5) portrays refugees in a humane way?” using a Likert scale (1 - not at all to, 9 - very much so). Humane depiction was defined as “refugees portrayed in the same way as

Table 1 presents the key aims of each study and the measures used alongside the order in which the measures were administered.

	Study and Primary Research Question	Measure(s) used in the order presented
1	Does exposure to the visual <i>Framing</i> of showing refugees in large groups increases their implicit dehumanization?	<ul style="list-style-type: none"> ▪ Pre-exposure Dehumanization Questionnaire ▪ Distress Ratings for each image ▪ Post-exposure Dehumanization Questionnaire ▪ Social Dominance Scale (SDO) ▪ Political Orientation
S1	Does exposure to the visual <i>Framing</i> of large groups of survivors of natural disasters, who are also frequently dehumanised, increase their implicit dehumanization ?	<ul style="list-style-type: none"> ▪ Pre-exposure Dehumanization Questionnaire ▪ Distress Ratings for each image ▪ Post-exposure Dehumanization Questionnaire ▪ SDO ▪ Political Orientation
2	Does exposure to a particular visual <i>Narratives</i> depicting large groups of refugees in the Sea leads to increased implicit dehumanization?	<ul style="list-style-type: none"> ▪ Pre-exposure Dehumanization Questionnaire ▪ Distress Ratings for each image ▪ Post-exposure Dehumanization Questionnaire ▪ SDO ▪ Political Orientation
3	Provide a conceptual replication of the main effect of Framing using a different measure of dehumanization as proposed by the Stereotype Content Model.	<ul style="list-style-type: none"> ▪ Warmth & Competence Ratings for each image ▪ SDO
4	Do viewers explicitly evaluate photographs of refugees depicted in large groups as less humane ?	<ul style="list-style-type: none"> ▪ Humanness Ratings for each photo ▪ SDO
S5	Collect subsets of real newspaper headlines differing in the perceived portrayal of refugees in humane and less humane ways.	<ul style="list-style-type: none"> ▪ Humanness Ratings for each headline ▪ SDO
5	How do different combination of photographs and headlines affect viewer’s evaluation of the (in)humanness of front covers?	<ul style="list-style-type: none"> ▪ Humanness Ratings for each front cover ▪ SDO
6	Does exposure to the visual <i>Framing</i> of showing refugees in large groups influence the viewers’ endorsement of pro- and anti-refugees petitions?	<ul style="list-style-type: none"> ▪ Pre-exposure Dehumanization Questionnaire ▪ Distress Ratings for each image ▪ Post-exposure Dehumanization Questionnaire ▪ Signing of petition task ▪ Social Dominance Scale (SDO)
7	Does exposure to the visual <i>Framing</i> of showing refugees in large groups influence the viewers’ political leader preferences?	<ul style="list-style-type: none"> ▪ Pre-exposure Leader Choice Task ▪ Pre-exposure Dehumanization Questionnaire ▪ Distress Ratings for each image ▪ Post-exposure Dehumanization Questionnaire ▪ Post-exposure Leader Choice Task ▪ Xenophobia Scale
8	Investigate how emotional reactions (i.e. pity, admiration, contempt) to different photographs mediate Framing and Narrative effects on viewers’ political leader preferences, and their perceptions of symbolic and realistic threat.	<ul style="list-style-type: none"> ▪ Pre-exposure Leader Choice Task ▪ Emotion Ratings for each image ▪ Post-exposure Leader Choice Task ▪ SDO ▪ Realistic & Cultural Threat

national citizens of your country would be, if exposed to and depicted in similar situations”. By contrast, dehumanizing depiction was defined as “depictions of refugees as inferior human beings”.

Signing of Petitions task. Participants were provided with two petitions (adapted from³⁶ ; Figure 3) and asked to indicate whether they wanted their vote to be counted for (coded as 1), against the petition (coded as -1) or not counted at all (0). The order of presentation of the two petitions was counterbalanced across participants.

Leader choice Task. In each trial participants saw two avatar faces, generated by Facegen^{37,38} and controlled for their level of dominance and trustworthiness³⁹. There were eight different

faces comprising every possible combination of dominance and trustworthiness in a range of -2 to +2 points^{37,39} and scaled on both dominance and trustworthiness. The pairs were presented in a random order across 36 trials, and the position of the more dominant face (to the right or left) was counterbalanced between pairs. Before each trial, a fixation cross was presented for 200ms.

Experienced Emotions Questionnaire: Participants were asked to rate the extent to which they themselves experienced certain emotions, after each image with a 15-items questionnaire used by Esses³⁵ and Fiske⁴⁰ (see Figure 5b) using a VAS scale (0-not at all-100 –very much). Pity toward refugees was calculated as the average of 2 items (pity and sympathetic); Admiration as the average of 5 items (admiring, fond, inspiring, proud, respectful) and contempt as the average of 8 items (angry, ashamed, contemptuous, disgusted, frustrated, hateful, resentful and uneasy).

Xenophobia Scale. Participants' fear-related reactions to immigrants and foreigners was assessed using a 5-item xenophobia scale⁴¹. Agreement with each statement (e.g. "Interacting with immigrants makes me uneasy") was assessed in a scale ranging from 1 (strongly disagree) to 7 (strongly agree). Scores were summed up. The presentation of the items was randomized.

Realistic & Symbolic Threat: They were also asked at the end of the experiment to indicate the levels of *Realistic* (e.g. 'Because of the presence of refugees, unemployment in Europe will increase') and *Symbolic Threat* (e.g. 'European identity is being threatened because there are too many refugees') that refugees pose, measured with a 3-items (randomized order) for each type of threat⁴². Scores were summed up for each measure.

Stimuli

Study 1 used a random selection of 25 pSG and 25 pLG images of refugees from our full stimulus set (available [here](#)) and presented to participants in a between-subjects design. Study 2 used a random selection, taken from our full set of images, of 16 sea-pSG, 16 sea-pLG, 16 land-pSG and 16 land-pLG of refugees. In Study 3, each participant was presented with one block of refugee photos and another of SND photos. Each block contained the same number of pLG and pSG images. The order of blocks was counterbalanced, and each block consisted of one of seven random selections, of 24 images per cell, from our full stimulus set. In Study 4, to reduce testing time and fatigue, the stimuli set of refugees photos was randomly divided

into two groups, each with a similar number of pSG (n=21) and pLG (n=20), and participants were randomly assigned to rate one of the two subsets. In Study 5, 48 headlines (taken from five major UK newspapers) that were previously rated for their ‘humanizing’ or ‘dehumanizing’ portrayal of refugees (Study S5 in SM) were paired with photos to create a “news front-cover” in a 2x2 within-subjects design: dehumanizing (e.g. “Migrant flood ‘to alter us forever’”) or humanizing (e.g. “Refugees Welcome”) headlines paired with pSG or pLG. We created ten different randomizations consisting of 48 of these ‘front-covers’, each one consisting of a combination of photo and headline. Each randomization contained the following pairs: 12 pLG/12 Humanizing titles; 12 pLG/12 Dehumanizing titles, 12 pSG/12 Humanizing titles; 12 pSG/12 Dehumanizing titles. The average ratings of the headlines (collected in Study S5) paired with pLG and pSG did not differ across randomizations ($p > 0.05$). Participants rated each “front-cover” on the extent to which it portrays refugees in a humane way. Studies 6 and 7 used a random selection of 25 pSG and 25 pLG images of refugees from our full stimulus set and presented to participants in a between-subjects design. In Study 8, same as in study 2, a

random selection, taken from our full set of images, of 16 sea-pSG, 16 sea-pLG, 16 land-pSG and 16 land-pLG of refugees was used.

Participants

All studies (except Studies 5 and S5) were open to EU nationals and residents (see Table 2). Participants were randomly assigned to different conditions and each study had an independent sample.

For Study 1 a sample size of 477 was estimated to detect a small effect (partial $\eta^2=0.02$)

with a power of 0.8 in a multiple regression with 2 predictors. Anticipating some poor quality

Table 2 Participants’ nationality, gender and age

	Study 1	Study 2	Study3	Study 4	Study 5	Study 6	Study 7	Study 8	Study S1	Study S5
Austria	3	1	1	-	-	2	2	3	-	-
Belgium	8	1	-	1	-	1	3	7	-	-
Bulgaria	2	3	-	-	-	-	-	2	2	-
Cyprus	1	-	-	-	-	-	-	-	-	-
Czech Republic	7	2	-	2	-	7	2	5	2	-
Denmark	5	-	-	1	-	8	1	6	-	-
Estonia	5	1	1	-	-	3	2	20	-	-
Finland	7	1	2	1	-	8	5	6	-	-
France	17	6	1	1	-	12	6	3	5	-
Germany	32	11	1	5	-	26	9	19	4	-
Greece	22	14	-	2	-	24	7	36	4	-
Hungary	4	1	-	2	-	15	1	6	3	-
Ireland	20	5	2	3	-	18	11	9	4	-
Italy	53	16	4	13	-	40	14	60	3	-
Latvia	-	1	-	-	-	4	3	-	2	-
Lithuania	4	-	-	1	-	0	3	1	-	-
Netherlands	17	6	3	1	-	19	5	10	3	-
Poland	40	9	5	3	-	66	22	120	6	-
Portugal	82	31	9	9	-	68	18	122	22	-
Romania	9	1	-	-	-	6	2	2	1	-
Slovakia	2	-	-	1	-	0	3	-	-	-
Slovenia	3	2	1	-	-	7	2	4	1	-
Spain	26	7	9	8	-	40	15	27	5	-
Sweden	6	1	1	1	-	8	-	-	-	-
United Kingdom	89	332	134	152	100	314	278	312	359	147
Other/unspecified	2	-	-	-	-	-	27	27	1	-
Total	466	452	174	206	100	696	443	840	427	147
Male	208	183	59	60	32	350	191	406	123	41
Female	257	267	114	145	67	343	252	432	304	106
Not specified/other	1	2	1	1	1	3	-	2	0	0
Mean Age	32.4	33.2	33.1	34.7	32.6	29.96	31.52	23.1	34.3	38.8
SD	10.5	9.9	10.8	9.5	10.1	10.71	11.15	7.86	10.6	12.9

data, we collected data from 507 participants. The final sample comprised 466 participants (mean age=32.4, sd=10.5, 257 females, n=237 for pLG, and n=229 for pSG), as data from 41 participants was excluded, because they identified themselves as refugees/asylum seekers (n=1), or they were outliers (n=40), i.e. whose responses to any of the tasks were more than 2.5 standard deviations higher or lower than the average for that variable.

Study 2 aimed at a sample size similar to Study 1. The final sample comprised 452 participants (mean age=33.2, sd=9.9). Data from additional 36 participants (outliers (+/- 2.5 sd above the mean): n=32; refugees/asylum seekers: n=4) were excluded from analyses. Four independent groups of participants rated refugees' experience of primary and secondary emotions *before* and *after* exposure to images of pLG depicted in the sea (n=111), or on land (n=113), and pSG depicted in the sea (n=113) or on land (n=115).

Study 3, given the within-subject design and the mixed-models analyses, aimed at a lower sample of n=150-200. The final sample comprised 174 participants (mean age=33.1, sd=10.8, 114 females). Data from additional 12 outliers (+/- 2.5 sd above the mean) was excluded from the analyses.

Study 4 aimed at a sample size similar to Study 3. The final sample comprised 206 participants (mean age=34.7, sd=9.5, 145 females). Data from 53 additional participants (50 failed at least one of the two attention checks; 2 outliers (+/- 2.5 sd above the mean); 1 refugee/asylum seeker) was excluded from analyses.

In line with the strong effect sizes of the *Framing* manipulation in the within-subjects Studies 3-4, Study 5 consisted of 100 participants (mean age=32.6, sd=10.1, 67 females). Data from 23 additional participants (21 failed at least one attention check (see SM); 3 outliers (+/- 2.5 sd above the mean)) was excluded from analyses. Recruitment was restricted to UK nationals and residents to avoid language-based misinterpretation of newspaper headlines.

Study 6, in line with two studies using the same measure and analyses^{22,36} aimed at a sample size of 650-700. The final sample comprised 696 participants (mean age=29.96, sd=10.71, 343 females; pSG n=363 for pSG, and n=333 for pLG). Data from an additional 56 outliers (+/- 2.5 s.d. above the mean), 11 participants who identified themselves as refugees/asylum seekers and 42 participants who failed the attention checks were excluded from analysis.

Study 7 aimed for a sample size similar to Study 1. The final sample comprised 443 volunteers (mean age= 31.28, sd= 11.01, 252 females). Data from 29 outliers (+/- 2.5 s.d. above the mean), 2 participants who identified themselves as refugees or asylum seekers, 47

participants who failed at least one attention check and 2 participants for which the logit regression models did not converge were excluded from the analyses.

Study 8 comprised 840 volunteers (mean age= 23.1sd= 7.86, 432 females; sea-pSG=213; land-pSG=215; sea-pLG=203; land-pLG=215). Data from 29 outliers (+/- 2.5 s.d. above the mean), 1 participant who identified themselves as refugee/asylum seeker and 15 participants who failed at least one attention check, were excluded from analyses.

Study 1 Rationale & Results

We used a between-subject design (Figure 1A) to test whether exposure to photos of large groups (pLG) or small groups (pSG) of refugees changed participants' implicit dehumanization of refugees^{26,33}. An important dimension of dehumanization is to consider others as being less capable of experiencing secondary emotions that typically distinguish humans from animals (i.e. tenderness, guilt, and compassion), while the attribution of primary emotions that are shared with animals (i.e. fear, anger, joy) remains unaffected⁴³. This tendency is independent of the emotions' valence and is therefore not simply a general expression of (dis-)liking^{20,22,40}. We measured the attribution of primary and secondary emotions to refugees *before* and *after* exposure to either pLG or pSG. Given our focus on dehumanization, we focused on changes in the attribution of secondary emotions, while controlling for the baseline attribution of secondary emotions and for any changes in primary emotions. We hypothesised that exposure to pLG, as compared to pSG, would lead to a reduced attribution of the uniquely human secondary emotions to refugees, indicative of implicit dehumanization.

Linear regressions were carried out in R (R Core Team, 2013). Post-exposure secondary emotion attribution (*Post-Secondary*) was entered as a dependent variable on the general linear models. In the first model, additionally to our dummy variable of interest, *Framing* (0=pSG; 1=pLG), , respectively. the control variables, pre-exposure secondary emotion attribution (*Pre-Secondary*) and the difference between post- and pre-exposure assignment of primary emotions (*Difference-Primary*), and their interactions with *Framing* were entered in the model. Accounting for *Pre-Secondary* covariate allowed us to control for the baseline attribution of secondary emotions. Inclusion of the *Difference-Primary* covariate allowed us to control for any changes in the general attribution of emotions to refugees that are not specific to secondary emotions, our key measure of implicit dehumanization. Unspecific changes in emotion attribution could reflect, for example, perceptions of emotional numbing

or distress, instead of the specific negation of complex emotions that characterises dehumanization^{32,33}. All covariates were mean centred and scaled. F-values and p-values were estimated with the Anova() function from the car v3.0-3 package library for R (R Core Team, 2013).

In the first regression model ($R^2 = 0.6989$) which included *Framing* (pSG / pLG) and its interactions with *Pre-Secondary* and *Difference-Primary*, exposure to pLG, compared to pSG, resulted in reduced assignment of secondary emotions ($F(1,460)=4.420$, $p=0.0361$, Figure1B). *Pre-Secondary* ($F(1,460)=1062.961$, $p<0.001$) and *Difference-Primary* ($F(1,460)=32.871$, $p<0.001$) were also significant but, importantly, did not interact with *Framing*. The inclusion of several covariates of interest – *Social Dominance Orientation* (SDO), *Political Orientation* and participants’ average *Distress* ratings – in the model did not change the pattern of results (see Methods and Supplementary Material). In addition, as a control analysis, *Framing* did not predict the attribution of *Primary Emotions* to refugees after exposure to images (see Supplementary Material).

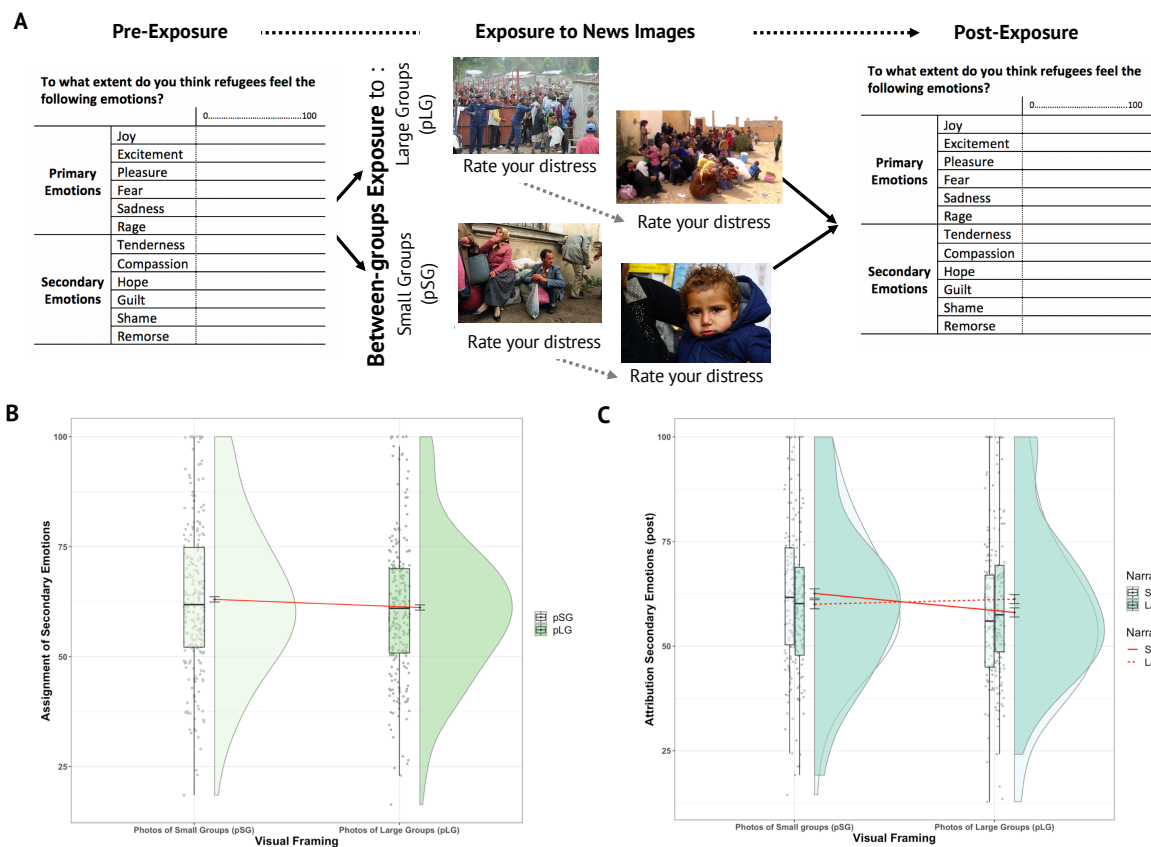


Figure 1: (A) Between-subjects design, Study 1. Pre- and post-exposure to images, participants completed a dehumanization questionnaire that considers the extent to which refugees feel each primary and secondary emotion, by providing a rating using a VAS scale

(0- not likely at all; 100 –extremely likely). Images depicted here are illustrative examples of the visual framing (i.e. were not presented in any of our studies) Source : Wikimedia Commons, top left [link](#), top right [link](#) , bottom left [link](#) , bottom right [link](#). **(B)** Study 1: Raincloud plot with fitted values of the main effects of Framing on attribution of Secondary Emotions. Y-Axis= Assignment of Secondary Emotions after exposure to photographic images. Dots represent single data points; boxplots and half violin plots represent mean and probability distribution according to the condition. Red lines, black points and error bars (S.E.M) represent fitted values of the main effect of Framing on attribution of secondary emotions. After exposure to pLG of refugees, participants attributed significantly ($p < 0.05$) fewer secondary emotions to refugees in comparison to pSG. **(C)** Study 2 tested four independent groups of participants, reflecting the 2x2 between-subjects design of Visual Framing (Large or Small Groups) x Narrative (at the Sea or on Land). Raincloud plot with fitted values of the main effects of Visual Framing on Assignment of Secondary Emotions in function of the Narrative. Y-Axis= Assignment of Secondary Emotions after exposure to photographic images of (refugees). Dots represent single data points; boxplots and half violin plots represent the mean and probability distribution according to the condition. Red lines, black points and error bars (S.E.M) represent fitted values. After exposure to pLG of refugees, participants attributed significantly ($p < 0.05$) fewer secondary emotions in comparison to pSG when refugees were depicted at Sea (light green, straight red line) rather than at Land (dark green, dotted red line).

These results support the hypothesis that photojournalistic images of large groups affect the viewers' implicit dehumanization of refugees, evidenced by the reduced attribution of uniquely human features to others, a fundamental aspect of social cognition. Past studies that used cartoons, vignettes or textual descriptions suggest that people tend to attribute less mind to individuals when they are perceived in highly cohesive groups but not when they are perceived in heterogeneous groups⁴⁴⁻⁴⁶, because perceived homogeneity promotes categorical perception and stereotyping⁴⁷. Visual depictions of large groups of faceless refugees may promote homogenized perception and stereotyping, whereas small numbers of identifiable refugees primes the viewer to consider them as individuals with minds of their own. However, in a study using a similar design (see S1, Supplementary Material), the dehumanizing effect of pLG vs. pSG, did not generalize to other groups who find themselves in hardship, such as survivors of natural disasters (SND), themselves a frequently dehumanized outgroup^{23,48}. Hence, the effects cannot be solely attributed to the size of any depicted group and are likely to depend on the socio-political and historical connotations associated with specific groups.

Study 2 Rationale and Results

Study 2 extended the dehumanizing effect of pLG by testing another hypothesis motivated by visual and linguistic analysis of the refugees' media portrayal. Widely common media narratives of refugee and asylum seekers make ample use of metaphors of water and flooding³¹ that has been proposed to reinforce the association between refugees and symbolic threats of cultural deluge^{12,28,30}. We therefore tested whether exposure to particular visual narratives which reference to the water and sea elements may also increase dehumanization. Four independent groups of participants rated refugees' experience of primary and secondary emotions *before* and *after* exposure to images of pLG depicted in the sea (n=111), or on land (n=113), and pSG depicted in the sea (n=113) or on land (n=115).

The statistical analysis was identical to that of Study 1, with the dummy variable *Narrative* (0 = Sea; 1 = Land) and its interactions with the other variables added to the models. The significant interaction was followed by planned post-hoc comparisons, using the emmeans function of R's CRAN package, to investigate the effect of *Framing* on each *Narrative* type and of *Narrative* on each *Framing* type. Bonferroni correction was applied to the comparisons made (n=4).

The first model ($R^2 = 0.6028$) consisted of *Framing* (pLG/pSG), *Narrative* (Sea/Land), their interaction, while controlling for *Difference-Primary* and *Pre-Secondary*. The interaction *Framing* x *Narrative* was significant ($F(1,440)=6.518$, $p=0.0110$; Figure 1C) as pLG (vs. pSG) were associated with increased dehumanization of refugees for the participants exposed to sea images ($t.ratio=2.90$, $p=0.0160$) but not those exposed to land images ($t.ratio=-0.712$, $p>0.99$; see SM for analysis including covariates of interests). No differences in dehumanization were found between sea and land photos at neither pLG nor pSG ($ps>0.05$) (see SM for analyses with the covariates). These results extend Study 1 by highlighting the importance of the visual narrative in addition to framing, as seeing large groups in a sea context resulted in the greatest increase in dehumanization. This finding speaks across social sciences and humanities according to which the (visual) use of elements such as 'water', 'waves', 'tides' reinforces representation of refugees as threatening 'floods of water'^{30,49}. The visual narrative coupled with the dominant visual framing, may further amplify the implicit dehumanization of refugees, speaking in favour of the ideological and connotative functions of images as semiotic devices^{15,50}.

Study 3 Rationale and Results

Study 3 provides a conceptual replication of the main *Framing* effect using a different measure of dehumanization in a more powerful within-subjects design. According to the

Stereotype Content Model (SCM)⁵¹, social stereotypes can be captured by the target's perceived warmth and competence. Warmth closely relates to the person's perceived intentions and their moral-social values such as trustworthiness and friendliness, while competence refers to abilities, such as intelligence and skills. Lower ratings on warmth and competence denote dehumanization, and have previously been reported for different social groups^{20,51,52}. We tested whether exposure to pLG or pSG of refugees as well as SND would induce changes in the perceptions of those groups' social and moral worth (Figure 2A). We hypothesized that dehumanization, manifested by lower attribution of warmth and competence, will mainly occur in response to pLG, and selectively for refugees. Thus, after each image was presented participants rated how warm and competent they thought the depicted refugees or SND are.

Data was analysed with mixed-model regressions using the lme4 v1.1-17 package for R software. Responses were analysed in two separate mixed-model regressions with Warmth and Competence ratings as dependent variables. In additional second models (see SM), we included the covariates *SDO* and *Political Orientation* and their interactions with *Framing* and *Group*. All covariates were mean centred and scaled. Chisq and p-values for fixed-effect parameters were calculated using the Anova() function from the car v3.0-3 package. Model comparisons, using the loglikelihood ratio statistics asymptotically approximated to a χ^2 distribution, were employed to test whether the inclusion of the interaction *Framing* x *Group* as random slope over participants improved model fit⁵³. Whenever convergence or singularity issues were found on model estimation the random slopes structure was simplified. Covariates were mean centred and scaled. Significant interactions were followed by planned post-hoc comparisons, using the emmeans function of the CRAN package, to investigate the effect of Visual Framing on each Group and differences in warmth between groups for each Framing type (Bonferroni-correction: n=4).

For warmth, the first model that included *Framing* (pSG / pLG), and its interaction with *Group* (Refugees/SND), showed a significant *Framing* x *Group* interaction (Chisq=13.379, p<0.001) whereby, compared to SND, refugees depicted in pLG were judged to be significantly less warm (t.ratio=-3.642, p<0.001), while for pSG, no significant difference was found between groups (t.ratio=0.397, p>0.99, Figure 2B). Nonetheless, it is worth noting that both groups were judged warmer in pSG (vs pLG) (refugees: (t.ratio=9.754, p<0.001); SND: (t.ratio=5.680, p<0.001)).; see also Supplementary Material for additional analysis with covariates). For competence ratings, the *Framing* x *Group* interaction (Chisq<0.01, p=0.981)

was not significant. However, overall, refugees were rated lower than SND (Chisq=20.249, $p < 0.001$). The main effect of *Framing* was not significant (Chisq=0.574, $p = 0.449$). Thus, while evaluations of competence are not affected by visual framing, competence is in general lower for refugees than for SND (see also 20). The selective effect of visual framing on warmth perception of refugees speaks to the capacity of visual framing to shape attitudes towards refugees, especially when it concerns their affective and moral capacities.

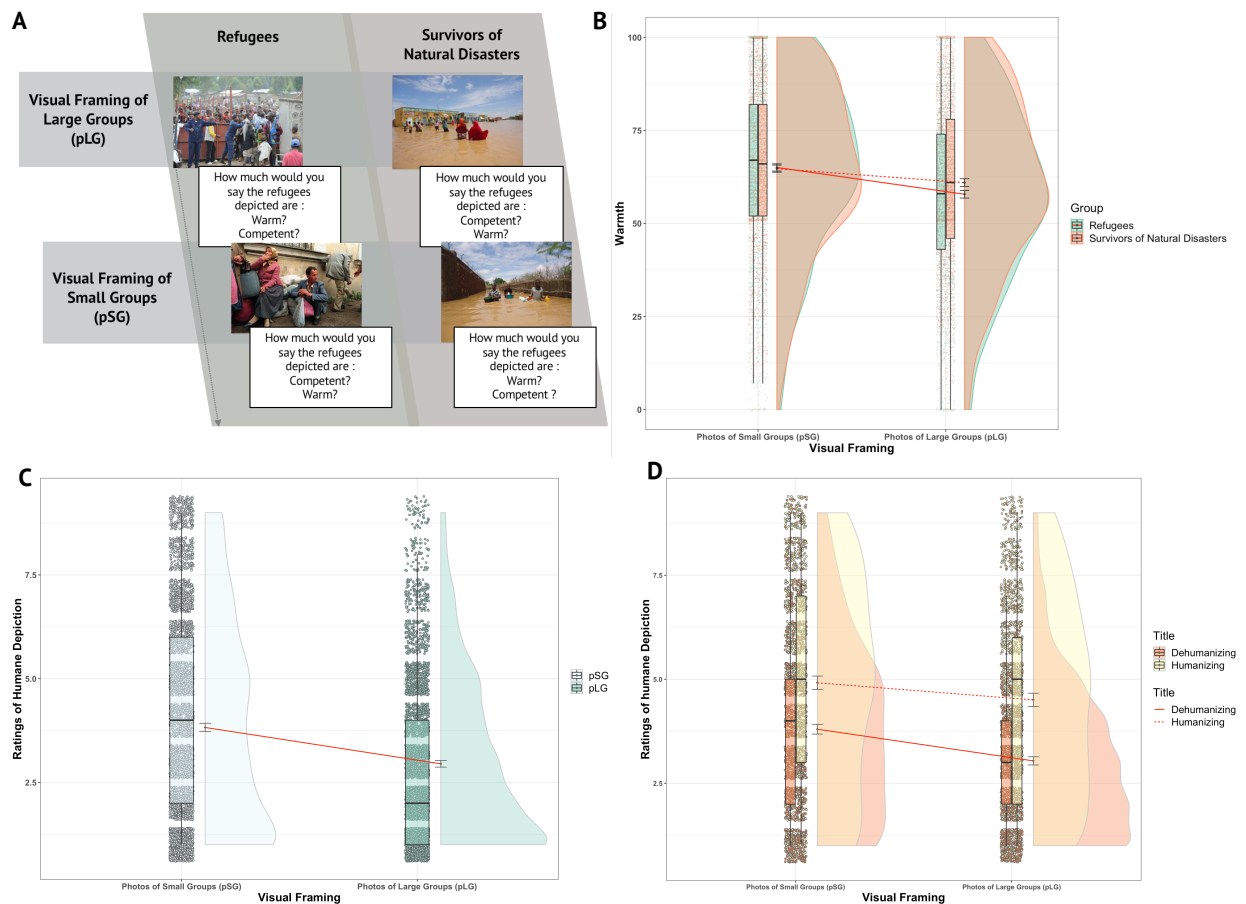


Figure 2: (A) 2x2 within-subjects design of Study 3. Visual framing was randomized within blocks, while block order (i.e. refugees or SNDs) was counterbalanced across participants.. (B): Raincloud plot with fitted values of the main effects of Visual framing on Attribution of Warmth in function of the Visual Framing and the Group (Ref vs. SND). Y-Axis= Attribution of Warmth after exposure to photographic images of Ref (refugees, in green) and SND (Survivors of Natural Disaster in red). Dots represent single data points; boxplots and half violin plots represent the mean and probability distribution according to condition. Red line, black points and error-bars (S.E.M.) represent fitted values of the main effect of Visual Framing on Attribution of Warmth in function of the Group (Refugees vs. SND). After exposure to pLG of refugees (green and straight red line), participants assigned significantly ($p < 0.01$) less warmth than after exposure to pSG, as well as in comparison to SND (red and dotted red line). (C) Study 4: Explicit ratings (fitted values) of humanness of photographic images across the two Framings. Dots represent single data points; boxplots and half violin plots represent the mean and probability distribution according to condition. Red line, black points and error-bars (S.E.M.) represent fitted values of the main effect of Visual Framing on Attribution of Humanness in function of the Group (Refugees vs. SND). After exposure to pLG of refugees (green and straight red line), participants assigned significantly ($p < 0.01$) less humanness than after exposure to pSG, as well as in comparison to SND (red and dotted red line). (D) Study 4: Explicit ratings (fitted values) of humanness of photographic images across the two Framings. Dots represent single data points; boxplots and half violin plots represent the mean and probability distribution according to condition. Red line, black points and error-bars (S.E.M.) represent fitted values of the main effect of Visual Framing on Attribution of Humanness in function of the Group (Refugees vs. SND). After exposure to pLG of refugees (green and straight red line), participants assigned significantly ($p < 0.01$) less humanness than after exposure to pSG, as well as in comparison to SND (red and dotted red line).

points and error-bars (S.E.M.) represent fitted values of the main effect of Visual Framing on Ratings of Humanness. Participants rated pLG of refugees as significantly ($p < 0.001$) less humane than pSG. (D) Study 5: Explicit ratings (fitted values) of front-covers' (headlines and images) humanness as a function of Visual Framing (pSG/pLG) and Headlines (Humanizing/Dehumanizing) characteristics. Dots represent single data points, boxplots and half violin plots according to condition pSG/pLG. Red line, black points and error-bars (S.E.M.) represent fitted values. Humanizing Headlines and pSG independently predicted high humanness ratings. The interaction was also significant ($p < 0.001$), i.e. the combination of pLG with dehumanizing headlines predicted particularly low ratings, and the combination of pSG with humanizing headlines was associated with higher perceptions of humaneness (as reflected by the different slopes in the solid and dashed red lines).

Study 4 Rationale and Results

We next set out to understand whether people form corresponding explicit evaluations about the (in)humane qualities of different visual framings, focusing on the depiction itself (i.e. image), and not on the (in)humane qualities of the target (i.e. refugees). In other words, are pSG perceived as portraying refugees in a more humane way than pLG? A new group of participants judged on a Likert-scale (1-9) the extent to which the images used in Study 3 portray refugees in a humane (i.e. as it would portray citizens of their own country), as opposed to a dehumanizing way (i.e. as inferior human beings).

As in Study 3, data was analysed with mixed-models with each participant's ID as an a priori random factor. Humanness ratings was the dependent variable. All predictors were mean centred and scaled. A stepwise approach was adopted in which we first tested the predictors of interest, i.e. *Framing* (pSG=0/pLG=1), *Narrative* (Sea=0/Land=1), and their interaction. *Framing* was significant, as pLG were perceived as less humane than pSG (Chisq=220.498, $p < 0.001$; Figure 2C). Interestingly, *Narrative* (Chisq=9.128, $p = 0.0025$) was also found to be significant with sea images perceived as more humane portrayals of refugees than photos in land. The *Narrative* x *Framing* interaction (Chisq=2.153, $p = 0.142$) was not significant (see SM for additional analysis). These findings show how the size of the depicted outgroup and its anonymity influences the explicit evaluation of images. Interestingly, the narrative did not influence *explicit* judgements of humane qualities of the images, suggesting that while people are able to recognize the inhumanness of pLG, these explicit judgments are less sensitive to the specific narrative portrayed, while their implicit attitudes may be more sensitive (Study 2).

Study 5 Rationale & Results

Image are rarely presented in isolation from metadata or textual material such as news articles or headlines that contextualize the images. Such metadata may be thought of as

embedding, and potentially reframing the effects of images. The question of how images operate in relation to words remains contested³. Are the effects of combining images and headlines independent, additive or interactive? Can images provide the context that shapes subsequent interpretation of the news? Study 5 answered this question by focusing on the relative balance of power between images and headlines and assessing how different combinations are explicitly evaluated. Forty-eight headlines (taken from five major UK newspapers) that were previously rated for their ‘humanizing’ or ‘dehumanizing’ portrayal of refugees (Study S5 in SM) were paired with photos to create a “news front-cover” in a 2x2 within-subjects design: dehumanizing or humanizing headlines paired with pSG or pLG. Participants rated each “front-cover” on the extent to which it portrays refugees in a humane way.

Data was analysed in a series of mixed-model regressions with humanness ratings as a dependent variable. The first model included the dummy variables *Framing* (0= pSG; 1=pLG) and *Titles* (0=Inhumane; 1=Humane), and their interaction. The second model (see SM) included *SDO* and *Political Orientation* (both mean centred and scaled), and their interactions with the variables of interest. The *Headline* x *Framing* interaction (Chisq=11.504, $p < 0.001$) was significant. All post-hocs were significant (t -ratios > 4.335 , p s < 0.001) showing that both pLG (vs pSG) and dehumanizing (vs. humanizing) headlines were associated with lower ratings of the front-covers’ humaneness. Moreover, the combination of strongly dehumanizing headlines and depictions of large groups of refugees predicted particularly low ratings, and the combination of humanizing headlines and photos of small groups of refugees predicted higher perceptions of humaneness (Figure 2D, see also SM). Thus, images and text can independently affect people’s perception of the (in)humane portrayal of refugees, and distinct combinations amplify such effects.

Study 6 Rationale & Results

Having tested for the dehumanizing effects of certain visual framings, as well as their explicit inhumane evaluation, we next focused on the potential political consequences of such images, by testing if exposure to pSG and pLG can influence political behaviour, here operationalized as the tendency to endorse pro- and/or anti-refugee petitions²² (see Figure 3). Thus, following exposure to images of pLG or pSG, participants were provided with 2 petitions presenting pro-refugees and anti-refugees measures, and had to indicate whether they wanted their vote to be counted for the petition, against the petition, or not counted at all.

Choices for each petition (i.e. Pro- and Anti-Refugees Petitions) were analysed in separate ordinal logistic regressions, using the `polr ()` function, with *Framing* (0=pSG; 1=pLG) as dependent variable. Given the direct relevance of the subjective measures collected to political attitudes, the covariates *SDO*, *Political Orientation*, *Dehumanization Questionnaire* (i.e. post- minus pre-exposure), *Distress* ratings and their interactions with *Framing* were included. All covariates were mean centred and scaled.

For the pro-refugees petition (Figure 3), *Framing* was a significant main predictor ($t=-2.513$, $p=0.0120$; Figure 3A), while controlling for the covariates of interest – *Dehumanization* (i.e. post- minus pre-exposure attribution of secondary emotions), *SDO* scores, *Political Orientation* and *Distress* ratings. After exposure to pLG, participants were less likely to support and sign the pro-refugees petition, compared to exposure to pSG. As expected, higher *SDO* scores predicted lower petition support ($t= -6.099$, $p<0.001$) and liberals were more likely to sign the petition ($t = 3.553$, $p< 0.001$). Participants reporting higher *Distress*, independently of *Framing*, also showed increased support for the petition ($t=5.156$, $p<0.001$). None of the covariates showed significant interaction with *Framing*.

For the anti-refugees petition, participants' choices to sign for, against or abstain were predicted by their social attitudes, as captured by *SDO* scores ($t=5.672$, $p<0.001$) and *Political Orientation* ($t= -2.987$, $p=0.0028$) but, notably, also by *Framing* ($t=2.385$, $p=0.0171$) with those exposed to pLG (vs pSG) more likely to support it and less likely to sign against it. No covariate was found to interact with *Framing* (all other $ps>0.05$; see Figure 3). The seizure of refugees' assets can be considered a rather extreme anti-immigration measure^{22,36} compared to the more passive stance of opposing the allocation of additional resources to support refugees (i.e. signing against the pro-refugees petition). Thus, exposure to images of large groups does not result simply in apathy, but may increase the support for active anti-refugee measures. These findings show the political capacity of the dominant visual framing of refugees in the media, as the significant effect of *Framing* on the pro-refugee and anti-refugee petitions illustrates the power of images in influencing public support for humanitarian measures. Interestingly however, this does not seem to be moderated by changes in implicit dehumanization. In fact, unlike Studies 1-2, Study 6 did not reveal a significant *Framing* effect on the attribution of secondary emotions to refugees ($F(1,690)=0.527$, $p=0.468$), see also Study 7 and meta-analysis reported after Study 7).

Since we are collecting information from a representative sample of Europeans, we plan to deliver these last responses to the EU parliament for consideration in making policies. Please let us know if you would like your vote counted **for - or against-** the following petitions, or if you would like to **abstain** :

A Petition A (Pro-refugees) : We should be investing more money and resources to support the refugees who are fleeing war and hardship and coming to our borders. I would like (tick as appropriate) :

B Petition B (Anti-Refugees) : We should be seizing assets from refugees to pay for their stay in the EU. I would like (tick as appropriate) :

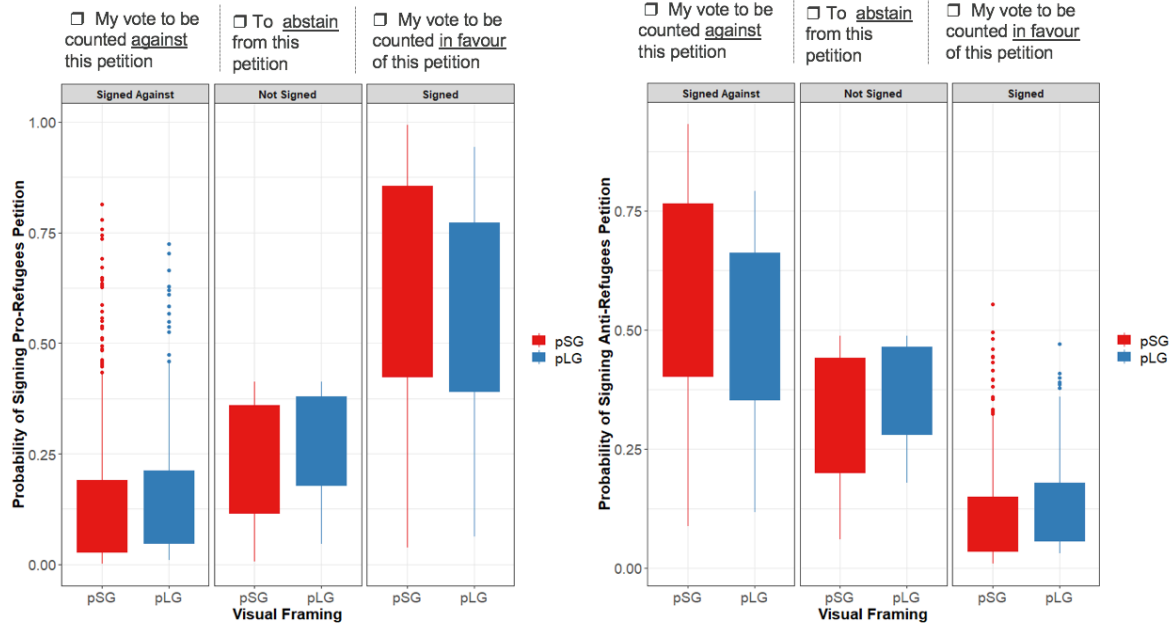


Figure 3: Study 6 results. Plot with predicted values of the main effect of Visual Framing on the probability of signing a Pro- Refugees Petition or an Anti- Refugees Petition. See Tabular Results in Supplementary Material.

Study 7 Rationale & Methods

Beyond the general public’s endorsement or disapproval of policies, our democracies rely on elected politicians to develop and implement them. Immigration policies have been central to political debates in recent elections across European democracies, and the global rise of populist parties led by authoritarian leaders has been partly attributed to anti-immigration sentiments. **Study 7** investigated whether the political capacity of visual framing extends to people’s choices of political leaders. We measured participants’ choices of political leaders based on their facial features^{54,55}, in the context of a hypothetical national election. Facial cues inform social judgements, are sensitive to environmental factors and reflect actual political preferences^{55–58}. Indeed, in line with the idea that authoritarianism increases in contexts of social and/or economic threat^{55,59}, recent research has shown how external threats bias political preferences towards more dominant looking leaders⁵⁴ and authoritarianism in general⁶⁰. Accordingly, we hypothesized that exposure to pLG of refugees that emphasize group-based threat will bias participants’ choices towards a more dominant and less

trustworthy leader. Participants were randomly assigned to the pLG (n=221) or pSG (n=222) condition, and performed a leader choice task³⁹ before and after exposure. In the leader choice task, participants had to choose from a pair of avatar faces, the one which represented their leader preference in a hypothetical national election (Figure 4A).

First, participants' choices of faces during the Pre- and Post- leader choice task were analysed using a logit regression model for each participant, with the order of presentation as random factor, and faces' levels of trustworthiness and dominance as fixed effects. The models did not converge for 2 participants due to a non-sufficient number of valid trials in the tasks; data from these participants was excluded from further analysis. Based on the coefficients of the logit regressions, we then computed the probabilities of choosing a more dominant and less trustworthy face as a leader³⁹ for each participant.

Next, a multiple linear regression was carried out in R with the difference between the probabilities of choosing a more dominant and less trustworthy leader before and after exposure to images (ProbaPost-ProbaPre) as a dependent variable. Specifically, we measured the main effect of our dummy variable of interest, *Framing* with our covariates and their interactions with *Framing* as predicting variables (*Political Orientation*, *Xenophobia Scale*, *Distress*, *Difference-Secondary* as the difference between post- and pre-exposure in the attribution of secondary emotions). All covariates were mean centred and scaled.

We quantified the effect of *Framing* (pSG vs. pLG) on the change in the probability of choosing a more dominant and less trustworthy leader face in the forced choice task. As predicted, exposure to pLG (compared to pSG) increased the probability of choosing a more dominant and less trustworthy leader ($R^2=0.01481$; $F(1,433)=3.974$, $p=0.0468$; Figure 4B-C). In addition to the main effect of *Framing* on the probability to choose a more authoritarian leader (*Post-Pre*), the interaction of *Framing* with *Xenophobia* ($F(1,433)=7,138$, $p=0.008$, see Methods) was significant: the higher participants scored in the *Xenophobia*-scale, the more likely they were to increase their preference for authoritarian leaders (ie. more dominant and less trustworthy faces) following exposure to pLG. No other covariates or interaction with *Framing* were found to be significant.

Thus, exposure to the visual framing of large groups can influence political leader-choices, resulting in an increased support for a more authoritarian-looking leader. Taken together, studies 6-7 demonstrate the political consequences of the dominant visual framing, both for the policies that are supported (or not) by the people, as well as for the choice of their political leaders.

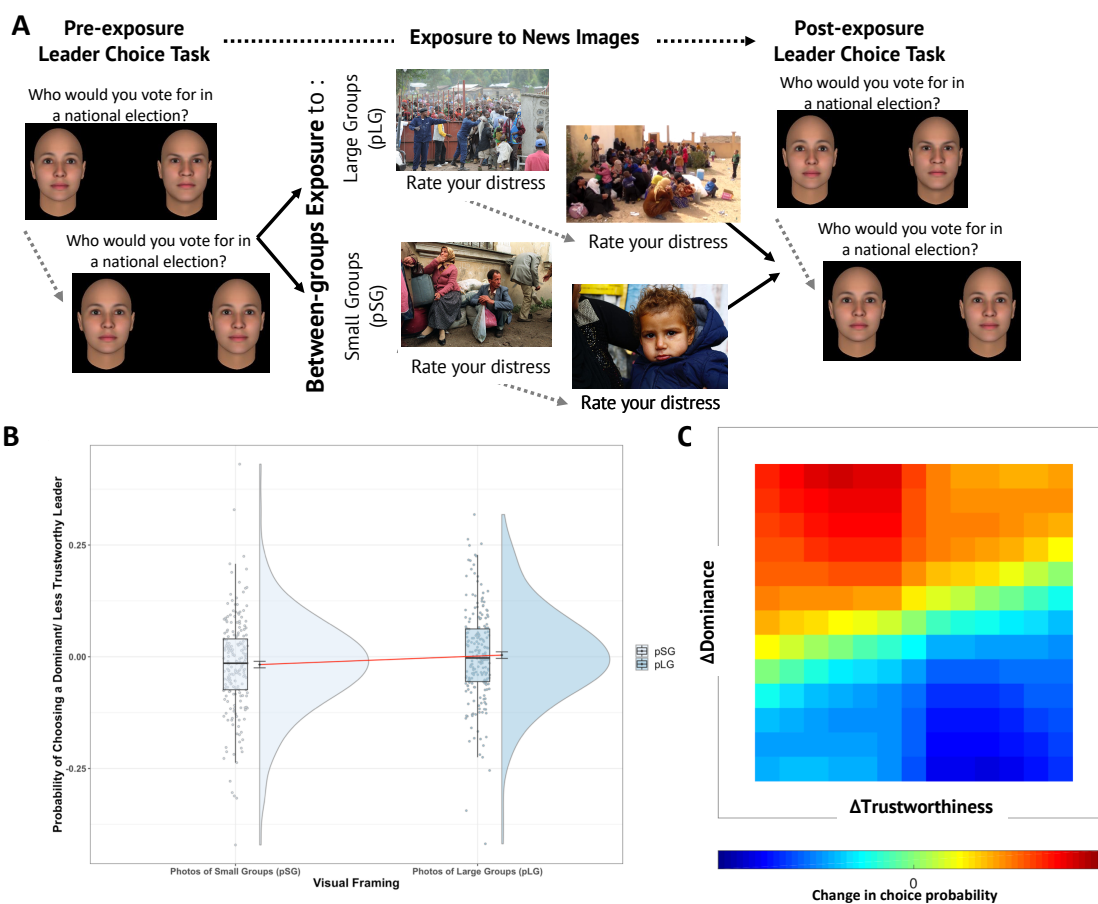
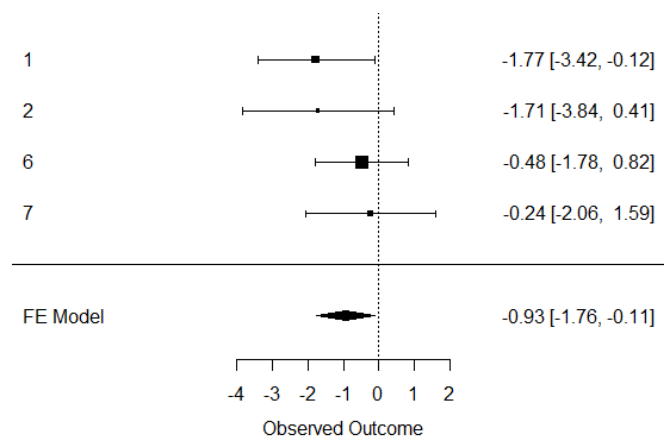


Figure 4. *A*) Between-subjects design of Study 7. Prior to exposure to pLG or pSG, participants completed a leader choice task. They had to choose which face out of a pair of avatar faces, scaled according to Trustworthiness and Dominance, they would vote for in hypothetical upcoming national election. During the exposure phase, participants saw 25 images depicting refugees either in pLG or pSG and rated how distressful each image was on a VAS scale (0-not distressing at all; 100 – highly distressing). After exposure, they completed again the task. Images depicted here are illustrative examples of visual framing (i.e. were not presented in any of our studies) Source : Wikimedia Commons, top left [link](#), top right [link](#), bottom left [link](#), bottom right [link](#). *B*) Study 7: Raincloud plot with fitted values of the main effects of Visual framing on the probability of choosing a strong leader (Post- minus Pre-exposure). Y-Axis= Probability of choosing a strong leader, Post- minus Pre-Image exposure. Dots represent single data points, boxplots and half violin plots represent the mean and probability distribution according to condition. Red line, black points and error-bars (S.E.M) represent fitted values of the main effect of Visual Framing on the probability of choosing a strong leader. After exposure to photos of large groups of refugees, participants significantly chose a more dominant and less trustworthy leader in comparison to the pSG condition ($p < 0.05$). *C*): Heatmaps for the probability of choosing a face as a leader according to Trustworthiness (X- Axis) and Dominance (Y-Axis). Values are probabilities in percentage as a difference of Post-Pre image exposure as well as the difference of photos of Large Groups - photos of Small Groups. After exposure to pLG vs pSG, participants were more likely to choose a face high in Dominance (red pixels) and low in Trustworthiness (blue).

Metanalysis of the Implicit Dehumanization Effect

Interestingly, the political consequences observed in Studies 6-7 do not seem to be directly related to changes in dehumanization. For Studies 6-7, *Framing* alone did not influence the implicit dehumanization of refugees (Study 6: $F(1,690)=0.527$, $p=0.468$, and Study 7: $F(1,437)=0.065$, $p=0.799$), nor did dehumanization influence the petition endorsement or the political leader choice, suggesting that visual framing may modulate dehumanization and political behavior independently. Given the divergence in results observed in Studies 1-2 and Studies 6-7, we carried out a meta-analysis on the effects of *Framing* across these 4 studies and confirmed that, on average, there was increased dehumanization of refugees after exposure to pLG compared to pSG ($\theta = -0.9344$, $z=-2.262$, $p= 0.026$; Figure 5). The meta-analysis was carried out using the metaphor Package for R on the coefficient estimates and standard errors from the linear regressions on the main effect of *Framing* on dehumanisation (attribution of secondary emotions) using a fixed effect methods ('FE'). The Coefficients for Study 2 were estimated in a model without the interaction *Framing* x *Narrative* for reliable estimation of *Framing* without the influence of the interaction. Using the reporter() function for the metaphor Package, the examination of Cook's distances and studentized residuals (in all studies smaller than +/- 2.4977), revealed that there was no indication of outliers in the context of this model and none of the studies could be considered to be overly influential. According to the Q-test, there was no significant amount of heterogeneity in the true outcomes ($Q(3)=2.5364$, $p=0.4688$, $I^2=0.0000\%$).

Figure 5: Meta-analysis of Framing's coefficient estimates on assignment of secondary emotions to refugees across studies 1, 2, 6 and 7 confirming that on average dehumanization of refugees was greater after exposure to pLG than to pSG. Cook's distances and studentized residuals showed no indication of outliers in and the Q-test and I^2 suggest no evidence of heterogeneity in this model.



The meta-analysis substantiates the overall reliability of the *Framing* effect. Whereas our reported effect sizes are small to medium, when considering the en-masse effects on the general population, repeatedly exposed to considerably more images than the ones presented

in our studies, visual exposure to pLG can have substantial real-life social and political consequences.

Study 8 Rationale and Results

The lack of a dehumanization effect, at least as measured in Studies 6 and 7, on political behaviour suggests that it is not the emotions observers attribute to the refugees that are driving these political changes. Instead, in line with past findings, the role of emotions people experience themselves during different visual depictions may be more important in bringing about these effects. Esses and colleagues^{35,61} have shown that emotional reactions elicited by dehumanizing media editorials mediated negative attitudes towards refugees and refugee policy⁶¹. **Study 8** investigated the mechanism whereby visual framing elicits distinct patterns of emotional reactions which may in turn influence participants' political behaviour. In a between-subjects design, participants rated, after each picture, to what extent they themselves felt emotions of *pity*, *contempt* and *admiration* toward the depicted refugees^{30,53}. Before and after visual exposure, participants performed the Leader-Choice Task (see Figure 6A) and then rated how threatening refugees were in terms of symbolic (i.e., threats to the in-group's norms, values and culture) and realistic threat (i.e., threats to the in-group's economic or political power or physical wellbeing)⁴².

In order to develop a more mechanistic understanding on how visual images may impact viewers' threat perceptions and political behavior, we used path analysis in Structural Equation Modeling (SEM), to investigate whether participants' emotional reactions during exposure to images (*contempt*, *pity*, *admiration*) mediate the effects of *Framing* and *Narrative* on leader choice (*ProbaPost-ProbaPre*) and on perceived *realistic* and *symbolic threat* (see Figure 6c and 6d for the model specification and SM for all effects coefficients). All models were estimated in the lavaan package for R[version 0.6-4] using full information maximum likelihood. Overall model fit was assessed with the comparative fit index and SRMR.

The model [CFI= 0.854; SRMR= 0.065] revealed that exposure to pLG ($\beta = -0.181$, $p = 0.006$) and pictures of refugees on *land* ($\beta = -0.197$, $p = 0.003$) resulted in reduced felt *pity* ($R^2=0.235$) and *admiration* ($R^2=0.111$; with pLG: $\beta = -0.313$, $p < 0.001$; *land*: $\beta = -0.199$, $p = 0.004$). Conversely, exposure to land pictures increased *contempt* ($R^2=0.078$, $\beta = 0.242$, $p = 0.001$). Ratings of *pity* ($\beta = -0.013$, $p = 0.003$) towards refugees directly predicted *Leader*

Choice ($R^2=0.025$): the less they reported feeling pity towards refugees, the more likely they were to choose the more dominant and less trustworthy face. Importantly and relevant for understanding the mechanism by which visual depictions impacts political behavior, we observed indirect effects of both *Framing* ($\beta = 0.002$, $p = 0.044$) and *Narrative* ($\beta = 0.002$, $p = 0.036$) through *pity* on Leader Choice: the less participants reported feeling *pity* for refugees depicted on pLG, the more likely they were to choose an authoritarian leader. In addition, the less participants reported feeling *pity* for refugees depicted on land in general, the more likely they were to choose an authoritarian leader.

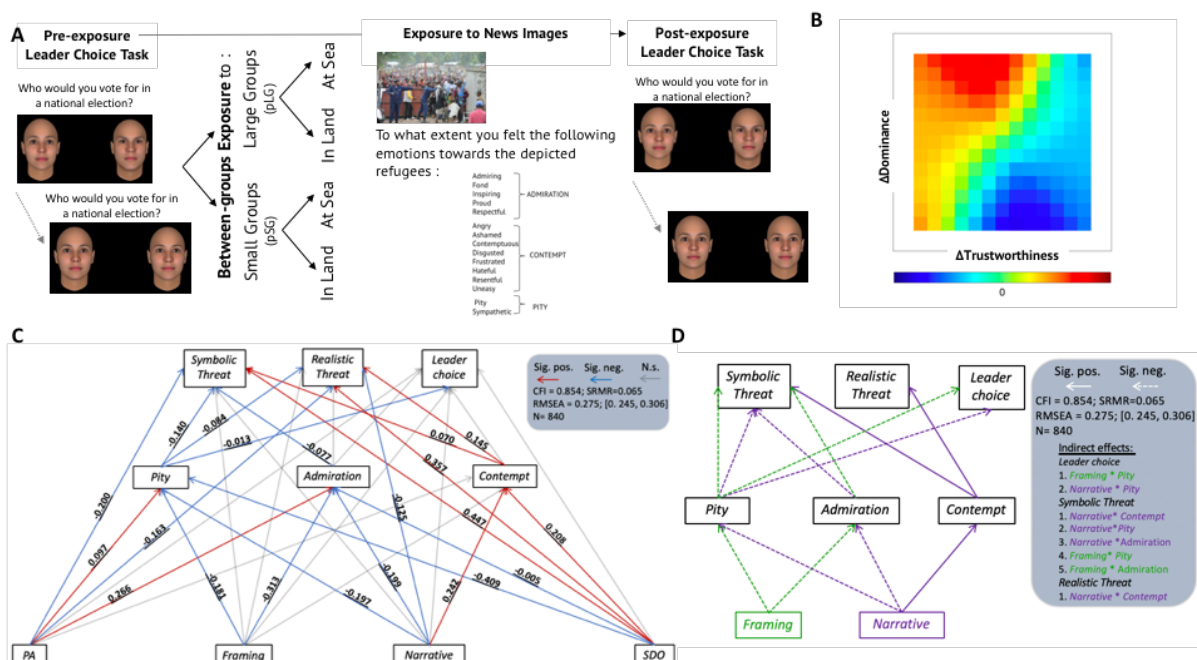


Figure 6: (A) Between-subjects design of Study 8. Before and after exposure to images, participants completed a leader-choice-task. During exposure (16 images of refugees pLG /pSG; Land/ Sea) participants rated after each image, to what extent they felt 15 emotions towards the depicted refugees (VAS scale;0-not at all-100 –very much so). Pity toward refugees was calculated as the average of 2 items (pity and sympathetic); Admiration as the average of 5 items (admiring, fond, inspiring, proud, respectful) and contempt as the average of 8 items (angry, ashamed, contemptuous, disgusted, frustrated, hateful, resentful and uneasy). (B) Heatmaps for the change (post minus pre) in probability of choosing a face as a leader according to Trustworthiness and Dominance. (C). Structural equation model predicting Leader-Choice and symbolic and realistic threat. Standardized parameter estimates are shown in blue for negative and red lines for positive significant relationships. PA= Political attitude, conservative- liberal(0-7); Framing= pSG(0), pLG(1); Narrative= sea(0), land(1); SDO= Social Dominance Orientation;) Political Leader Choice (Post-Pre exposure to images of refugees). (D). Plot of significant indirect effects of Framing (green) and Narrative (purple) on Leader-Choice behaviour, perceptions of symbolic and realistic threat via felt Emotions (Pity, Admiration and Contempt) towards refugees. Significant negative paths are plotted in dotted and significant positive paths in solid lines. All indirect effects presented positively predict the manifest variables Leader-Choice, Symbolic and Realistic threat; i.e. both pLG and images on Land are positively related to socio-political variables via the respective emotions (see also Table S3 in SM).

While perceptions of *Symbolic Threat* ($R^2=0.486$) towards refugees were not directly affected by *Framing* and *Narrative*, indirect effects of both were observed. That is, refugees were judged to pose greater symbolic threat after exposure to pLG through diminished feelings of *pity* ($\beta = 0.025$, $p = 0.017$) and *admiration* ($\beta = 0.024$, $p = 0.019$). Further, photos of refugees arriving on land were associated with enhanced perceptions of symbolic threat through the experience of *contempt* ($\beta = 0.017$, $p = 0.042$), diminished *pity* ($\beta = 0.028$, $p = 0.011$) and reduced *admiration* ($\beta = 0.015$, $p = 0.048$). Perceptions of *Realistic Threat* ($R^2 = 0.331$) were directly predicted by *Narrative* ($\beta = -0.125$, $p = 0.042$) and indirectly through feelings of *contempt* ($\beta = 0.035$, $p = 0.006$). Overall, participants exposed to images of refugees at sea (vs land) perceived them as an important realistic threat to the ingroup. However, when indicating high feelings of *contempt* after exposure to images showing refugees on land participants also rated refugees as being of considerable realistic threat. The above pattern of results demonstrates once more the importance of emotive reactions to the pictures in the mediation of *Framing* and *Narrative* effects. Moreover, it is interesting to note that *Framing* was particularly associated with the modulation of emotions perceived as “high warmth” (*pity* and *admiration*)⁴³ and with perceptions of symbolic (but not realistic) threat which further suggests its impact on socio-moral outgroup evaluations (see Study 3). Taken together, these results advance our understanding of the effect of *Framing* on political leader choice of Study 7 by explaining aspects of the mechanism whereby *Framing* and *Narrative* may independently influence political behavior via distinct emotional reactions.

General Discussion

Going beyond the well-studied pro-social changes in attitudes and behavior in response to iconic images of identifiable victims^{8,10,11}, we investigated the potential adverse effects of the most commonly used, yet understudied, visual framing of large outgroups, in particular of refugees. We tested a series of multi-disciplinary hypotheses on whether and how exposure to news images influence our perceptions of and political behaviour towards the highly stigmatized outgroup of refugees. Unsurprisingly, depicting refugees in large groups is explicitly evaluated as a less humane way of visualizing them (Studies 4-5). Beyond such explicit evaluations, Studies 1-3 and a meta-analysis showed that exposure to the current dominant visual framing of refugees, namely that of large anonymized groups, reduced the attribution of uniquely human characteristics to the depicted refugees. This effect cannot be simply attributed to differences in distress⁶² that viewers may experience when exposed to different framings, as reported distress did not vary according to framing. In general, people

tend to attribute less mind to individuals perceived in cohesive groups³⁷⁻³⁹ by showing selective dehumanization according to the group's social characteristics. Interestingly, increased dehumanization was not observed for large groups of survivors of natural disasters suggesting that the effect of visual framing on the refugees' dehumanization is not simply denotative, in the sense that seeing any anonymous group literally hinders the identification of human subjects. Cognitive processes of categorial perception and stereotyping are subject to historical and social contexts and the saliency of the refugee crisis in western media over the recent years⁶³ may explain the selective effect we observed.

Beyond the denotative level, our findings demonstrate the power of specific visual framings at the connotative and ideological levels. The fact that exposure to pLG may increase dehumanization of refugees resonates with the view that current visual representations of refugees emphasize a security rather than a humanitarian debate, as refugees are visually represented 'as *being* a crisis' for host nations, rather than finding themselves *in* a crisis^{49,64}. Drawing on the parallels between the common visual depiction of refugees in the sea and linguistic narratives that compare refugees to elemental forces such as water and flooding^{12,30,49}, we find tentative support for this connotative hypothesis that a narrative conveyed by metaphors of water^{13,29-32} may increase dehumanization. Connotation refers to the cultural and historical meanings added to a sign's literal meaning. Here, we found evidence that depictions of large refugee groups in the sea may indeed further increase their dehumanization (Study 2) and, through separate cognitive processes, independently promote perceptions of realistic threat in the case of sea images and symbolic threat for land images (Study 8). Other inferences or associations, such as perceived vulnerability or incurred risk, might also contribute to the observed effects and should be tested in future studies.

In general, while the effect of framing on dehumanization is in the same direction across all studies, we do note that neither in Study 6 nor in Study 7 this effect reaches significance. The meta-analysis, and the replication with an alternative measure that we used in Study 3 provides support in favour of a general effect of framing on dehumanization. Moreover, as Study 2 shows it may be the case that the effect of framing on dehumanization is more pronounced for images that depict refugees in the sea element, and we note that in Studies 6 and 7 images of refugees in both land and sea were used. This may explain why the effect is at trend level in these studies, but we note that the interpretation of a null finding must always be done cautiously. Study 7 also had a different design, as it started with the political leader choice task and that may have framed the dehumanization questionnaire in a different way.

Lastly, future studies could focus in more systematic ways in how citizens from different EU countries, depending on the specific geopolitical features of their country, may be differently affected by Framing and Narrative.

As we show, visual framing (Studies 6-8), can impact both the endorsement of policies as well as the hypothetical choice of political leaders. Undoubtedly, voting preferences are best explained by the candidate's positions but we often form rapid automatic inferences from the facial appearance of political candidates⁵⁶. Increased preference for facial dominance in leaders is thought to reveal the electorate's support for a leader capable of enforcing actions and policies to protect the ingroup⁵⁴. Our findings on the effects of framing-driven biases on political leader choices, reduced endorsement of pro-refugee policies and increased endorsement for anti-refugee policies accord with such findings and demonstrated the political power of imagery to bias political choices. Importantly, it is not the emotions that viewers attribute to the depicted groups that drive these political consequences, but instead it is the emotions that the viewers *themselves experience* when looking at these images of large groups. In particular, the experience of pity mediated the relationship between visual framing and political leader choice, but also perceived symbolic threat. In line with insights from psychology^{51,61} and humanities¹, images function as semiotic devices^{15,50}, that elicit specific emotional reactions to the visually depicted human beings, ultimately affecting the ways we relate to one another.

In the present studies, we focused primarily on what is considered to be the most important and salient dimension in the visual documentation of humanitarian crises, namely the size of the depicted group, and therefore our conclusions concern the role of group framing. However, images and especially photojournalistic ones vary on several different dimensions, such as their iconography, depicted emotions, gendered aspects to name a few. Even though we used highly ecological stimuli, future studies must further explore the roles of different dimensions and ascertain their potential political power. Lastly, while our studies demonstrated the effects of Framing and Narrative on dehumanization and independently on political behaviour, we note that our focus here was on implicit dehumanization. Given that blatant dehumanization is predictive of numerous consequential attitudes and behaviours, future studies could further explore how the effects of visual exposure to such images influence explicit forms of dehumanization.

There are no neutral ways to visually depict human beings. Neither the medium itself can afford such neutrality, nor the photographers, the publishers or the spectators. Across history,

images of refugees change as socio-political discourse, cultural norms and humanistic values - or lack thereof⁶³ change. What seemed to be a strategic decision to display refugees as helpless groups devoid of individuality with the hope to increase public support in the sixties, no longer functions in the same way⁶³. Nowadays, the removal of individuality, rather than countering the public's fear, enhances the dehumanization of refugees and the political consequences of specific visualizations. Therefore, the decision of *what* is made visible, and *how*, should be thought of as a choice that has consequences for the ways in which we perceive and relate to other human beings, especially in a culture that is powered by images at unprecedented levels.

Data Availability: All materials, data-sets and scripts are available at the Open Science Framework <https://osf.io/ap9f7/>

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SUPPLEMENTARY MATERIALS -When the lens is too wide: the political consequences of the visual dehumanization of refugees

Table S1 present a summary of the aims, main measures, primary and secondary findings of Studies 1-8, and Studies S1 and S5. Note that analyses reported in this table refer to the regression models including all the covariates.

	Study Aim	Key Measure(s)	Primary findings	Secondary findings
1	Does exposure to the visual Framing of showing refugees in large groups increases their implicit dehumanization?	Differences (i.e. post-pre) in the <i>Assignment of Secondary Emotions</i> to refugees after exposure to pSG or pLG (i.e. Framing)	Exposure to pLG (vs pSG) was associated with increased dehumanization of refugees, i.e. reduced assignment of secondary emotions (F=4.816, p=0.029)	Participants reporting higher levels of distress in response to the photos were more likely to assign secondary emotions to refugees (F=5.857, p=0.016) independently of the <i>Framing</i>
S1	Does exposure to the visual Framing of large groups of survivors of natural disasters, who are also frequently dehumanised, increase their implicit dehumanization ?	Differences (i.e. post-pre) in the <i>Assignment of Secondary Emotions</i> to Survivors or Natural Disasters after exposure to pSG or pLG	Exposure to pLG (vs pSG) was not associated with increased dehumanization of Survivors of Natural Disasters (F=1.432, p=0.320)	
2	Does exposure to a particular visual Narratives depicting large groups of refugees in the Sea leads to increased implicit dehumanization?	Differences (i.e. post-pre) in the <i>assignment of secondary emotions</i> to refugees after exposure to pSG or pLG of refugees arriving through Land or Sea	Exposure to pLG (vs pSG) of refugees arriving through Sea (t.ratio=2.90, p=0.0160) but of those arriving through to Land (t.ratio=-0.712, p>0.99) was associated with increased dehumanization	Participants reporting higher levels of distress in response to the photos were more likely to assign secondary emotions to refugees (F(1,428)=10.753, p=0.001
3	Provide a conceptual replication of the main effect of Framing using a different measure of dehumanization as proposed by the Stereotype Content Model.	Differences in <i>Competent</i> and <i>Warmth</i> judgments of refugees and Survivors of Natural Disasters depicted in pSG and pLG	Refugees depicted in pLG, but not in pSG (t.ratio=0.397, p>0.99), were judged to be less warmth than SND depicted in pLG (t.ratio=-3.642, p<0.001) Overall, refugees were judged to be less competent than SND ($\chi^2=20.173$, p<0.001)	Politically conservative individuals ($\chi^2=0.965$, p=0.0259) and those scoring high on SDO ($\chi^2=24.289$, p<0.001) judged refugees and SND as less competent.
4	Do viewers explicitly evaluate photographs of refugees depicted in large groups as less humane ?	Differences in <i>Ratings of Humane Depiction</i> of pLG and pSG of refugees arriving through Land or Sea	pLG were perceived as less humane than pSG ($\chi^2=234.03$, p<0.001) and Sea photo were evaluated as more humane than Land photos ($\chi^2=10.645$, p=0.0011)	An interaction between Political Orientation and Framing ($\chi^2= 5.160$, p=0.023) revealed that self-reported liberals, but not conservatives, tend to perceive pSG as more humane compared to pLG.
S5	Collect subsets of real newspaper headlines differing in the perceived portrayal of refugees in humane and less humane ways.	<i>Humanness ratings</i> of each headline	The 24 most dehumanizing and the 24 most humanizing headlines were selected. The average ratings of (in)humanness of these two subsets differed statistically (t=34.4, p<0.001).	
5	How do different combination of photographs and	Differences in <i>Humanness ratings</i> of different	Both pLG (vs pSG) and dehumanizing (vs. humanizing) headlines were	

	headlines affect viewer's evaluation of the (in)humanness of front covers?	combination of "front-covers", i.e. humanizing or dehumanizing headlines and pLG or pPG	associated with lower ratings of the front-covers' humaneness. Moreover, the combination of pLG and dehumanizing headlines predicted particularly low ratings, and the combination of pSG and humanizing headlines predicted higher perceptions of humaneness, suggesting an interactive effect (t.ratios>4.335, ps<0.001)	
6	Does exposure to the visual Framing of showing refugees in large groups influence the viewers' endorsement of pro- and anti-refugees petitions?	Differences in the endorsement of pro- and/or anti-refugees petitions after exposure to pSG or pLG. Interaction between <i>Framing</i> and differences (i.e. post-pre) in <i>the Assignment of Secondary Emotions</i> to refugees after exposure to pSG or pLG	Exposure to pSG (vs pLG) was associated with increased likelihood of signing a pro-refugees petition (t=-2.513, p=0.012) and decreased probability to sign an anti-refugees petition (t=2.386, p=0.017). Dehumanization was not found to moderate the effect of Framing on the endorsement of pro- or anti-refugees petitions (ts<0.107, ps>0.05).	Participants with higher SDO scores (t=-6.099, p<0.001), those who identify themselves politically as liberals (t=3.553, p<0.001) and those reporting higher levels of distress (t=5.156, p<0.001) were more likely to sign in favour of the pro-refugees. Politically liberal participants (t=-2.987, p=0.003) and those with higher SDO scores (t=5.672, p<0.001) were more likely to sign against the anti-refugees petition. <hr/> No effect of Framing (F=0.527, p=0.468) on dehumanization was observed
7	Does exposure to the visual Framing of showing refugees in large groups influence the viewers' political leader preferences?	Differences in the <i>probability of choosing an authoritarian</i> (i.e. more dominant and untrustworthy) <i>political leader</i> in an hypothetical national election after exposure to pSG or pLG Interaction between <i>Framing</i> and differences (i.e. post-pre) in <i>the Assignment of Secondary Emotions</i> to refugees after exposure to pSG or pLG	Participants exposed to pLG (vs pSG) were more likely to show preference towards an authoritarian political leader (F=3.974, p=0.0468) Dehumanization was not found to moderate the effect of Framing on the choice of political leader (F=0.501, p=0.479)	The higher participants scored in the Xenophobia-scale, the more likely they were to choose an authoritarian leaders following exposure to pLG (F=7,138, p=0.008). No effect of Framing (F=0.065, p=0.799) on dehumanization was observed.
8	Investigate how emotional reactions (i.e. pity, admiration, contempt) to different photographs mediate Framing and Narrative effects on viewers' political leader preferences, and their perceptions of symbolic and realistic threat.	Structural Equation Modelling was used to test whether participants' emotional reactions during exposure to images mediate the effects of <i>Framing</i> and <i>Narrative</i> on leader choice Using Structural Equation Modelling, we	The less participants reported feeling pity for refugees depicted on pLG ($\beta=0.002$, p=0.044) or on Land ($\beta=0.002$, p=0.036), the more likely they were to choose an authoritarian leader. Participants who reported feeling less pity ($\beta=0.025$, p=0.017) or admiration	Participants reporting less pity ($\beta=-0.013$, p=0.003) towards refugees were more likely to choose and authoritarian leader. Liberal participants ($\beta=-0.200$, p<0.001), those with high SDO scores ($\beta=0.447$,

	<p>estimated <i>the effects that Framing and Narrative have either directly or indirectly</i>, through reported emotional reactions to the images, on perceptions of symbolic and realistic threat.</p>	<p>($\beta=0.024$, $p=0.019$) of refugees depicted in pLG were more likely to judge them as posing greater symbolic threat.</p> <p>Participants reporting greater levels of contempt ($\beta=0.017$, $p=0.042$) or diminished pity ($\beta=0.028$, $p=0.011$) or admiration ($\beta=0.015$, $p=0.048$) to photos of refugees arriving on Land were more likely to perceive them as posing greater symbolic threat.</p> <p>Participants exposed to images of refugees at Sea (vs Land) were more likely to perceived them as a realistic threat ($\beta=-0.125$, $p=0.042$).</p> <p>When participants exposed to photos of refugees arriving through the Land reported high feelings of contempt they were also more likely to perceive them as a realistic threat ($\beta=0.035$, $p=0.006$).</p>	<p>$p<0.001$), those reporting greater feelings of pity ($\beta=-0.140$, $p<0.001$), admiration ($\beta=-0.077$, $p=0.006$) or feeling less contempt ($\beta=0.070$, $p=0.011$) towards refugees were less likely to perceive refugees as a symbolic threat.</p> <p>Participants experiencing more contempt ($\beta=0.145$, $p<0.001$) or less pity ($\beta=-0.084$, $p=0.013$) towards refugees reported were more likely to perceive refugees as a realistic threat. Likewise, conservative participants ($\beta=-0.163$, $p<0.001$) and those scoring high on SDO ($\beta=0.357$, $p<0.001$) perceived refugees as a realistic threat to their ingroup.</p>
	<p>Using Structural Equation Modelling, we estimated the effects that Framing and Narrative have on <i>reported emotional reactions</i> to the images of refugees</p>	<p>Exposure to pLG or pictures of refugees on Land was associated with reduced felt pity (pLG: $\beta=-0.181$, $p=0.006$; Land: $\beta=-0.197$, $p=0.003$) and admiration (pLG: $\beta=-0.313$, $p<0.001$; Land: $\beta=-0.199$, $p=0.004$)</p> <p>Exposure to Land pictures was associated with increased feelings of contempt ($\beta=0.242$, $p=0.001$)</p>	<p>Liberal participants were more likely to report feeling pity ($\beta=0.097$, $p=0.008$) and admiration ($\beta=0.266$, $p<0.001$) towards refugees.</p> <p>Participants who scored high on SDO were more likely to report more contempt ($\beta=0.208$, $p<0.001$) and less pity ($\beta=-0.409$, $p<0.001$) towards refugees.</p>

Stimuli Selection and Classification of Images Studies 1-8:

We collected award winning photojournalistic images (e.g. Pulitzer Prize, World Press Photo Award, Magnum Photography Award, and Prix Pictet) taken between 1990-2017, that depicted refugees and survivors of natural disasters (SND). We excluded photojournalistic images showing explicit violence, blood or dead people.

Images were classified as photos of Small Groups (pSG) when the refugees/SND displayed were no more than 8 in number, and at least half of the individuals depicted or the main person in focus (e.g. center of the scene or main subject of the action depicted) had distinguishable facial traits.

Conversely, photos were classified as photos of Large Groups (pLG) when they showed more than 8 refugees/SND and when no more than two individuals had clearly recognizable facial features.

Images were selected according to these criteria by 2 independent coders (SDB & RTA), and photos that did not fit any of these classifications were excluded. After exclusion, a pool of 130 images in

total, 78 depicting refugees (pSG = 40, pLG =38) and 52 depicting survivors of natural disasters (See Study S1, pSG=27, pLG=25) were selected for use. In a second step, 4 independent raters classified the 130 images according to the number of people depicted (individual; 2-8 people; >8 people). We computed their interrater reliability with the irr package in R. An excellent beyond chance agreement was reached (Kappa = 0.868: $z=30.1$) among the raters. Out of this image-pool we randomly selected the stimuli used in each of our studies (see Methods). Links to all the images used are provided at <https://osf.io/4uqeh/>.

Study 1: Supplementary Analysis

In a second model, *Framing* and our covariates of interest – *Social Dominance Orientation* (SDO), *Political Orientation* and participants' average *Distress* ratings for each picture (see Figure 1A and Methods) – were added to the model together with their interactions with *Framing* ($R^2 = 0.7013$). The main effect of *Framing* ($F(1,454)=4.816$, $p=0.0287$), remained significant. Additionally, *Distress* ($F(1,454)=5.857$, $p=0.0159$) positively predicted the assignment of secondary emotions. However, none of the covariates interacted with *Framing* ($ps>0.05$). The fact that this effect was independent of political orientation and general social attitudes suggests that the effects of visual framing may be partially immune to explicit political beliefs. This was not unmediated by differences in the distress reported by participants in response to the different images, as for both pLG and pSG they reported comparable distress levels ($t(463.73)=-0.58$, $p=0.56$).

Further, we controlled whether *Framing* alone and with our covariates of interest impacts the attribution of *Primary Emotions* to refugees after exposure to images.

In the first model (Adjusted $R^2=0.7602$), only *Pre-Primary* ($F(1,460)=1466.835$, $p<0.001$) and *Difference-Secondary* ($F(1,460)=32.594$, $p<0.001$) were found to predict *Post-Primary*, as neither *Framing* ($F(1,460)=0.249$, $p=0.618$) nor its interactions were significant ($ps>0.05$), suggesting that exposure to the two different visual framings did not influence the attribution of primary emotions to refugees. In the second model (Adjusted $R^2=0.7634$), *Political Orientation* ($F(1,454)=4.011$, $p=0.0458$) predicted significantly the attribution of primary emotions: the more liberal the participants, the more they attributed primary emotions to refugees. The interaction of *Political Orientation* and *Framing* was not significant. Neither *Framing*, *SDO* nor *Distress* scores were significant (all $ps>0.05$). Finally, we found a trend for the interaction between *Distress* and *Framing* ($F(1,454)=2.987$, $p=0.0846$) in predicting attribution of primary emotions.

Lastly, we investigated whether *Framing* without *Difference- Primary* as predictor to the model, still predicted the attribution of secondary emotions after exposure to images. In the first model, (Adjusted $R^2=0.6788$), *Framing* ($F(1,462)=4.016$, $p=0.0456$) predicted significantly attribution of *Post-Secondary* emotions. Attribution of *Pre-Secondary* emotions ($F(1,462)=977.251$, $p<0.001$) also predicted significantly attribution to *Post-Secondary* emotions. Indeed, participants attributed fewer uniquely human emotions to refugees after exposure to images of large groups of refugees.

Study S1

Aim: To investigate whether the effect of Study 1 can be generalized to the depiction of any large group of humans who may find themselves in hardship, **Study S1** applied the same methods as Study 1 to images of survivors of natural disasters (SND) who are frequently dehumanized (1) but, arguably, do not share the same socio-political discourse of threat and invasion such as refugees. Notably, SND are often framed similarly to refugees. For instance, depictions of SND in the media often portray human suffering, physical struggle and precarious living conditions that may imply the need for a- at least temporary- displacement of large groups of people.

Methods

Participants. The final sample consisted of 427 participants (mean age=34.3, sd=10.6, 304 females). Data from further 40 participants (outliers: +/- 2.5 sd above the mean) was excluded from analyses.

Design: The design and structure of this study was identical to Study 1. Before and after exposure to pLG of SND (n=208) and pSG of SND (n=219), participants rated how much SND generally feel each of the primary and secondary emotions by answering to the following question: “To what extent do you think Survivors of Natural Disasters, in general, are likely to feel the following emotions?” using a visual analogue scale (0- not likely at all; 100 –extremely likely)

Stimuli. 25 pSG and 25 pLG depicting SND were randomly selected from our data set and used.

Procedure. Baseline dehumanization questionnaire, image exposure and distress ratings following each image as in Study 1, post-manipulation infrahumanization questionnaire, SDO, demographics and political affiliation.

Results: Statistical analysis of Study S1 was identical to that of Study 1. Using the first model (Adjusted $R^2=0.598$), only the *Pre-Secondary* ($F(1,421)= 591.888, p<0.001$) and *Difference-Primary* ($F(1,421)=21.905, p<0.001$) covariates were found to predict *Post-Secondary*, as neither *Framing* ($F(1,421)= 1.551, p=0.214$); see Figure S1) nor the interactions were significant ($ps>0.05$), suggesting that exposure to the two different visual framings did not influence the dehumanization of SNDs. Likewise, in the second model (Adjusted $R^2=0.596$), neither *SDO* scores, *Political Orientation* nor *Distress* ratings were found to be significant nor interacted with *Framing* (main effect: $F(1,415)=1.432, p=0.232$) in predicting *Post-Secondary* (all $ps>0.05$).

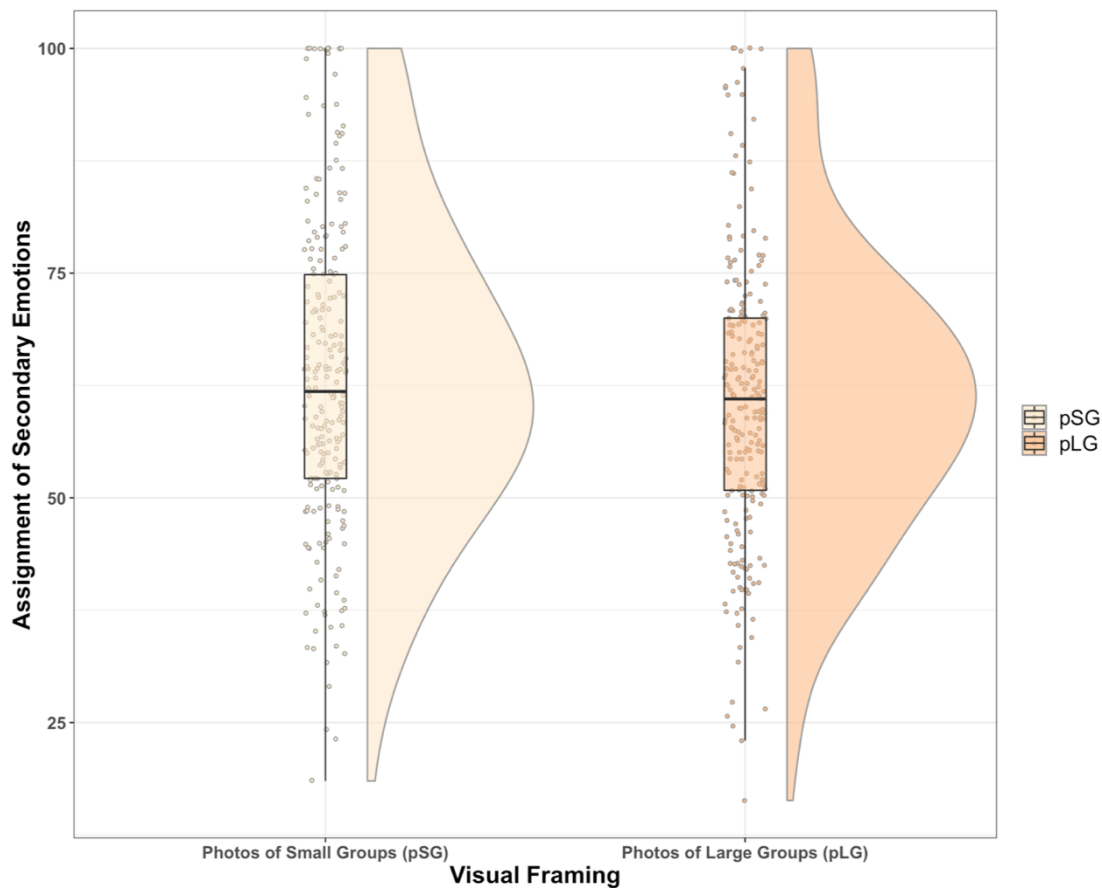


Figure S1: Results of Study S1: Y-Axis = Assignment of Secondary Emotions after exposure to photographic images of SND. Dots represent single data points, boxplots and half violin plots represent the mean and probability distribution according to condition. There was no main effect of visual framing on the Assignment of Secondary Emotions after exposure to photographic images of SND.

Study 2 Supplementary Analysis

In a second model, the additional predictors *Social Dominance Orientation* (SDO), *Political Orientation* and participants' average *Distress* ratings for each picture (see Figure 1A and Methods) were added to the model together with their interactions with *Framing* and *Narrative* ($R^2 = 0.7013$) but none of them were significant ($ps > 0.05$). Importantly, the interaction *Framing* x *Narrative* ($F(1,428) = 6.987$, $p = 0.00851$) remained significant. Reported *Distress* ($F(1,428) = 10.753$, $p = 0.001$) positively predicted the attribution of secondary emotions to refugees. No other covariate was found to be significant nor to interact with *Framing* or *Narrative* ($ps > 0.05$).

We also investigated whether *Framing* and *Narrative* alone and with our covariates of interest affect the attribution of *Primary Emotions* to refugees after exposure to images.

In the first model (Adjusted $R^2 = 0.554$), only *Pre-Primary* ($F(1,440) = 562.704$, $p < 0.001$) was found to predict *Post-Primary*, as neither *Framing* ($F(1,440) = 1.840$, $p = 0.176$) nor *Narrative* ($F(1,440) = 0.527$,

$p=0.468$) and their interactions were significant ($ps>0.05$), suggesting that exposure to the two different visual framings and narratives did not influence attribution of primary emotions to refugees. In the second model (Adjusted $R^2=0.676$), *Pre-Primary* ($F(1,440)=577.245$, $p<0.001$) and *Difference-Secondary* ($F(1,428)=321.503$, $p<0.001$) predicted significantly the attribution of primary emotions. Neither *Framing*, *Narrative* nor *Distress* ratings and *SDO* scores and their interactions were found to be significant (all $ps>0.05$). Noteworthy, we found a significant interaction between *Narrative* and *Distress* ($F(1,428)=6.588$, $p=0.0106$) in predicting attribution of primary emotions. This interaction could be explained by positive relationship between distress and the assignment of primary emotions in pSG and the opposite trend for pLG.

As in Study 1, we also investigated whether *Framing* and *Narrative* without *Difference-Primary* as predictor to the model, still predicted the attribution of secondary emotions after exposure to images. In the first model, (Adjusted $R^2=0.602$), the interaction *Framing* x *Narrative* ($F(1,444)=6.748$, $p=0.00970$) and the main effect of *Pre-Secondary* ($F(1,444)=675.927$, $p<0.0001$) remained significant. Indeed, participants attributed fewer uniquely human emotions to refugees after exposure to images of large groups of refugees, particularly, when they were portrayed arriving by sea.

Study 3 Supplementary Analysis

For *Warmth*, in a second mixed-models regression, when including *SDO* scores ($\text{Chisq}=15.055$, $p<0.001$) and *Political Orientation* ($\text{Chisq}=6.613$, $p=0.0101$), the interaction between *Framing* x *Group* x *Political Orientation* was significant ($\text{Chisq}=4.346$, $p=0.0371$). The function *emTrends* of the CRAN package for R was used to test for the mediation of political orientation in warmth ratings across Framing and Group type (Bonferroni-correction: $n=4$) but the post-hoc results revealed no robust differences in the influence of *Political Orientation* as a function of *Framing* and *Group* ($ps>0.05$). Importantly, the interaction *Framing* x *Group* ($\text{Chisq}=13.726$, $p<0.001$) remained significant confirming higher warmth ratings to SND (vs refugees). All other $ps>0.05$.

Similarly, a second mixed-models regression for *Competence*, showed that politically conservative individuals ($\text{Chisq}=9.65$, $p=0.0259$) and those scoring high on *SDO* ($\text{Chisq}=24.289$, $p<0.001$) judged refugees and survivors of natural disasters as less competent (all other $ps>0.05$). Importantly, the main effect of *Group* ($\text{Chisq}=20.173$, $p<0.001$), was still significant reflecting higher competence ratings to SND (vs refugees).

Study 4 Supplementary Analysis

In a second multiple regression model that included *Political Orientation* and *SDO* scores as predictors, as well as their interactions with *Framing* and *Narrative*, we found a significant interaction between *Political Orientation* and *Framing* ($\text{Chisq}=5.160$, $p=0.023$) showing that self-reported liberals tend to perceive pSG as more humane compared to pLG. Unlike liberal participants, self-

defined conservatives did not consider pSG to be more humanizing than pLG. This finding suggests, that the explicit evaluation of the (de)humanizing quality of visual framing is partially dependent on the viewers' political orientation. *Framing* (Chisq= 234.030, $p < 0.001$) and *Narrative* (Chisq=10.645, $p = 0.0011$) remained significant. We also found a trend on *SDO* (Chisq= 3.302, $p = 0.0692$). No other significant effects were found (all $ps > 0.05$).

Study S5:

Study S5 allowed us to collect independent ratings on the (in)humanness of headlines that have appeared in British media. Participants were asked to rate on a 9-point Likert scale the extent to which each headline describes refugees in a humane way, i.e. as they would describe national citizens of their own country, allowing us to obtain (de)humanizing ratings for each headline.

Participants. 147 participants, recruited with the online platform Prolific (<https://www.prolific.ac/>) took part in Study S5 (mean age: 38.8, $sd = 12.9$, 106 females). Recruitment was restricted to UK nationals and residents to avoid language-based misinterpretation of newspaper headlines.

Stimuli. We used the NEXIS Online Database and the Newspaper Archives of the British Library to collect all headlines including the words refugee(s) or (im)migrant(s) from May-December 2015 that appeared in five major UK National Newspapers (*The Guardian, The Independent, The Daily Mirror/Star, The Telegraph, The Sun*). We excluded titles that referred to: i) organization/institution (except the EU), country (except the UK), ii) any particular person or political figure/party, or iii) a specific geographical site. Moreover, headlines describing settings or actions that were deemed too specific and likely to be incompatible with the visual content of the photos (see Study 5), were also excluded. A total of 149 titles remained after exclusion.

Humanness ratings. The titles were randomly divided into 3 subsets of newspaper headlines (number of headlines in each subset = 50, 50, 49) and participants were randomly split into three groups.

Participants were asked to rate “*How much do you believe this news headline portrays refugees in a humane way?*” on a Likert scale (from 1=not at all to 9=very much so). Humane treatment was defined as “refugees portrayed in the same way as national citizens of your country would be, if exposed to and depicted in similar situations”. By contrast, dehumanizing treatment was defined as “depictions of refugees as inferior human beings”. An example of a dehumanizing (e.g. “Refugees flooding our cities like cockroaches”) as well as humanizing (e.g. “With these helping hands: Refugees built new school for local community”) title was given.

Attention Check. Four Attention checks were included in the task using made-up extremely dehumanizing ($n=2$) and humanizing ($n=2$) titles. Data was excluded, if participants failed more than 1 attention checks. In total, data from 49 participants was excluded from further analysis due to failure of at least 1 attention check.

Procedure: The order of events was as follows: Humanness ratings of headlines, demographics.

Analysis and Results: We selected the 24 most dehumanizing (mean=2.54, sd=0.42) and the 24 most humanizing (mean=7.16, sd=0.5) titles for use in Study 5. The average ratings of (in)humanness of these two subsets differed statistically ($t=34.4$, $p<0.001$).

Study 5 Supplementary Analysis

In a second multiple regression model that included our covariates of interest, *SDO* and *Political Orientation* did not predict humanness ratings nor interacted with any of the effects of interest ($p>0.05$). The interaction *Framing x Headline* remained significant ($\chi^2=11.502$, $p<0.001$).

Study 6

Table S2: Tabular results for Study 6

Odds Ratios- Pro Refugees Petition				
	OR	Confidence Interval 5%	Confidence Interval 95%	
Visual Framing	0.6361	0.4456	0.9034	
Social Dominance Orientation (SDO)	0.4247	0.3208	0.5569	
Political Orientation (PO)	1.682	1.2676	2.2532	
Difference Secondary- Emotions (DSE)	0.9738	0.76818	1.2322	
Distress Ratings (Dist)	2.004	1.5448	2.6233	
Visual Framing: SDO	1.1869	0.8213	1.7199	
Visual Framing: PO	0.9398	0.6394	1.3787	
Visual Framing: DSE	0.8988	0.6372	1.2663	
Visual Framing: Dist	0.7176	0.5042	1.0184	
Ordinal Regression - Pro Refugees Petition				
	Value of coefficient	St. Error	t-value	p-value
Visual Framing	-0.4524	0.1800	-2.5128	0.0120
Social Dominance Orientation (SDO)	-0.8563	0.1404	-6.0989	<0.001
Political Orientation (PO)	0.5203	0.1464	3.5536	<0.001
Difference Secondary-	-0.0265	0.1201	-0.2208	0.8252

Emotions (DSE)				
Distress Ratings (Dist)	0.6951	0.1348	5.1562	<0.001
Visual Framing: SDO	0.1713	0.1883	0.9098	0.3629
Visual Framing: PO	-0.0621	0.1957	-0.3173	0.7510
Visual Framing: DSE	-0.1067	0.1750	-0.6099	0.5419
Visual Framing: Dist	-0.3318	0.1791	-1.8530	0.0639

Residual Deviance: 1077.15
AIC: 1099.15

Odds Ratios- Anti Refugees Petition

	OR	Confidence Interval 5%	Confidence Interval 95%
Visual Framing	1.463	1.0713	2.0025
Social Dominance Orientation (SDO)	2.1104	1.635	2.7413
Political Orientation (PO)	0.6751	0.5203	0.8719
Difference Secondary-Emotions (DSE)	0.9653	0.7795	1.1990
Distress Ratings (Dist)	0.8753	0.6923	1.1067
Visual Framing: SDO	0.9637	0.6784	1.3677
Visual Framing: PO	1.299	0.9157	1.8465
Visual Framing: DSE	1.080	0.7897	1.4779
Visual Framing: Dist	1.1172	0.8098	1.5411

Ordinal Regression - Anti Refugees Petition

	Value of coefficient	St. Error	t-value	p-value
Visual Framing	0.3804	0.1594	2.3855	0.0171
Social Dominance Orientation (SDO)	0.7469	0.1317	5.6721	<0.001
Political Orientation (PO)	-0.3928	0.1315	-2.9875	0.0028
Difference Secondary-Emotions (DSE)	-0.0353	0.1094	-0.3227	0.7469

Distress Ratings (Dist)	-0.1332	0.1195	-1.1150	0.2648
Visual Framing: SDO	-0.0370	0.1787	-0.2069	0.8361
Visual Framing: PO	0.2618	0.1787	1.4646	0.1430
Visual Framing: DSE	0.0775	0.1596	0.4857	0.6271
Visual Framing: Dist	0.1108	0.1640	0.6757	0.4992
Residual Deviance: 1190.471 AIC: 1212.471				

Study 6: Additional measure

We asked participants in study 6, at the end of the experiment, to estimate the number of refugees/asylum seekers currently in their countries of residence. We hypothesized that the perception of pLG (vs. pSG) would lead to a greater overestimation of the number of refugees. Participants' estimations of the number of refugees were divided by the actual number of refugees and asylum seekers in their country of residence (data from The UN Refugee Agency concerning the year of 2017: <http://popstats.unhcr.org/en/>) to get relative estimation values (accurate estimation would be 1). Because data distribution was heavily skewed, a Mann-Whitney U Test was used to test estimation differences across the framing conditions. On average, participants largely overestimated the number of refugees currently in their country (pSG: mean=4.988, sd=27.206; pLG: mean=7.9518, sd=38.349) but no difference between conditions was found ($W = 5618$, $p = 0.108$).

Study 7 Supplementary Analysis

Leader Choice task: In addition to the main effect of *Framing* on the probability to choose a more authoritarian leader (*Post-Pre*), the interaction of *Framing* with *Xenophobia* ($F(1,433)=7,138$, $p=0.008$, see Methods) was significant: the higher participants scored in the *Xenophobia*-scale, the more likely they were to increase their preference for authoritarian leaders (ie. more dominant and less trustworthy faces) following exposure to pLG. No other covariates or interaction with *Framing* were found to be significant.

Dehumanization: *Framing* alone did not influence the dehumanization of refugees ($F(1,437)=0.065$, $p=0.799$). However, when adding our covariates of interest to the model ($R^2=0.6146$) – *Xenophobia*, *Political Orientation*, *distress ratings* – we found the interactions between *Framing* and *Distress ratings* ($F(1,431)= 6.164$, $p=0.0134$) and *Framing* and *Political Orientation* ($F(1,431)= 4.370$, $p=0.0372$) to predict negatively and positively, respectively, the attribution of secondary emotions to refugees depicted in pLG (vs pSG) .

Study 8 Results for Path analysis within SEM for effects of Political Orientation, SDO on the emotions (contempt, pity, admiration), on Realistic and Symbolic threat and on Leader Choice.

Emotions: *Political Affiliation* positively predicted *pity* ($\beta = 0.097, p = 0.008$) and *admiration* ($\beta = 0.266, p < 0.001$), that is, the more liberal participants declared to be, the higher they reported feeling *pity* and *admiration* towards refugees. The higher they scored on SDO, the less likely they were to report feeling *pity* ($\beta = -0.409, p < 0.001$) and more likely to experience *contempt* ($\beta = 0.208, p < 0.001$) towards refugees after exposure to the images.

Symbolic Threat: Both *SDO* ($\beta = 0.447, p < 0.001$) and *contempt* ($\beta = 0.070, p = 0.011$) predicted positively the amount of reported symbolic threat towards refugees: that is, participants were more likely to perceive refugees as a symbolic threat to their ingroup when they scored high on *SDO* or when they felt more *contempt* towards refugees after exposure to the images. *Political affiliation* ($\beta = -0.200, p < 0.001$), *pity* ($\beta = -0.140, p < 0.001$) and *admiration* ($\beta = -0.077, p = 0.006$) were found to be negative predictors of symbolic threat: liberal participants and those reporting greater feelings of *pity* or *admiration* towards refugees were less likely to perceive refugees as a *symbolic threat*.

Realistic Threat: Similarly, *SDO* ($\beta = 0.357, p < 0.001$) and *contempt* ($\beta = 0.145, p < 0.001$) predicted positively the amount of reported realistic threat towards refugees, that is, participants experiencing more *contempt* towards refugees or scoring high on *SDO* perceived refugees as a realistic threat to their ingroup. *Political affiliation* ($\beta = -0.163, p < 0.001$) and *pity* ($\beta = -0.084, p = 0.013$) predicted significantly negatively *realistic threat*: liberal participants and those reporting greater feelings of *pity* towards refugees were less likely to perceive them as a *realistic threat* to the ingroup.

Table S3: Standardized parameter estimates for Study 8. Structural Equation Model, Path analysis with Chi-square= 226.172, df= 4, p= 0.000; CFI= 0.854 and SRMR= 0.065.

Parameter	Variable	Estimate	Standard Error	z-value	Pr (> z)
Coefficient	LC ~ Framing	0.014	0.008	1.817	0.069
	Narrative	-0.009	0.008	-1.149	0.251
	PA	0.000	0.004	0.011	0.991
	SDO	-0.005	0.005	-1.065	0.287
	Contempt	-0.005	0.004	-1.344	0.179
	Pity	-0.013	0.004	-2.925	0.003
	Admiration	0.008	0.004	1.942	0.052

	RT~ Framing	-0.012	0.061	-0.195	0.845
	Narrative	-0.125	0.062	-2.031	0.042
	PA	-0.163	0.035	-4.652	0.000
	SDO	0.357	0.037	9.554	0.000
	Contempt	0.145	0.031	4.624	0.000
	Pity	-0.084	0.034	-2.488	0.013
	Admiration	-0.050	0.032	-1.563	0.118
	ST~ Framing	0.020	0.054	0.369	0.712
	Narrative	-0.010	0.054	-0.181	0.856
	PA	-0.200	0.031	-6.496	0.000
	SDO	0.447	0.033	13.647	0.000
	Contempt	0.070	0.028	2.536	0.011
	Pity	-0.140	0.030	-4.726	0.000
	Admiration	-0.077	0.028	-2.752	0.006
	Admiration~ Framing	-0.313	0.069	-4.515	0.000
	Narrative	-0.199	0.070	-2.845	0.004
	PA	0.266	0.034	7.740	0.000
	SDO	-0.005	0.005	-1.065	0.287
	Pity~ Framing	-0.181	0.065	-2.769	0.006
	Narrative	-0.197	0.066	-2.997	0.003
	PA	0.097	0.037	2.649	0.008
	SDO	-0.409	0.037	-11.016	0.000
	Contempt~ Framing	0.055	0.070	0.783	0.434
	Narrative	0.242	0.071	3.416	0.001
	PA	-0.064	0.040	-1.610	0.107
	SDO	0.208	0.040	5.206	0.000
Variance	.LC	0.011	0.001	19.183	0.000
	.RT	0.661	0.034	19.183	0.000
	.ST	0.509	0.027	19.183	0.000
	.Admiration	0.884	0.046	19.183	0.000
	.Pity	0.784	0.041	19.183	0.000
	.Contempt	0.910	0.047	19.183	0.000
Covariance	LC ~ RT	-0.002	0.003	-0.583	0.560
	~ ST	-0.003	0.003	-1.064	0.287
	RT ~ ST	0.269	0.024	11.393	0.000
Indirect effects	ST~ Framing x contempt	0.004	0.005	0.748	0.454
	RT~ Framing x contempt	0.008	0.010	0.772	0.440
	LC~ Framing x contempt	-0.000	0.000	-0.677	0.499
	ST~ Framing x pity	0.025	0.011	2.389	0.017
	RT~ Framing x pity	0.015	0.008	1.851	0.064
	LC~ Framing x pity	0.002	0.001	2.011	0.044
	ST~ Framing x admiration	0.024	0.010	2.350	0.019
	RT~ Framing x admiration	0.016	0.011	1.477	0.140
	LC~ Framing x admiration	-0.002	0.001	-1.784	0.074

ST~ Narrative x contempt	0.017	0.008	2.036	0.042
RT~ Narrative x contempt	0.035	0.013	2.748	0.006
LC~ Narrative x contempt	-0.001	0.001	-1.251	0.211
ST~ Narrative x pity	0.028	0.011	2.531	0.011
RT~ Narrative x pity	0.017	0.009	1.914	0.056
LC~ Narrative x pity	0.002	0.001	2.093	0.036
ST~ Narrative x admiration	0.015	0.008	1.978	0.048
RT~ Narrative x admiration	0.010	0.007	1.370	0.171
LC~ Narrative x admiration	-0.002	0.001	-1.604	0.109

All Studies - Distress Ratings

In Studies 1,2,6,7 and S1, participants were asked to rate the distress they experienced in response to each image. Distress ratings were entered as a covariate in the analysis reported above (Studies 6-7 in main manuscript).

	pSG mean (sd)	pLG mean (sd)	t	p
Study 1	66.6 (13.3)	67.3 (14.1)	-0.58	0.56
Study 2	64.6 (14.6)	63.3 (15.9)	0.92	0.36
Study 6	63.12 (12.7)	65.07 (14.1)	-1.92	0.055
Study 7	40.1 (8.0)	41.0 (8.7)	-1.23	0.22
Study S1	65.6 (8.0)	62.9 (8.7)	2.1	0.036

	pLG in Sea	pLG in Land	t	p
Study 2	64.93 (15.3)	61.72 (16.29)	1.5	0.13

Table S4: Distress ratings. Average (and standard deviation) distress ratings across visual framing conditions in each study. Two-sample t-tests (two tailed) revealed no differences between conditions except in study S1, where pSG of SND evoked significantly higher distress than pLG of SND. For Study 2 we also contrasted distress ratings for the two Visual Narratives in the pLG conditions. Only in Study 6, we observed a trend in the difference in distress ratings between the two *Visual Framings*, where interestingly distress ratings were higher for large groups than for small groups.

References

1. Andrighetto L, Baldissarri C, Lattanzio S, Loughnan S, Volpato C (2014) Humanitarian aid? Two forms of dehumanization and willingness to help after natural disasters. *Br J Soc Psychol* 53(3):573–584.