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The Dutch moral foundations stimulus database

A validation of standardized vignettes and images

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The Dutch Moral Foundations Stimulus Database:
An Adaptation and Validation of Moral Vignettes and Socio-Moral Images
in a Dutch Sample

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Abstract

Moral judgments are shaped by socialization and cultural heritage. Understanding how moral considerations vary across the globe requires the systematic development of moral stimuli for use in different cultures and languages. Focusing on Dutch populations, we adapted and validated two recent instruments for examining moral judgments: 1) the Moral Foundations Vignettes (MFVs) and 2) the Socio-Moral Image Database (SMID). We translated all 120 MFVs from English into Dutch and selected 120 images from SMID that primarily display moral, immoral, or neutral content. 586 crowd-workers from the Netherlands provided over 38,460 individual judgments for both stimuli sets on moral and affective dimensions. For both instruments, we find that moral judgments and relationships between the moral foundations and political orientation are similar to those reported in the US, Australia, and Brazil. We provide the validated MFV and SMID images, along with associated rating data here: https://osf.io/9gnza/

Keywords: moral judgment, vignettes, images, cross-cultural, moral foundations theory

Introduction

Moral intuitions – instant feelings of approval or disapproval that come with witnessing moral actions (Haidt, 2001) – vary within and between cultures (Graham et al., 2011, 2016; Haidt & Joseph, 2004a). To investigate morality across the globe, we need valid and reliable instruments that adopt the language and cultural context of specific regions (Atari et al., 2023). With mounting studies tailoring their moral judgment tasks to cultural idiosyncrasies (e.g., Bobbio et al., 2011; Kim et al., 2012; Marques et al., 2020; van Leeuwen & Park, 2009), we can expand our understanding of how individuals' moral compass is guided by regional and sociopolitical pressures (Malik et al., 2021). However, our knowledge of how morality operates remains confined to the US context (Atari et al., 2023; Bos & Minihold, 2022), partly because the instruments to test moral theories in other nations and cultures are missing.

We fill in this void by adapting and validating two existing, popular moral stimulus sets for studying moral judgment among Dutch populations: the Moral Foundations Vignettes (MFV; Clifford et al., 2015) and the Socio Moral Image Database (SMID; Crone et al., 2018). Our focus on the Netherlands and these stimulus sets is motivated by three reasons. First, the Netherlands is a multiparty system that has recently witnessed an increase in affective polarization (Harteveld, 2021), and understanding how moral intuitions diverge across partisan lines can reduce partisan animosity and foster mutual understanding (Puryear et al., 2022). Second, the text-based MFV have already successfully been adopted to the Portuguese language with a Brazilian sample (Marques et al., 2020), yet how well the MFV transfer to European populations is largely unknown (but see a pilot study by Wagemans et al., 2018, who used a small selection of 8–10 vignettes in Dutch samples, while we adopt and validate 120 vignettes). Third, as photographic images do not require translational adaptations, the SMID offers a promising resource for probing cross-cultural differences in moral intuitions; however, the SMID's applicability to European contexts remains unclear.

Moral Foundations Theory

Moral Foundations Theory (Haidt & Joseph, 2004a) provides a pragmatic taxonomy of moral intuitions by postulating that six moral foundations developed in the course of cultural evolution: care-harm, fairness-cheating, liberty-oppression, authority-subversion, loyalty-betrayal, and sanctity-degradation (Haidt & Joseph, 2004b; Iyer et al., 2012). According to MFT, observing violations of moral foundations elicits automatic affective responses, which may not even be consciously endorsed (Decety & Cacioppo, 2012). Studies show robust support for cultural and ideological differences in the endorsement of moral foundations (Graham et al., 2011; Kivikangas et al., 2021). However, the majority of cross-cultural studies has relied on adaptations of the Moral Foundations Questionnaire (MFQ; Graham et al., 2011), whose factor structure has recently been challenged, both in the United States and international samples (Buck & Pauwels, 2023, 2023; Curry et al., 2019; Harper & Rhodes, 2021; Zakharin & Bates, 2021). In addition, the MFQ probes individuals' abstract, general endorsement of moral concerns, which differs from moral judgment of specific behaviors and concrete situations (Clifford et al., 2015; Crone et al., 2018; Schein, 2020). Yet, focusing on moral judgments of third-party transgressions is important for at least two reasons (Wagemans et al., 2018): First, they incorporate the impact of moral intuitions, which are known to play a substantial role in moral decision making (Haidt, 2001; but see May, 2018, for the role of deliberate processes in

moral judgment). Second, Graham and colleagues (2013) argue that the existence of a moral foundation can be doubted if there is a lack of response to third-party transgressions of that foundation, even when people claim to broadly endorse that moral foundation in the MFQ.

Given the MFQ's limitations, researchers have started to develop and adapt alternative, culturally-contextualized instruments for soliciting moral judgments. A popular database for morally relevant scenarios are the Moral Foundations Vignettes (MFV; Clifford et al., 2015; cited 363 times to date on Google Scholar). The MFV span 120, one-sentence descriptions detailing the violation of one (and only one) of seven moral foundations: physical care, emotional care, fairness, liberty, loyalty, authority, and sanctity. The vignettes also contain non-moral, social norm transgressions. The MFV have been employed in both behavioral (Clifford, 2017; Dehghani et al., 2016; Wagemans et al., 2018) and functional magnetic resonance imaging (fMRI) studies (Hopp et al., 2023; Khoudary et al., 2022). While extant studies (e.g., Hopp et al., 2023; Khoudary et al., 2022) have administered the entire range of MFV solely in samples from the United States, recent work by Marques and colleagues (2020) introduced a Portuguese adaptation of the MFV. Using a Brazilian sample (N=494), they demonstrated that the Portuguese version of the MFV performed similarly to the original English version in terms of its factor structure. Aside from this Portuguese case study, there have been no attempts to adapt and validate the MFV to other contexts, although MFT's theoretical postulations demand cross-cultural research.

Adapting the MFV for non-English countries necessitates translating and adjusting specific vignettes for cultural comprehension (cf. Marques et al., 2020). A remedy for this issue may be offered by recent studies that have developed photographic and even audiovisual moral stimulus databases (Crone et al., 2018; McCurrie et al., 2018). The Socio Moral Image Database (SMID; Crone et al., 2018; cited 49 times to date on Google Scholar) offers a large resource for examining differences in moral judgment, both within and across cultures. The SMID contains 2,941 images, each annotated for moral and affective qualities using crowd-sourced samples from the United States and Australia. Each image was rated on how much it depicts each moral foundation as well as for general valence, arousal, and (im)morality. Notably, images in the SMID also display morally good actions, extending previous stimulus sets which solely contain moral transgressions. Moreover, images may offer increased external validity over text-based vignettes, which have been criticized for creating an artificial moral psychology of 'raceless, genderless strangers' (Hester & Gray, 2020). Subsets of SMID images were already used in previous studies in Japan (Chunyu et al., 2021, 160 images; Sudo et al., 2021; 60 images) and China (Tao, Leng, Huo, et al., 2022, 66 images; Tao, Leng, Peng, et al., 2022; 192 images), but validations of SMID images in a European context are absent. Furthermore, prior research has predominantly utilized the SMID to gather general moral and immoral images, often relying on student samples for image evaluations. To advance MFT, it is essential to procure images that consistently elicit perceptions of distinct moral foundations in more diverse cultural populations. Given that SMID's moral foundation ratings originate from crowd-workers in the United States and Australia, validation is required to examine the applicability of visual representations of moral foundations in other cultures.

Current Work

In view of demands for culturally-tailored moral stimulus sets, we adapt and validate the MFV and SMID for studying moral judgment among Dutch populations. We first translated and adapted the MFV into Dutch. Second, we selected images from the SMID that primarily display moral and immoral exemplars of each moral foundation as well as neutral images that do not display moral information. In turn, we validated these stimuli sets using a large crowd-sourced sample from the Netherlands. Crowd-sourced validations of moral stimuli are increasingly becoming the gold standard in moral psychology, particularly because they capture a more diverse moral signal and are less prone to introducing annotator biases (Crone et al., 2018; Hopp et al., 2021; Hopp & Weber, 2021; McCurrie et al., 2018).

Method

We report how we determined our sample size and all data exclusions in the study. All materials, data, analysis code, and supplementary information (SI) are accessible at https://osf.io/9gnza/. This study's design and its analysis were not preregistered. All procedures were approved by the ethics board of the host institution.

Moral Foundations Vignettes

The full MFV database by Clifford et al. (2015) contains 132 moral transgressions. While previous work had adapted selections of 8–10 (Wagemans et al., 2018) and 90 (Marques et al., 2020) vignettes, we aimed to adapt a larger selection of 120 vignettes that have been employed in past experimental research (Hopp et al., 2023; Khoudary et al., 2022). Each vignette consists of a one-sentence description (14–17 words) detailing the violation of one (and only one) of seven moral foundations: physical care, emotional care, fairness, liberty, loyalty, authority, and sanctity. The vignettes also contain a non-moral, social norm transgression category. Each of the eight conditions featured 15 vignettes. One of the authors – a Dutch native – translated each vignette from English into Dutch. After translating all vignettes, the translator met with the remaining authors of the paper to ensure that minor adjustments of the vignettes fit the context of the Netherlands (e.g., US ambassador adjusted to Dutch ambassador; all edits are reported in SI Table 1).

Socio-Moral Image Database

The SMID (Crone et al., 2018) contains 2,941 images, all annotated for moral and affective qualities using crowd-sourced samples located in the United States and Australia. Each image was rated on how much it depicts Care, Fairness, Loyalty, Authority, and Sanctity, using a five-point Likert-type scale from 1 (not at all) to 5 (very much). Similarly, each image was also rated using five-point Likert-type scales for valence (1 = unpleasant or negative; 5 = pleasant or positive), arousal (1 = calming; 5 = exciting), and morality (1 = immoral/blameworthy; 5 = moral/praiseworthy).
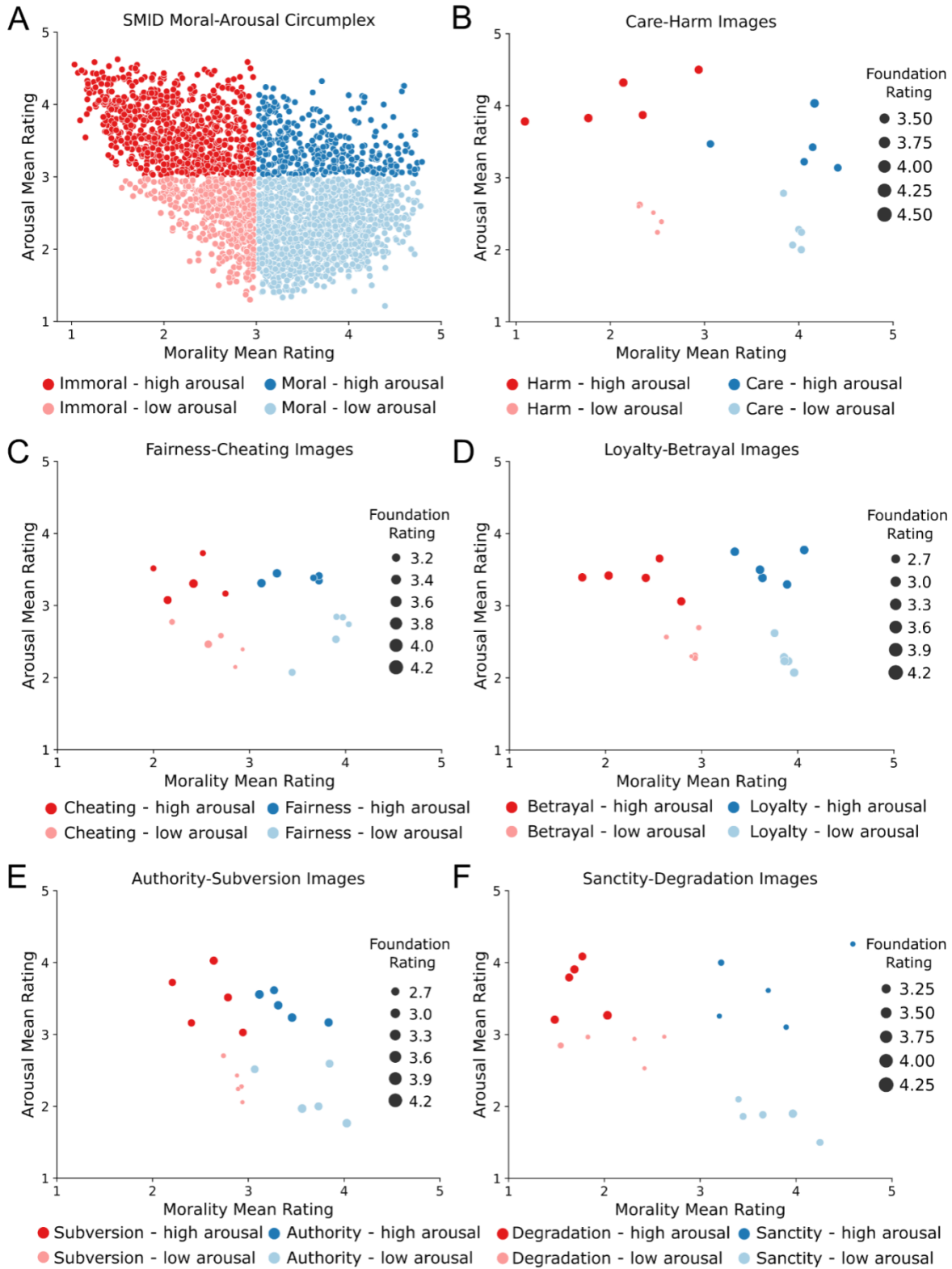
Figure 1. SMID image sampling procedure. **A.** The 2,941 images were first organized into a circumplex model according to the midpoint (3) of the Arousal and Morality rating axes. **B–F.** The Selection of foundation-specific images proceeded as follows: From each quadrant of the original circumplex model, five images were selected that received the highest rating for a given foundation and the lowest ratings for all other foundations. Dot sizes in B–F reflect the average degree to which images in each category were perceived to display that moral foundation, with greater sizes indicating a higher average foundation-specific rating.

Because valence and morality ratings correlated at r = .87 (Crone et al., 2018), we only retrieved the morality ratings. Based on these ratings, we organized all images into a circumplex model typically used for stimulus sampling in emotion research (Russell, 1980), with one axis describing morality and the other axis capturing arousal, thereby creating four image quadrants (Figure 1; A): moral-high arousal (N=340); moral-low arousal (N=1247); immoral-high arousal (N=767); and immoral-low arousal (N=500). Next, within each quadrant, we selected 20 images rated highest on a single foundation and lowest on all other foundations (Figure 1; B–F). In a similar fashion, we also sampled 5 'neutral' images in each quadrant that received high and low arousal ratings, but clustered close to a morally neutral rating of '3' (i.e. ≥2.9; ≤3.1) and were rated lowest across all moral foundations. This resulted in a final sample of 120 images, with ten moral and ten immoral images per moral foundation category as well as ten high arousal, morally neutral and ten low-arousal, morally neutral images.

Participants

We used the Prolific academic (PA) platform (https://www.prolific.co/) for recruiting participants. Eligibility criteria included speaking Dutch as a first language, holding Dutch nationality, and being located in the Netherlands. Our sample size was determined by following previous moral stimulus validation studies (Clifford et al., 2015; Crone et al., 2018; McCurrie et al., 2018) and thus aimed to obtain at least twenty ratings for each stimulus on each dimension. In total, 648 survey responses were collected, of which 62 were excluded who provided incomplete responses or finished the survey in under 6 minutes (<5% quantile), leaving us with a total sample size of 586. Complete demographic information for 572 participants could be retrieved and indicated that we had a diverse sample of the Dutch population: participants had a mean age of 28.39 years (SD = 8.89) of which 326 (57%) identified as male (244 female; 1 non-disclosed). The sample was also politically diverse, with a slight skew towards the political left (M = 38.95, SD = 22.12), and the majority reporting a White ethnicity (497; 87%), followed by mixed (42; 8%), Asian (14; 3%), Black (8, 1%), and "other" (8; 1%). 253 (44%) participants indicated to not hold a student status, 239 (41%) held a student status, and data for 80 participants had expired.

Procedure

Data were collected through an online survey using Qualtrics. After signing the informed consent, the survey started with a brief overview of MFT – adapted from Crone et al. (2018) and translated by us into Dutch – to familiarize participants with the basic contents of moral foundations. Thereafter, participants answered a one-item question concerning their political orientation using a slider from 0 (very left) to 100 (very right). Next, participants provided ratings of vignettes, images, or news clips (not reported here), in which the order of stimuli blocks varied randomly across participants. Each participant was assigned to a random selection of five vignettes and five images, respectively. For each vignette, participants used a five-point Likert scale to rate the vignette's *moral wrongness*, *comprehensibility*, *imagineability*, *frequency*, and *emotional response*. Participants were also asked why the action is morally wrong and could choose one out of seven response options reflecting each vignette category (all vignette-related item prompts and response options are provided in their original English and translated Dutch version in the SI). Similarly, for each image, participants used a five-point Likert

scale to rate the image's general *valence, arousal,* and *morality* as well as the degree (henceforth: moral foundation relevance) to which the image makes them think about each moral foundation (all image-related item prompts and response options are provided in their original English and translated Dutch version in the SI).

Results

Moral Foundations Vignettes

All vignettes were rated an average of 21.97 times (min: 14; max 30).[1] We first tested whether vignettes displaying a moral violation were rated as more morally wrong than vignettes describing a social norm transgression (Table 1). Indeed, every moral vignette item was rated as more morally wrong than every social norm vignette item (Figure 2A), except for one Authority item (MFV 61 "You see a teaching assistant talking back to the teacher in front of the classroom."; moral wrongness ratings for each vignette item are summarized in SI Table 1). Replicating previous work (Clifford et al., 2015; Hopp et al., 2023; Khoudary et al., 2022; Marques et al., 2020), moral vignettes violating physical care received the highest moral wrongness rating, whereas loyalty violations received the lowest moral wrongness ratings among moral vignettes (Table 1). We also tested whether each moral foundation category was rated more morally wrong than social norms. Using the Tukey-Kramer Method for multiple comparisons of groups with unequal sample sizes (Kramer, 1956), we found that violations of each moral foundation were rated as significantly more morally wrong than social norm transgressions (Table 2).

Next, we tested whether each vignette was classified into its originally intended category (Table 1; Figure 2B). To this end, we calculated the classification rate (%) - the percentage of times a vignette was classified into their intended category. We observed that the majority of vignettes (97%) were classified into their intended category, with average classification rates ranging from 85.63% for Fairness vignettes to 60.2% for Loyalty vignettes (classification rates for each vignette item are reported in Supplementary Table 1). Only four vignettes were mostly classified into a non-intended category: 1) The above-mentioned Authority item MFV 61 (73.33% "Not Wrong"); 2) Loyalty item MFV 1: "*You see a former Secretary of State publicly giving up his citizenship to the Netherlands*" (53.33% "Not Wrong"); 3) Loyalty item MFV 72: "*You see a Dutch swimmer cheering as a Chinese foe beats his teammate to win the gold*" (56.52% "Not Wrong"); and 4) Emotional Care item MFV 35: "*You see a man laughing at a disabled co-worker while at an office softball game*" (45.00% "Liberty"). Curiously, both Loyalty items received higher average moral wrongness than any social norm vignette, suggesting that participants may indeed have intuitively perceived them as moral violations. In addition, all vignettes were rated as highly comprehensible and imaginable, and ratings of frequency, as well as emotional response were comparable to those reported in the original MFV (Clifford et al., 2015) study (Table 1; Figure 2C–F).

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[1] Due to a technical error, ratings for one authority vignette (MFV 80, "*You see a boy turning up the TV as his father talks about his military service.*") could not be retrieved and thus are not reported.

Table 1. *Ratings across MFV categories*.

Category	Moral Wrongness		Classification Rate in %		Comprehensibility		Imagineability		Frequency		Emotion	
	M	*SD* 95% CI	*M*	*SD* 95% CI	*M*	*SD* 95% CI	*M*	*SD* 95% CI	*M*	*SD* 95% CI	*M*	*SD* 95% CI
Physical Care	4.09	0.95 [3.99, 4.19]	75.89	4.28 [71.48, 80.30]	4.09	1.10 [3.98, 4.20]	4.08	0.96 [3.99, 4.18]	1.79	0.84 [1.71, 1.88]	3.19	1.10 [3.08, 3.31]
Emotional Care	3.53	0.94 [3.42, 3.63]	54.57	4.99 [49.33, 59.81]	4.19	0.88 [4.10, 4.29]	4.17	0.82 [4.08, 4.25]	2.27	0.99 [2.17, 2.38]	2.70	1.02 [2.59, 2.80]
Fairness	3.72	0.91 [3.62, 3.82]	85.63	3.51 [81.89, 89.37]	4.25	0.89 [4.16, 4.35]	4.19	0.83 [4.10, 4.28]	2.32	1.01 [2.21, 2.42]	2.68	1.02 [2.57, 2.79]
Liberty	3.94	0.89 [3.84, 4.04]	69.59	4.61 [64.69, 74.49]	4.02	1.01 [3.91, 4.13]	3.88	0.97 [3.78, 3.98]	2.01	0.87 [1.92, 2.10]	2.92	1.01 [2.81, 3.02]
Loyalty	2.68	1.09 [2.57, 2.80]	60.20	4.90 [55.34, 65.07]	3.79	1.11 [3.68, 3.90]	3.68	1.12 [3.57, 3.80]	1.62	0.80 [1.54, 1.70]	1.97	0.89 [1.88, 2.06]
Authority	2.89	0.92 [2.78, 3.00]	69.97	4.59 [64.86, 75.07]	4.19	0.79 [4.10, 4.28]	4.08	0.83 [3.99, 4.18]	2.30	1.05 [2.18, 2.41]	2.18	0.84 [2.08, 2.27]
Sanctity	3.64	1.15 [3.52, 3.76]	72.82	4.45 [68.32, 77.32]	3.74	1.24 [3.61, 3.86]	3.54	1.22 [3.42, 3.67]	1.52	0.82 [1.43, 1.60]	3.11	1.08 [3.00, 3.22]
Social Norms	1.29	0.67 [1.22, 1.36]	82.60	3.80 [78.79, 86.40]	4.25	0.98 [4.15, 4.35]	4.27	0.95 [4.18, 4.37]	1.78	1.01 [1.68, 1.89]	1.52	0.79 [1.44, 1.60]

Note. Classification Rate reflects the percentage of categorisation into the intended foundation.
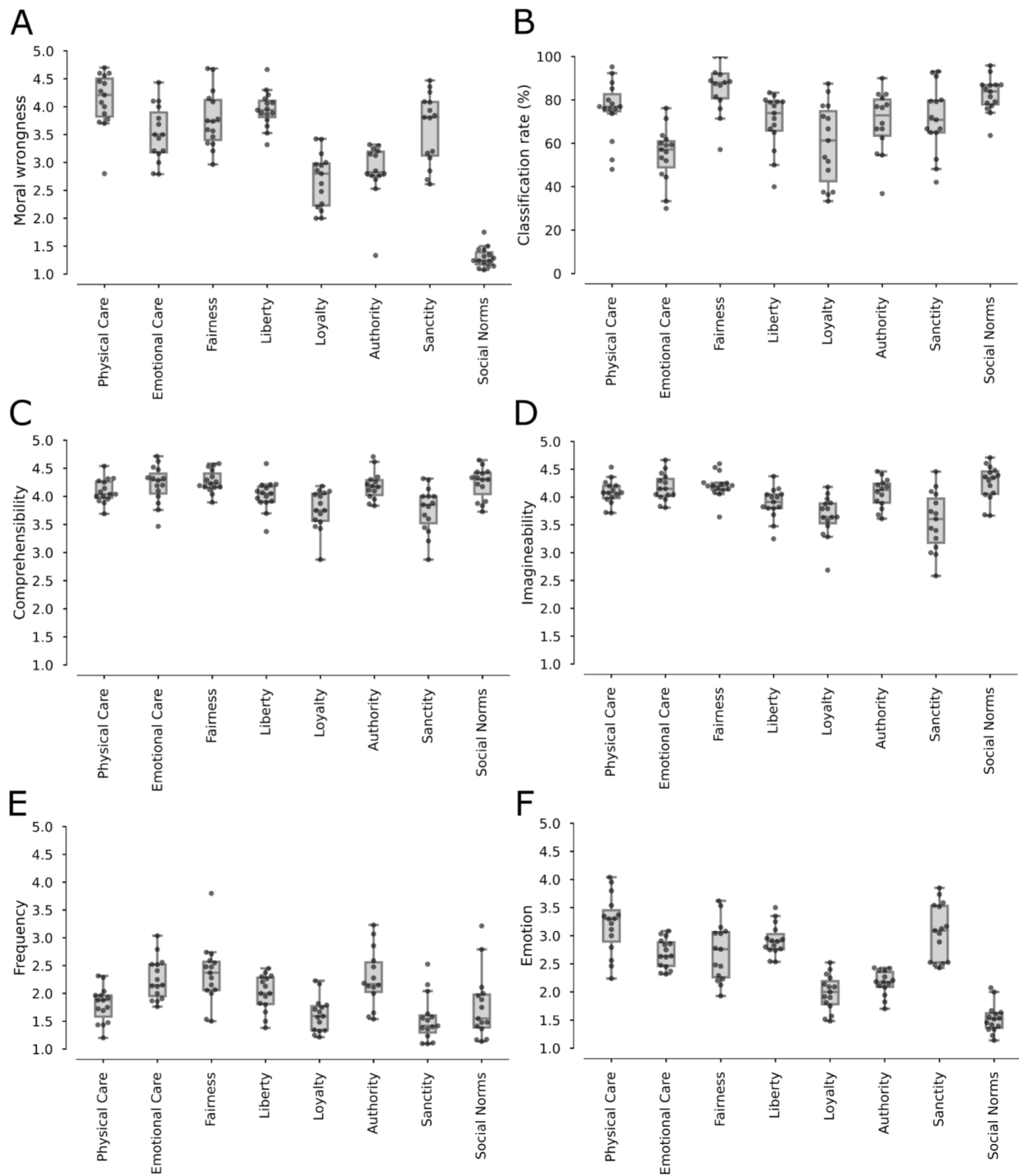
Figure 2. Moral foundations vignettes ratings. **A.** Moral wrongness. **B.** Classification rate in percent. **C.** Comprehensibility. **D.** Imaginability. **E.** Frequency. **F.** Emotional response. Each dot reflects the mean response of all participants to a single vignette item. Box plots for each condition display median (center line), upper and lower quartiles (box limits), whiskers connotate 1.5 × interquartile range (IQR) and points that fall outside the whiskers are outliers.

Table 2. *Difference of moral wrongness ratings between each moral foundation and social norms.*

Foundation	Difference	95% CI	d	q	p
Physical Care	2.80	[2.58, 3.02]	3.43	54.62	< .001
Emotional Care	2.24	[2.01, 2.46]	2.77	43.02	< .001
Fairness	2.43	[2.21, 2.66]	3.07	46.77	< .001
Liberty	2.65	[2.43, 2.88]	3.41	50.55	< .001
Loyalty	1.39	[1.18, 1.61]	1.53	27.60	< .001
Authority	1.60	[1.37, 1.83]	2.03	29.81	< .001
Sanctity	2.35	[2.13, 2.57]	2.52	46.04	< .001

Note. Results of Tukey's honest significance test on the difference between moral wrongness ratings of each moral foundation and social norms.

Furthermore, we explored the correlation between moral wrongness ratings across vignette categories and participants' political orientation (Table 3). Consistent with MFT, authority and loyalty, which both belong to MFT's *binding* moral foundations, were significantly positively correlated (r = .25, p = .008). Analogously, we found that a more conservative political attitude correlated significantly and positively with wrongness ratings of the binding moral foundations loyalty (r = .16, p = .011), authority (r = .21, p = .001), and sanctity (r = .14, p = .022). Surprisingly, Fairness, which belongs to MFT's individualizing foundations, significantly positively correlated with Loyalty (r = .24, p = .009) and Sanctity (r = .27, p = .004); both belonging to the binding moral foundations. As demonstrated by Hopp and colleagues (2023), more conservative individuals also rated Fairness (r = .18, p = .004) and Social Norms (r = .21, p < .001) as more morally wrong. In view of these empirical results and how they compare to previous studies, we consider our translation and adaptation of the MFV to the Dutch context successful.

Table 3. *Correlations of moral wrongness ratings between MFV categories and political orientation.*

	Physical Care	Emotional Care	Fairness	Liberty	Loyalty	Authority	Sanctity	Social Norms
Emotional Care	.03							
Fairness	.12	.08						
Liberty	.07	-.03	.15					
Loyalty	.11	.09	**.24****	.13				
Authority	-.08	.08	.15	**.24***	**.25****			
Sanctity	.10	.05	**.27****	-.03	.11	.03		
Social Norms	-.02	-.11	-.10	.13	-.09	.14	-.17	
Political Orientation	-.08	.01	**.18****	.05	**.16***	**.21****	**.14***	**.21****

Note. A positive correlation between Political Orientation and Moral Wrongness rating implies that more conservative participants made higher ratings. Bold cells indicate significant correlations at *p <.05. **p <.01.

Sociomoral Image Database

All images were rated an average of 21.88 times (min: 10; max 36). First, we examined whether images originally rated as moral (immoral) were also judged as moral (immoral) by our Dutch sample (Table 4). Collapsing all images across their foundation-specific categories, moral images were, on average, rated as more moral (M = 3.66, SD = 0.49) and immoral images were judged to be more immoral (M = 2.64, SD = 0.56). This difference was large in terms of effect size and statistically significant t(118) = 10.63, p < .001, d = 1.94, 95% CI = [0.83, 1.21], indicating that moral images were indeed perceived to display something morally praiseworthy compared to immoral images judged to depict immoral and blameworthy content. Critically, these moral versus immoral differences were also statistically significant within each foundation-specific image category (Table 4; Figure 3A). Likewise, images within the neutral category did not differ significantly in their moral valence ratings t(18) = 1.2, p = .122, d = 0.54, 95% CI = [-0.13, 0.48]. Yet, we also observed that eight images originally placed into the "immoral" category and associated with a moral foundation were rated as moral (<3), and four supposedly moral images were rated as immoral (>3; moral valence ratings for each image item are summarized in Supplementary Table 2).

Moreover, we investigated differences in arousal (Table 4; Figure 3B). Similar to ratings on moral valence, high-arousal images received a higher arousal rating (M = 3.42, SD = 0.39) than low-arousal images (M = 2.70, SD = 0.61). This difference was again large in terms of effect size and statistically significant t(118) = 7.67, p < .001, d = 1.40, 95% CI = [0.53, 0.90]. Compellingly, these mean differences were statistically significant within each foundation-specific as well as neutral image category. Despite these averaged categorical differences, there were images whose arousal rating differed from the intended arousal category. Nine high-arousal items were rated on average with low arousal (<3), and 23 low-arousal items were rated on average with high arousal (>3; arousal ratings for each image item are summarized in Supplementary Table 2). As morality ratings and valence ratings were again highly correlated (r = 0.73, p < .001), we provide no further analysis of valence ratings.

Thereafter, we tested whether participants rated the presence of moral foundations according to their intended foundation-specific image category (Table 5–6; Figure 3C;). To this end, we conducted a series of independent, one-sided t-tests comparing the mean foundation rating for images of the intended foundation with the mean foundation rating of images of across all other categories (e.g., mean rating of care-harm in images classified as care-harm compared to mean rating of care-harm for all other images). As expected, we observed that for all foundations, the corresponding images received significantly higher ratings on their foundation compared to images from all other categories (Table 6).

Table 4. *Arousal and moral valence ratings across image categories.*

Category	Moral		Immoral		Difference	d	t(18)	p	High Arousal		Low Arousal		Difference	d	t(18)	p
	M	SD 95% CI	M	SD 95% CI	95% CI				M	SD 95% CI	M	SD 95% CI	95% CI			
Care	4.06	0.41 [3.76, 4.36]	2.34	0.53 [1.97, 2.72]	1.72 [1.27, 2.16]	3.62	8,09	<.001	3.47	0.58 [3.05,3.88]	2.74	0.74 [2.21,3.27]	0.73 [0.10,1.35]	1.09	2,45	.012
Fairness	3.78	0.42 [3.48, 4.08]	2.70	0.46 [2.37, 3.03]	1.08 [0.67, 1.50]	2.45	5,48	<.001	3.35	0.32 [3.13,3.58]	3.02	0.42 [2.72,3.33]	0.33 [-0.02,0.68]	0.89	1,99	.031
Loyalty	3.80	0.41 [3.51, 4.09]	2.54	0.56 [2.14, 2.94]	1.26 [0.80, 1.72]	2.58	5,78	<.001	3.50	0.19 [3.37,3.63]	2.58	0.80 [2.00,3.15]	0.92 [0.38,1.47]	1.59	3,56	.001
Authority	3.35	0.40 [3.06, 3.64]	2.73	0.38 [2.46, 2.99]	0.62 [0.26, 0.99]	1.60	3,57	.001	3.56	0.39 [3.28,3.84]	2.80	0.35 [2.55,3.05]	0.75 [0.40,1.10]	2.02	4,52	<.001
Sanctity	3.55	0.62 [3.11, 3.99]	2.28	0.57 [1.88, 2.69]	1.27 [0.71, 1.83]	2.13	4,77	<.001	3.49	0.41 [3.20,3.78]	2.72	0.69 [2.23,3.22]	0.77 [0.24,1.30]	1.36	3,03	.004
Neutral	3.44	0.35 [3.19, 3.69]	3.26	0.30 [3.05, 3.48]	0.18 [-0.13, 0.48]	0.54	1,2	.122	3.14	0.24 [2.96,3.31]	2.35	0.44 [2.03,2.66]	0.79 [0.46,1.12]	2.23	4,98	<.001

Note. T and p values are the results of independent, one-sided t-tests comparing moral > immoral and high arousal > low arousal for each image category separately.

Table 5. *Foundation Ratings across Image Categories.*

Category	Care		Fairness		Loyalty		Authority		Sanctity	
	M	SD 95% CI	*M*	SD 95% CI	*M*	SD 95% CI	*M*	SD 95% CI	*M*	SD 95% CI
Care	3.61	0.66 [3.31, 3.92]	1.96	0.40 [1.77, 2.15]	2.26	0.51 [2.02, 2.50]	2.19	0.50 [1.95, 2.42]	1.80	0.34 [1.64, 1.96]
Fairness	2.19	0.59 [1.91, 2.46]	2.87	0.65 [2.57, 3.18]	2.33	0.42 [2.13, 2.53]	2.34	0.59 [2.06, 2.62]	1.67	0.31 [1.53, 1.82]
Loyalty	2.78	0.68 [2.46, 3.09]	2.33	0.41 [2.14, 2.52]	2.86	0.47 [2.64, 3.08]	2.80	0.50 [2.57, 3.03]	1.97	0.53 [1.72, 2.21]
Authority	2.41	0.60 [2.13, 2.70]	2.39	0.34 [2.23, 2.55]	2.62	0.49 [2.39, 2.85]	3.52	0.60 [3.24, 3.80]	1.94	0.43 [1.73, 2.14]
Sanctity	2.64	0.62 [2.35, 2.93]	2.31	0.50 [2.08, 2.55]	2.33	0.51 [2.09, 2.57]	2.89	0.48 [2.66, 3.12]	2.79	0.89 [2.37, 3.21]
Neutral	1.98	0.40 [1.79, 2.16]	1.57	0.34 [1.41, 1.72]	1.60	0.36 [1.43, 1.77]	1.70	0.50 [1.46, 1.93]	1.55	0.31 [1.41, 1.70]

Table 6. *Mean Differences in Foundation Ratings across Image Categories.*

Foundation	Difference		*d*	*t*(118)	*p*
	M	95% CI			
Care	1.21	[0.90, 1.53]	1.88	7.68	< .001
Fairness	0.76	[0.51, 1.02]	1.44	5.87	< .001
Loyalty	0.63	[0.36, 0.90]	1.14	4.67	< .001
Authority	1.14	[0.82, 1.46]	1.73	07.06	< .001
Sanctity	1.01	[0.75, 1.26]	1.92	7.85	< .001

Note. Results of five independent, one-sided t-tests. For each directional test, the average foundation rating of images within one foundation was compared against the average foundation rating across all other image categories (i.e., foundation ratings for foundation images > foundation ratings for all images not within the foundation).
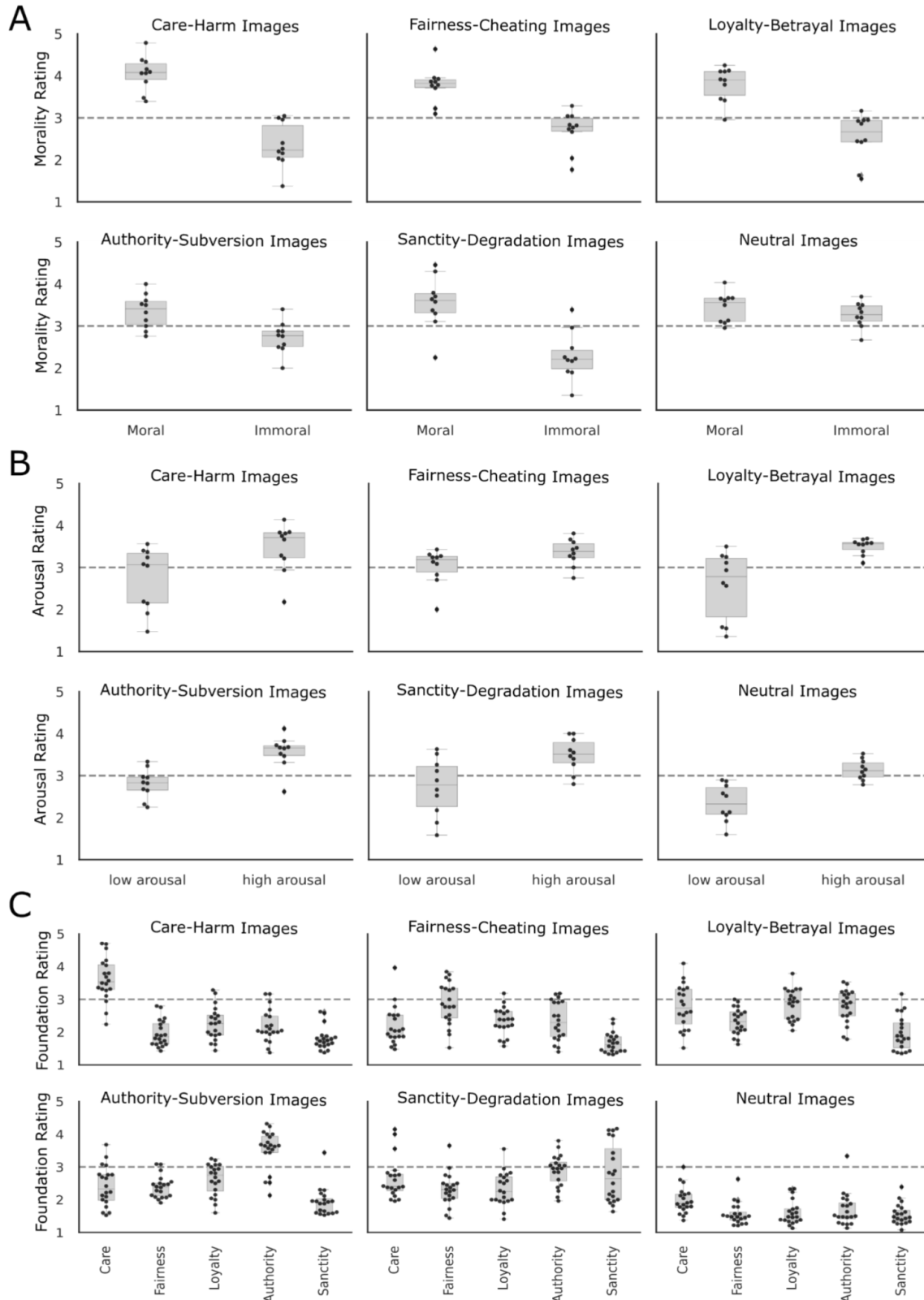
Figure 3. Socio-moral image ratings. **A.** Morality ratings for moral versus immoral images. **B.** Arousal ratings for low versus high arousal images. **C.** Foundation ratings for each moral foundation category. Each dot reflects the mean response of all participants to a single image. Box plots display median (center line), upper and lower quartiles (box limits), whiskers connotate 1.5 × interquartile range (IQR) and points that fall outside the whiskers are outliers.

Table 7. *Confusion matrix comparing intended and rated image categories.*

Category	Rated Foundation							Sum	Recall	Accuracy	F1
	Care	Fairness	Loyalty	Authority	Sanctity	Neutral	Authority Sanctity				
Care	19	0	1	0	0	0	0	20	95,00	85,83	69,09
Fairness	2	10	1	5	0	2	0	20	50,00	90,83	64,52
Loyalty	7	0	7	4	0	1	1	20	35,00	86,67	46,67
Authority	0	0	1	17	0	1	1	20	90,00	82,50	63,16
Sanctity	4	1	0	7	7	0	1	20	40,00	88,33	53,33
Neutral	3	0	0	1	0	16	0	20	80,00	93,33	80,00
Sum	35	11	10	34	7	20	3	120	**65,00**	**87,92**	**62,79**
Precision	54,29	90,91	70,00	48,65	80,00	80,00		**63,37**			

Note. We assigned each image the foundation which received the maximum rating and assigned 'Neutral' to the 20 images with the lowest mean ratings. For three images, sanctity and authority both received the highest mean rating, therefore we added them to both, authority and sanctity, when we calculated our measures. The numbers in **bold** are weighted averages for the respective measure.

We also determined whether individual images received the intended foundation-specific ratings. To this end, we computed the mean foundation rating for each image and assigned each image to the foundation that received the highest mean rating. Likewise, the 20 images with the lowest mean foundation ratings were classified into the "neutral" category. The resulting confusion matrix crossing intended and rated foundation is displayed in Table 7. Notably, 19 (95%) of the intended care images indeed received the highest care ratings across images, followed by 18[2] (90%) authority images and 16 (80%) "neutral" images. In contrast, discrepancies were larger for fairness images (10 images; 50%), sanctity (8[2] images; 35%), and loyalty (7 images, 35%). Across all images, 63% were rated according to their intended category, with an average accuracy of 87.92%, suggesting that even on the individual image level, the majority of images were correctly categorized into their intended foundation.

Lastly, we examined the correlation across all image rating categories and participants' political orientation. Higher ratings on each of the moral foundations correlated with distance of morality ratings from the midpoint of the scale, a metric that we termed 'moral polarity'. In line with exemplification theory (Zillmann, 1999), this could imply that individuals who perceive an image to be more exemplary for a moral foundation also deem this image to be more moral or immoral. Interestingly, more morally polarized ratings did not correlate with arousal ratings ($r = .03$, $p = .519$). Rather, the more arousing an image, the less it was perceived to display something moral/praiseworthy ($r = -.31$, $p < .001$). Replicating findings from Crone and colleagues (2018), all five foundation ratings were moderately correlated with each other (all $rs > .4$, $p < .001$), although all our pairwise foundation correlations were lower than those in the original study (cf. Figure 4 in Crone et al., 2018). Again fairness was strongly related to binding

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[2] For three images, sanctity and authority were the highest mean ratings. We therefore added those images to both categories during calculations.

foundations. In particular, the highest foundation correlations were between fairness and loyalty ($r = .71$, $p < .001$), fairness and authority ($r = .60$, $p < .001$) and loyalty and authority ($r = .71$, $p < .001$). Moreover, we found that ratings for all foundations were positively associated with more conservative political orientations – but the association between care and ideology was close to zero and not statistically significant. Note that in contrast to the MFV, foundation image ratings reflect how strongly participants perceived those foundations in the images and not how morally wrong they found those images to be. While conservatives tended to provide more polarized morality ratings overall ($r = .10$, $p = .025$), this is likely driven by the fact that conservatives rated images as more moral compared to progressives ($r = .15$, $p < .001$).

Table 7.
Correlation table for image ratings

	Care	Fairness	Loyalty	Authority	Sanctity	Moral valence	Moral polarity	Arousal
Fairness	.45**							
Loyalty	.49**	.71**						
Authority	.47**	.60**	.71**					
Sanctity	.41**	.52**	.51**	.47**				
Moral valence	-.10*	.01	.10*	.07	-.11*			
Moral polarity	.28**	.26**	.27**	.32**	.19**	.34**		
Arousal	.16**	.11*	.06	.10*	.08	-.31**	.03	
Political Orientation	.02	.10*	.15**	.11*	.10*	.15**	.10*	-.03

Note. A positive correlation between political orientation and other ratings implies that more conservative participants made higher ratings. Moral polarity refers to how distant the rating was from the scale midpoint. *p <.05. **p <.01.

Discussion

We adapted and validated two widely used moral stimulus sets for examining moral judgment in a Dutch sample. We translated the MFV (Clifford et al., 2015) into the Dutch language and selected a wide range of morally salient photographic images from the SMID (Crone et al., 2018), which we then validated in a crowd-sourced sample from the Netherlands. These instruments offer advantages over alternatives by allowing participants to make moral judgments about specific situations (Crone et al., 2018; Marques et al., 2020; Schein, 2020).

The results of our MFV analysis suggest that we successfully adapted them to the Dutch context. Participants rated scenarios violating a moral foundation as more morally wrong than those describing social norm transgressions. Additionally, trends in moral wrongness ratings across MFV categories were similar to those reported in the original MFV study (Clifford et al., 2015). Furthermore, participants predominantly accurately identified the intended type of moral or social norm violation in the vignettes. These results suggest that we have successfully provided a valid and reliable MFV for the Dutch population.

Our demonstrated relationship between MFV moral wrongness ratings and political orientation only partially replicates prior findings. As Haidt and Graham (2007) argued and a meta-analysis by Kivikangas et al. (2021) confirmed, conservatives in the US usually judge the

binding moral foundations as more morally relevant than progressives. Compellingly, this pattern also emerged in our study, and even social norms were rated more morally wrong by more right-leaning individuals. Yet, extant literature suggests that left-leaning (progressive) individuals in the US judge transgressions of individualizing foundations as more morally wrong than conservatives do (Graham et al., 2011; Kivikangas et al., 2021). However, we found no statistically significant associations between progressiveness and moral wrongness ratings of care violations, and wrongness ratings of fairness transgressions even showed a small to mid-sized association with conservatism. We reason that these discrepancies might be more driven by instruments than translational artifacts or genuine cultural differences.

On the one hand, the previously mentioned studies used the MFQ (Graham et al., 2011; Kivikangas et al., 2021), whereas we used the MFV. In the original MFV paper, fairness was unrelated to political orientation (Clifford et al., 2015). Analogously, Hopp et al. (2023), also using the MFV in a US college sample, found the same pattern as we did. On the other hand, Van Leeuwen and Park (2009) used the MFQ with Dutch participants and reported that fairness was associated with a more progressive political orientation. Why is fairness sometimes related to progressive political orientation and sometimes not? According to Janoff-Bulman (2023) and Atari et al. (2023), Moral Foundations Theory omits the distinction between two kinds of distributional justice: equality and proportionality. Participants may interpret fairness items in the MFQ as questions of equality, which aligns with progressive concerns (Jost, 2017). In contrast, proportionality may be more associated with conservative political orientation (Lee et al., 2018). To clarify these relationships, future versions of the MFV may incorporate scenarios related to both equality and proportionality.

The SMID ratings analysis validated our image selection for studying Dutch moral judgment. We identified images that consistently evoked moral or immoral ratings across various moral foundations, while neutrally classified images were consistently rated as having neutral moral content and low appeal to all moral foundations. Furthermore, we offer evidence that foundation-specific images can be identified. Images primarily showcasing one moral foundation reliably elicited stronger perceptions of that foundation compared to images emphasizing other moral foundations. In summary, we successfully validated the SMID for the Dutch context.

Parallel to MFV ratings, conservatives gave higher ratings for loyalty, authority, sanctity, and fairness than progressives. This may indicate conservatives' greater recognition of these foundations and suggests that higher moral wrongness ratings for MFV and similar stimuli might result not only from greater relevance assigned to these foundations but also from more frequent recognition in various contexts. Future studies should dissect these influences and interaction of perception and evaluation in moral judgment. Notably, our results also imply that moral perception of images differs between cultures. Following our approach, we advise researchers using the SMID in cultures other than the US and Australia to first validate the images in their respective cultures. Furthermore, for scientists using the images in the Dutch population, we suggest using our derived foundation ratings as continuous variables or linear contrasts, rather than as discrete categorical assignments.

This study has limitations. We used a crowd-sourced approach common for affective datasets (Crone et al., 2018, Hopp et al., 2021) and had each participant rate only a fraction of stimuli. This enabled us to simultaneously investigate two large stimuli sets, yet it also came at

the cost of only around 20 individuals rating per stimulus. These sup-samples are smaller than in classic scale development or validation studies (e.g., Clifford et al., 2015; Graham et al., 2011) and do not allow for classic checks on internal and external validity, like factor analysis. Hence, we provide a fertile ground for future studies employing the full range of our adapted MFV and SMID within a repeated-measured design.

Analogously, the relationship between stimuli and political orientation rather reflects a starting point for future research than a mere limitation. For both stimuli sets, our results do not exactly replicate the expected left-right pattern, and the stimuli as such - and not only culture - present themselves as a possible explanation for our findings. This may be because of the translations we made, the sample we used, or the context that we studied (the Netherlands). We can only speculate, but think the best answer to this question lies in future research. Future studies should determine whether the differences in fairness rating for the MFV is due to wording or actual difference between general principles and actions (as this is the purported difference between MFV and MFQ; Clifford et al., 2015). For the SMID images, there are two possible ways to investigate the origin of our results. If we assume that method drives our findings, the variance in morality ratings should be increased. Thus, future studies should use our or alternative sampling procedures (Crone et al., 2018) to choose pictures which best discriminate between political orientation. In addition, if we assume that modality modulates moral judgment, neuroimaging studies may dissociate which processes are independent from modality and which are shared.

Notwithstanding these limitations, we herein successfully adapted two widely used stimuli sets for investigating moral judgment among Dutch populations. This validation highlights the significance of exploring cultural differences, especially for non-verbal moral stimuli, which might be strongly dependent on culture-specific interpretations. It is also a call for more stimulus validation in social psychological and personality science. By providing publicly available and validated stimuli adapted to the Dutch context, we aim to assist scholars in conducting rigorous and comparable research on morality.

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