# Care-Based Moral Appeals in Pictorial Tobacco Control Messages

## A Cross-Cultural Comparison of American and Chinese Smokers Using Real-World Campaign Messages

Thomas H. Zhang[1], Xiaohui Cao[1], Yidi Wang[2], Jiaying Liu[2], Shiwen Wu[3], and Sijia Yang[1]

[1]School of Journalism and Mass Communication, University of Wisconsin–Madison, Madison, WI, USA
[2]Department of Communication, University of California, Santa Barbara, CA, USA
[3]School of Journalism and Communication, Wuhan University, PR China

**Abstract:** The care/harm moral foundation is a key antecedent of health behavior change, and care-based moral appeals, persuasive messages that integrate the care/harm foundation with specific health behaviors, have demonstrated effectiveness in health promotion campaigns. However, the role of care-based moral appeals within pictorial warnings (PWs), a widely implemented tobacco control strategy, remains understudied. Moreover, little is known about how smokers from diverse sociocultural backgrounds respond to the same type of care-based moral appeals, particularly in countries that have yet to adopt PWs on cigarette packaging. To address these gaps, this study reports secondary analyses of two randomized multi-message experiments using real-world tobacco control campaign messages ($K_{US}$ = 319, $K_{China}$ = 510) among American and Chinese smokers ($N_{US}$ = 1,392, $N_{China}$ = 2,306). Each participant viewed six PWs randomly selected from a large stimulus pool and rated their perceived message effectiveness, yielding 22,188 total observations. Cross-classified multilevel regression analyses revealed that smokers in both countries perceived shocking care appeals as more effective than non-shocking care appeals and other PWs that did not employ care-based moral appeals. Non-shocking care appeals were also rated more effective than the control category. Significant cross-level two-way interactions emerged between message features (shocking care appeals) and respondents' care/harm foundation endorsement, as well as between country and care/harm foundation. The three-way interaction was non-significant. Our findings underscore the effectiveness of care-based moral appeals in tobacco control campaigns and contribute to theoretical inquiries in message effects research from global and comparative perspectives

**Keywords:** care-based moral appeals, moral foundations, moral shock, tobacco control, US-China comparison, large-$K$ design

The moral roots of morally concerned health issues (e.g., smoking, abortion, and meat consumption) are widely acknowledged (Brandt & Rozin, 2013). However, systematic efforts to define and examine persuasive messages that leverage deep-seated, context-transcending moral judgment to motivate specific behavior changes, dubbed as moral appeals, in public health contexts currently lag behind similar efforts in political communication (Grizzard et al., 2017; Suh & Kim, 2025; Youk et al., 2024). Even in more recent research examining moral appeals as a promising messaging strategy for health persuasion (e.g., Waldron et al., 2024; Yang et al., 2018), the focus is exclusively on Western contexts, particularly in the US, with very limited attention to non-Western contexts.

Few studies have adopted a cross-cultural perspective to investigate whether the same type of moral appeals perform similarly or differently across sociocultural contexts. This narrow empirical scope limits theoretical development and challenges one of the core premises of the Moral Foundations Theory (MFT; Haidt, 2012): while humans are equipped with innate moral intuitions, the salience and expression of these moral concerns are extensively shaped by cultural socialization (Graham et al., 2013). From this perspective, the same type of moral appeals may perform differently depending on the social environments and cultural backgrounds that guide how individuals interpret relevant moral messages. A central, yet underexplored, question is whether the same type of moral appeals

function as universal psychological triggers or as culturally sensitive cues. This is particularly relevant in health promotion, where campaigns increasingly rely on moral appeals to change morally concerned behavior across populations (e.g., Wisneski & Skitka, 2017; Yang et al., 2018). Revisiting the theoretical foundations of moral appeals in health messaging requires comparative research that investigates how audiences from different sociocultural backgrounds respond to the conceptually same type of moral appeals. Such research not only clarifies whether moral foundations operate universally or contextually in health messaging but also informs how moral messages for health promotion can be designed for populations from distinct sociocultural backgrounds.

This study conducted a comparative analysis of care-based moral appeals embedded in pictorial warnings (PWs) on cigarette packaging, a widely adopted global tobacco control strategy. PWs have been shown to reduce smoking rates and promote anti-smoking beliefs over time (Morgan et al., 2018), often by vividly depicting smoking-related health consequences such as respiratory and oral diseases. Beyond highlighting personal health risks for smokers, many PWs portray harm inflicted on innocent, vulnerable non-smokers, including children, pregnant women, fetuses, and pets. These portrayals reflect moral content deeply rooted in the care/harm foundation (Yang et al., 2018), which emphasizes the protection of others (i.e., moral victims) from suffering.

Care-based moral appeals are persuasive messages designed to activate concern for others by illustrating how one's actions (e.g., smoking) may harm individuals who are dependent, innocent, or defenseless. These appeals may elicit moral emotions such as guilt, empathy, outrage, or morally charged disgust. Building on the work of Wisneski and Skitka (2017), we categorize care-based moral appeals into two types: "shocking care appeals", which use intense imagery, such as suffering children to provoke visceral reactions and highlight moral victimization, and "non-shocking care appeals", which rely on scientific facts or statistics while lacking portrayals of visible suffering experienced by moral victims. This study examines how American and Chinese smokers respond to these two types of care-based moral appeals, comparing their perceived effectiveness to each other and to PWs that do not contain such morally relevant message features (i.e., the control category).

## Moral Foundations Theory and Health Behaviors

The Moral Foundations Theory (MFT) (Haidt, 2012; Atari et al., 2023) argues that moral judgments are based on six moral foundations: care, equality, proportionality,

authority, loyalty, and purity. These foundations are innate and hard-wired features of the evolving moral mind. People possess a sense of morality at birth, which is then shaped by life experiences and socialization, reordering the ranking of foundations and connecting abstract moral foundations to specific issue positions (Joseph et al., 2009). Observational evidence suggests that moral foundations can differentially predict health behaviors (e.g., Brandt & Rozin, 2013; Nan et al., 2022). For example, Kiser (2013) found that care and authority foundations were associated with healthy eating. In other studies, authority appeals also predicted the sharing of pro-vaping tweets (Wang et al., 2023; Wu et al., 2023) while purity and liberty endorsement predicted vaccination hesitancy (Amin et al., 2017; Nan et al., 2022; O'Marr et al., 2023). In contrast, experimental work directly testing manipulated moral appeals on health behaviors is much less common, with several notable exceptions in the domains of tobacco control (Yang & Yang, 2023; Yang et al., 2018) and compliance with COVID-19 public health guidelines (Jordan et al., 2021; Kaplan et al., 2023).

Among these moral foundations, the care/harm foundation is particularly relevant to tobacco control and secondhand smoke because it emphasizes protecting vulnerable innocents (e.g., children, pregnant women, pets) from physical damage (i.e., secondhand smoke from smokers). According to Graham et al. (2013), the original triggers of the care/harm foundation are "visual and auditory signs of suffering, distress, or neediness expressed by one's child (p. 69)," whereas the perceptual modules can also be activated by other stimuli such as pets. There are multiple ways to evoke compassion for moral victims, often accompanied by feelings of anger toward those responsible for the harm. Given this, we argue that people with a higher endorsement of the care/harm foundation are more likely to accept messages emphasizing the victim's suffering, especially when this suffering is caused by their own behaviors, such as smoking.

## The Effectiveness of Care-Based Moral Appeals in Tobacco Control

Moral appeals are a persuasion strategy to address morally concerned health issues such as vaping (Yang et al., 2018), the COVID-19 pandemic (Luttrell & Trentadue, 2024; Waldron et al., 2024), and organ donation (Hansen et al., 2018). This messaging approach underscores the moral perspectives of health issues by stating certain behaviors as moral and the opposites as morally questionable (Yang & Yang, 2023). For example, moral appeals in tobacco control would highlight that smoking inside the house is considered morally unacceptable because secondhand smoke harms non-smoking innocents. Such messages could trigger message recipients' sense of moral obligation,

encourage them to consider adopting health behaviors through the highlights of the social consequences and violation of moral norms (Yang, 2019).

Moral appeals are typically grounded in the MFT (Haidt, 2012; Yang et al., 2018). This type of message translates moral foundations into message features and connects abstract moral values with specific health behaviors. In this study, we focus on care-based moral appeals, proposing that incorporating such moral content into PWs may enhance their effectiveness by helping smokers recognize the negative consequences of smoking on vulnerable innocents around them. Guided by social psychology literature (Jasper & Poulsen, 1995; Stockdale, 2022), we identify two different thematic categories within care-based moral appeals: shocking vs. non-shocking care appeals. On the one hand, shocking care appeals depict intensely unsettling events, often through visuals that trigger message recipients' immediate, unpleasant moral emotional responses such as morally charged disgust, shame, guilt, sympathy, and compassion, thereby emphasizing the moral significance of featured issues (Stockdale, 2022; Wisneski & Skitka, 2017). For instance, the visual depictions of premature births due to parental smoking addiction fall under shocking care appeals. Such visuals are potent enough to evoke strong moral emotions (Haidt, 2003; Nabi, 2015). Non-shocking care appeals, on the other hand, rely on rational explanations of moral conflicts rather than emotionally aroused visual cues. For example, the highlights of serious consequences of secondhand smoke by showing statistics and reasons behind it fall under this category. These messages foster moral judgment and behavioral change through more reflective moral reasoning processes, in contrast to the immediate, emotion-driven responses typically elicited by shocking care appeals (Bandura, 2014).

Notably, shocking care appeals share similarities with fear and disgust appeals commonly discussed in tobacco control literature (Leshner et al., 2011). However, our conceptualization differs in two important ways. First, shocking care appeals explicitly integrate moral significance through visual content grounded in the care/harm foundation, activating moral intuitions about the responsibility to protect vulnerable others, not smokers themselves (Haidt, 2001). Second, rather than emphasizing self-oriented threats toward smoking-related health consequences (e.g., diseased lungs), shocking care appeals highlight harms inflicted upon vulnerable moral victims, such as children, pregnant women, and pets. Consequently, the emotional reactions elicited by shocking moral appeals are not merely fear or non-moral disgust but morally charged outrage and/or disgust towards moral transgressors, as well as other discrete moral emotions like guilt, remorse, and compassion (Haidt, 2003; Wisneski & Skitka, 2017). Therefore, while our conceptualization of shocking care appeals shares vivid-

ness and emotional intensity with fear and disgust appeals commonly studied using the Extended Parallel Process Model (EPPM; Mongeau, 2012; Witte, 1992), our conceptualization emphasizes the moral roots of such emotional responses.

We argue that shocking care appeals would be more effective in tobacco control messaging when short-term exposure techniques are used, as they provoke stronger emotional reactions through impactful, morally grounded visual cues, leading to quicker and effective message processing. Shocking care appeals may be particularly effective for smokers as they can elicit an immediate affective response to the message and have higher issue relevance. Based on this rationale, we developed the following two hypotheses:

*Hypothesis 1 (H1)*: PWs that employ care-based moral appeals, including (a) shocking and (b) non-shocking care appeals, will be perceived as more effective than other PWs without using such message features.

*Hypothesis 2 (H2)*: Shocking care appeals will be perceived as more effective than non-shocking care appeals.

We further argue that the effectiveness of care-based moral appeals may depend on individual differences in moral orientation, specifically the degree to which a person endorses the care/harm foundation. According to the moral matching hypothesis (Feinberg & Willer, 2015), care-based moral appeals would be more effective when the messages align with the receivers' core moral values. Individuals who strongly prioritize care/harm foundation are likely to experience greater emotional and cognitive resonance when exposed to messages emphasizing this moral foundation, such as visual depictions of victimization of vulnerable innocents, especially when these depictions are morally relevant. Conversely, individuals with a lower level of endorsement of the care/harm foundation may perceive such messages as less effective and persuasive. This effect may be more pronounced for shocking care appeals, which tend to elicit stronger moral emotions, compared to non-shocking care appeals, which rely more on cognitive moral reasoning. To date, limited studies have examined these dynamics outside of political contexts (Clifford et al., 2015; Feinberg & Willer, 2015), particularly in the domain of tobacco control messaging. In response, we propose the following hypothesis:

*Hypothesis 3 (H3)*: There will be a cross-level two-way interaction between responded care/harm foundation and (H3a) shocking (vs. other control PWs) and (H3b) non-shocking care appeals (vs. other control PWs) on perceived message effectiveness, such that

smokers with higher level of care/harm foundation will perceive PWs with care-based moral appeals as more effective.

## Sociocultural Influence, Moral Foundation, and Response to Moral Appeals

While moral foundations are often treated as universal belief systems applicable across sociocultural contexts, MFT was originally developed with an emphasis on cultural sensitivity, positing that moral foundations are shaped through cultural socialization (Haidt, 2012; Joseph et al., 2009). Accordingly, the effectiveness of PWs employing care-based moral appeals may not be entirely universal but instead shaped by the specific sociocultural contexts in which they are presented. However, most research in health promotion and health psychology that involves morality remains heavily Western-centric (e.g., Waldron et al., 2024; Yang et al., 2018). To date, little effort has been made to compare cultural differences in moral foundations or examine how these differences influence health outcomes, which has hindered the theoretical development of MFT from a global perspective.

The US and China represent two distinct cultural orientations. China is a collectivistic society that emphasizes social harmony, interdependence, and fulfilling duties to families. The US, by contrast, is an individualistic society where personal autonomy and freedom of choice are highly valued. A large amount of empirical evidence demonstrated that collectivism ideology is closely associated with health-related altruistic and prosocial behaviors (e.g., Cho et al., 2022; Zhu et al., 2021). From this aspect, PWs employing moral appeals might be more effective for Chinese smokers because such messages highlight smoking as a violation of social expectations and family responsibility. On the other hand, however, data show that the harm of secondhand smoke is much better recognized in the US than in China due to the effects of long-standing tobacco control campaigns (e.g., Jin et al., 2014). Therefore, it is also plausible that care-based moral appeals work better in the US since Americans are less likely to question the rationale of such PWs, since the negative consequences of secondhand smoke have been well-internalized into their health belief system. Thus far, no studies have investigated the effects of care-based moral appeals in health promotion in cross-cultural contexts. To address this gap and for potential theoretical inquiries, we proposed the following research questions to compare whether smokers from the US and China evaluate care-based moral appeals in different ways:

*Research Question 1 (RQ1)*: Which country's smokers perceive care-based moral appeals as more effective?

*Research Question 2 (RQ2)*: Is there a cross-level three-way interaction between country, self-reported care/harm moral foundation, and (a) shocking (vs. other control PWs) and (b) non-shocking care appeals (vs. other control PWs) on perceived message effectiveness, such that smokers from China or the US with higher care/harm moral foundation perceive PWs with care-based moral appeals as more effective?

## Methods

This paper reports a secondary analysis of two projects evaluating the effectiveness of a large pool of real-world tobacco control campaign messages among American and Chinese smokers, respectively. Both projects included three datasets: (1) the within-subject online survey experiment evaluating the effectiveness of PWs using a randomized multiple-message design ($N_{US}$ = 1,392 and $N_{China}$ = 2,306), (2) a quantitative content analysis of manually coded message features within PWs ($K_{US}$ = 319, $K_{China}$ = 510), and (3) a computer vision analysis assessing the aesthetic characteristics of PWs. Study materials were reviewed and approved by the Institutional Review Board. Participants were recruited from Qualtrics' online panel, and data collection for the US sample was completed prior to the Chinese sample. To be eligible for the online experiment, participants were required to be 18 years or older and current daily or occasional smokers who had smoked at least 100 cigarettes at the time of participation. The average age of participants was 39.42 ($SD$ = 11.80), and the mean level of nicotine dependence was 4.91 ($SD$ = 2.43). Nicotine dependence was measured using the Fagerström Tolerance Questionnaire (FTQ; Heatherton et al., 1991), which yields scores ranging from 0 to 11, with higher scores indicating greater physiological dependence on nicotine. Based on standard cutoffs reported in prior research (Horn et al., 2003), scores from 0–2 are typically categorized as very low dependence, 3–4 as low, 5 as moderate, 6–7 as high, and 8–11 as very high dependence. Accordingly, a mean score of 4.91 in our sample falls at the upper end of the low dependence range and borders on moderate dependence, consistent with the categorization of low-to-moderate dependence used in previous studies. Due to the low smoking prevalence among women in China (2.1% vs. 50.5% among men in 2018; Chinese Center for Disease Control and Prevention, 2019), only male smokers were recruited in the Chinese sample. In contrast, gender was not restricted in the US sample. Age and parental status also differed between samples from the two countries, with a higher average age and a higher proportion of parents in the US sample due to differences in online panel demographics. These variables were included as covariates in

**Table 1.** Demographic information of experiment participants

| Demographic factors | Summary statistics (N = 3,698) | |
| --- | --- | --- |
| | $N_{US}$ = 1,392 | $N_{China}$ = 2,306 |
| Age | Mean = 43.78, SD = 12.55 | Mean = 36.82, SD = 10.50 |
| Gender | | |
| Male | 613 (42.40%) | 2,306 (100.00%) |
| Female | 779 (57.60%) | / |
| One or more children | 1,736 (75.29%) | 624 (46.10%) |
| Education level | | |
| Less than high school | 87 (6.60%) | 137 (5.93%) |
| High school diploma | 696 (51.50%) | 331 (14.35%) |
| Some college | 213 (15.80%) | 470 (20.40%) |
| College degree or more | 353 (26.10%) | 1,368 (59.36%) |
| Ethnicity | | |
| Hispanic | 115 (8.50%) | / |
| White | 1,171 (86.80%) | / |
| Black | 111 (8.20%) | / |
| Others | 68 (5.00%) | / |
| Han Chinese | / | 2,270 (98.44%) |
| Ethnic minorities | / | 36 (1.56%) |

data analyses. Additional demographic information is reported in Table 1.

The large-K multiple-message design minimizes case-category confounding while improving generalizability across the many specific messages falling under the same conceptual feature category (O'Keefe, 2015). Following the approach, participants from both countries were assigned to evaluate a random selection of six PWs. They were then asked to rate the perceived effectiveness of each viewed PW, accordingly, generating 22,188 observed data points. These design parameters, including the number of PWs per participant, were calibrated to surpass the recommended "data density" threshold of 25 evaluations per message from prior methodological work (e.g., Kim et al., 2016), which aims to balance ecological validity, participant fatigue, and evaluation efficiency.

We conducted a content analysis with three independent coders to identify care-based moral appeals within each PW in the stimulus pools. Coding decisions were based on the message unit as a whole, incorporating both textual and visual modalities to determine whether the warning aligned with the care/harm foundation. A PW was classified as a care-based moral appeal if it depicted or explicitly referenced the harm of secondhand smoke: (1) harm caused by secondhand smoke to infants, children, and other adults in the smoker's environment, (2) harm caused by secondhand smoke to pets, plants, other living beings, or the nature environment, and (3) harm caused by tobacco consumption to offspring, including depictions of premature birth, abortion, birth defects, or childhood cancer

resulting from parental smoking. In cases where visual imagery alone was ambiguous (e.g., depictions of bodily harm that could be interpreted as self-inflicted), coders relied on accompanying textual cues to determine whether the message emphasized harm to other non-smokers.

A total of 105 PWs were identified as care-based moral appeals (k = 105, Krippendorff's α = 0.95). More precisely, we further coded whether each care-based moral appeal was shocking or non-shocking. Shocking care appeals were identified when a care-based PW depicts: (1) facial expressions showing suffering, pain, or unpleasantness from innocent non-smokers, including children, adults, and animals, harmed by secondhand smoke, or (2) premature or aborted fetuses and children's illnesses linked to parental tobacco consumption. We excluded PWs depicting cartoons and other animated images without real human characters, as well as those featuring victims (e.g., children) yet lacking visible suffering or negative facial expressions from secondhand smoke. Importantly, textual modality was also considered in determining whether a PW met the threshold for "shocking," particularly in cases where the visual element alone was ambiguous. PWs that lacked visual depictions of unpleasantness, pain, illness, or suffering of moral victims, while still communicating harm to others, were categorized as non-shocking care appeals. A total of 27 PWs were identified as shocking care appeals (k = 27, Krippendorff's α = 0.85). The remaining moral appeals without such depictions were classified as non-shocking care appeals, including cartoons or animated messages (k = 78). There were 2,867 observed evaluations of moral

appeals, including 761 for shocking and 2,106 for non-shocking care appeals.

We selected perceived message effectiveness (PME, Bigsby et al., 2013) as the per-message outcome. The care/harm foundation served as the response predictor (Graham et al., 2011). Details on content analysis coding instructions and survey measures are provided in the Electronic Supplementary Material, ESM 1. This study focuses specifically on the effectiveness of care-based moral appeals within PWs; analyses of other message features and outcomes are reported in other publications (e.g., Tao et al., 2024).

## Data Analysis

We performed multilevel modeling with cross-classified random intercepts via the *lmerTest* package in the statistical programming language *R*. Due to the cross-classified data structure where participants rated multiple PWs and each PW received multiple evaluations, we included both participant- and message-level random intercepts. PME was the dependent variable, with coded care-based moral appeals (shocking/non-shocking care appeals vs. other control PWs), self-reported care/harm foundation endorsement, and country (1 = US) as fixed effects. Age, household smoking status, nicotine dependence, and number of children were participant-level covariates. Machine-coded aesthetic features (via the *Athec* package in Python) were included as message-level covariates. PME, responded care/harm foundation, nicotine dependence, and message-level covariates were standardized. We ran five regression models to test the main effects, as well as two-way and three-way cross-level interaction effects separately. The same computer vision and response covariates were included in all models.

We deposited the dataset, R code, and the stimuli pool in the Open Science Framework repository (https://osf.io/tywja/).

## Results

The regression results are summarized in Table 2. We used two dummy variables to code shocking (vs. not) and non-shocking (vs. not) care appeals (1 = *yes*). Other control PWs not employing care appeals were treated as the reference group (control). First, the results showed that shocking ($b = 0.15$, $p < .001$, 95% CI: [0.08, 0.23]) and non-shocking care appeals ($b = 0.05$, $p = .038$, 95% CI: [0.003, 0.10]) were both perceived as more effective than other PWs without using care-based moral appeals. H1 was supported. Besides, non-shocking moral appeals were perceived as less

effective than shocking moral appeals ($b = -0.10$, $p = .024$, 95% CI: [$-0.19$, $-0.01$]), supporting H2.

Regarding H3a-b, the results yield a significant cross-level two-way interaction between self-reported care/harm foundation endorsement and exposure to shocking care appeals (see Figure 1, $b = 0.05$, $p = .047$, 95% CI: [0.001, 0.10]). This suggests that the superiority of shocking care appeals over other control PWs lacking any care appeals was even more prominent among those who held higher care/harm endorsement. H3a was supported. However, the interaction effect between care/harm endorsement and non-shocking care appeals was non-significant ($b = 0.04$, $p = .068$, 95% CI: [$-0.095$, 0.011]). H3b was not supported.

Additional analyses were conducted to further compare shocking/non-shocking care appeals with PWs emphasizing self-related harms to smokers themselves, the most prevalent subcategory within "other control PWs". These results are available in ESM 1, Report 3, which largely replicated the pattern reported above, where shocking care appeals, but not non-shocking care appeals, outperformed PWs emphasizing self-related harms. Similarly, we found a positive interaction effect with self-reported endorsement of the care/harm foundation, specific to shocking care appeals.

In terms of RQ1 and RQ2, although the results found that American smokers ($b = 0.14$, $p < .001$, 95% CI: [0.080, 0.207]) reported higher PME in general than Chinese male smokers, regardless of message features, the two-way interactions between the country dummy and coded care-based moral appeals (vs. other control PWs) were non-significant. These null findings indicate the lack of substantial differences in the effectiveness of care-based moral appeals between smokers in these two countries (RQ1). Furthermore, our results did not show any significant three-way interactions (RQ2). Interestingly, we found a significant negative interaction between care/harm foundation and country (US vs. China) ($b = -0.19$, $p < .001$, 95% CI: [$-0.240$, $-0.140$]). Figure 2 revealed that the association between the response care/harm foundation and PME was steeper and stronger for Chinese men who smoke than their American counterparts.

## Discussion

As one of the first studies to comparatively examine care-based moral appeals in PWs among American and Chinese smokers, populations where PWs have not yet been implemented, we provided empirical evidence supporting the superiority of care-based moral appeals, particularly those employing shocking visuals, over other PWs lacking care

T. H. Zhang et al., Care-Based Moral Appeals & Tobacco Control

**Table 2.** Results of hierarchical linear regression: Effects on perceived message effectiveness

| Predictors | Model 1 | Model 2 | Model 3 | Model 4 | Model 5 |
|---|---|---|---|---|---|
| Fixed effects | | | | | |
| (Intercept) | −1.09*** [−1.265, −0.910] | −1.09*** [−1.266, −0.912] | −1.13*** [−1.318, −0.940] | −1.09*** [−1.264, −0.911] | −1.13*** [−1.319, −0.944] |
| *Responded moral foundation* | | | | | |
| Care/Harm Foundation | **0.28*** [0.259, 0.309]** | 0.33*** [0.278, 0.381] | 0.28*** [0.259, 0.309] | 0.36*** [0.324, 0.386] | 0.42*** [0.357, 0.492] |
| *Country* | | | | | |
| US vs. China | **0.14*** [0.080, 0.207]** | 0.14*** [0.080, 0.207] | 0.24** [0.077, 0.402] | 0.14*** [0.076, 0.203] | 0.24*** [0.074, 0.399] |
| *Care-based moral appeals (human-coded message features)* | | | | | |
| Control vs. Shocking care appeals | **−0.15*** [−0.229, −0.075]** | −0.15*** [−0.228, −0.074] | −0.11* [−0.212, −0.008] | −0.15*** [−0.229, −0.074] | −0.11* [−0.210, −0.007] |
| Non-shocking Care Appeals vs. Shocking Care Appeals | **−0.10* [−0.190, −0.014]** | −0.10* [−0.190, −0.013] | −0.05 [−0.165, 0.061] | −0.10* [−0.190, −0.014] | −0.05 [−0.164, 0.063] |
| *Demographic factors (responded covariates)* | | | | | |
| Number of children | 0.17*** [0.125, 0.212] | 0.17*** [0.125, 0.212] | 0.17*** [0.125, 0.212] | 0.17*** [0.125, 0.211] | 0.17*** [0.125, 0.211] |
| First-time smoking age | 0.03*** [0.030, 0.040] | 0.03*** [0.030, 0.040] | 0.03*** [0.030, 0.040] | 0.03*** [0.029, 0.040] | 0.03*** [0.029, 0.040] |
| Nicotine dependence | 0.05*** [0.035, 0.056] | 0.05*** [0.035, 0.056] | 0.05*** [0.035, 0.056] | 0.05*** [0.035, 0.056] | 0.05*** [0.035, 0.056] |
| *Aesthetic message features (computer vision covariates)* | | | | | |
| Hue Count | 0.02** [0.009, 0.039] | 0.02** [0.009, 0.039] | 0.02** [0.009, 0.038] | 0.02** [0.009, 0.038] | 0.02** [0.009, 0.038] |
| *Cross-level interactions* | | | | | |
| SCA vs. Control × Care/Harm Foundation | / | **0.05* [0.001, 0.095]** | / | / | 0.07* [0.010, 0.134] |
| NSA vs. Control × Care/Harm Foundation | / | −0.04 [−0.095, 0.011] | / | / | −0.07 [−0.137, −0.010] |
| SCA vs. Control × Country | / | / | 0.10 [−0.212, 0.008] | / | 0.22 [−0.253, 0.057] |
| NSA vs. Control × Country | / | / | −0.12 [−0.304, 0.056] | / | 0.18 [−0.305, 0.055] |
| Care/Harm Foundation × Country | / | / | / | **−0.19*** [−0.240, −0.140]** | −0.24*** [−0.349, −0.140] |
| SCA vs. Control × Care/Harm Foundation × Country | / | / | / | / | −0.06 [−0.040, −0.150] |
| NSA vs. Control × Care/Harm Foundation × Country | / | / | / | / | 0.06 [−0.050, 0.170] |
| Random effects | | | | | |
| Participant-level (*SD*) | 0.513 (0.716) | 0.513 (0.716) | 0.513 (0.716) | 0.505 (0.710) | 0.505 (0.710) |
| Message-level (*SD*) | 0.027 (0.163) | 0.027 (0.163) | 0.027 (0.163) | 0.027 (0.163) | 0.027 (0.163) |
| Residual variance (*SD*) | 0.308 (0.555) | 0.308 (0.555) | 0.308 (0.555) | 0.308 (0.555) | 0.308 (0.555) |
| Model summary | | | | | |
| AIC/BIC | 46,617/46,785 | 46,617/46,801 | 46,619/46,803 | 46,563/46,739 | 46,568/46,792 |
| Log-likelihood (deviance) | −23,288 (46,575) | −23,286 (46,571) | −23,287 (46,573) | −23,260 (46,519) | −23,256 (46,512) |
| Marginal $R^2$/Conditional $R^2$ | 0.154/0.692 | 0.154/0.692 | 0.154/0.692 | 0.162/0.692 | 0.162/0.692 |

*Note.* Observed data points = 22,188, $N_{total}$ = 3,698. There were 2,867 observed data points for care-based moral appeals in total, with 761 data points for shocking moral appeals and 2,106 data points for non-shocking appeals. Unstandardized coefficients (*b*) and 95% confidence intervals are reported in this table. SCA = shocking care appeals, NSA = non-shocking care appeals. PME, care/harm moral foundation, and nicotine dependence were standardized before fitting regression models. AIC = Akaike Information Criterion, BIC = Bayesian Information Criterion. We included file size, brightness, contrast, mean of hue, saturation, value, and aspect ratio as machine-coded computer vision covariates; as well as age, and household smoking status as response covariates. However, none of them yielded significant results on PME Values in bold demonstrate significant statistical relationships. ***$p$ < .001; **$p$ < .01; *$p$ < .05.
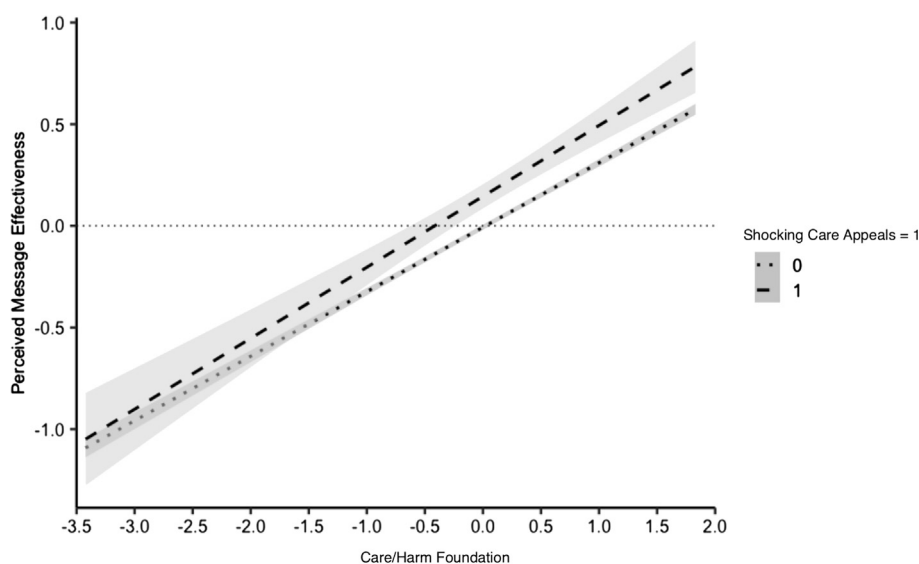
**Figure 1.** Cross-level interaction between care/harm foundation and care-based moral appeals. Shaded areas represent 95% CIs. PME and care/harm foundation were standardized.
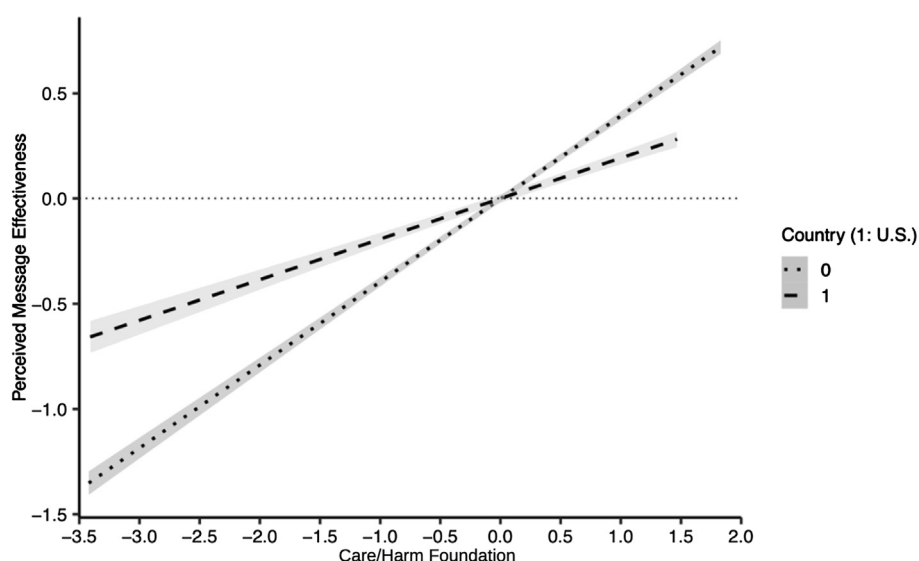


**Figure 2.** Cross-level interaction between care/harm foundation and country. Shaded areas represent 95% CIs. PME and care/harm value were standardized.

appeals. We also demonstrated the moderation effects of pre-exposure endorsement of the corresponding care/harm foundation. Interestingly, the effectiveness of shocking care appeals did not seem to vary substantially between these two countries despite considerable sociocultural differences. Our cross-national findings advance the theorization of morally grounded health messaging strategies from a global perspective.

Specifically, first, we distinguished between two types of care-based moral appeals: shocking versus non-shocking appeals, varying in the presence of portrayals depicting unpleasantness and suffering of moral victims (Stockdale, 2022). Extending prior literature on morally shocking messages (Dillard et al., 2007; Wisneski & Skitka, 2017), we found that shocking care appeals led to higher perceived effectiveness and represent a promising strategy for

tobacco control in both countries. However, caution is warranted, as repeated exposure to shocking care appeals may result in desensitization and message fatigue (Keating & Skurka, 2024).

Second, we found that smokers with a stronger care/harm foundation perceived PWs as more effective in general across message feature categories. This aligns well with the MFT, which posits that those individuals prioritizing care/harm foundation are especially attuned to preventing harm and protecting vulnerable others (Haidt, 2012). Our study further shows that PWs depicting suffering experienced by moral victims were rated as more persuasive by individuals with a higher care/harm foundation, and this interaction effect was not generalizable to non-shocking care appeals, similarly addressing secondhand smoking harms yet lacking morally shocking visuals. These results

illustrate the unique persuasive advantage of morally shocking visuals in tobacco control messaging as well as the sensitivity of such message features towards participants' baseline moral foundation endorsement.

Based on additional analyses reported in ESM 1, Report 3, we largely replicated this pattern, contrasting shocking care appeals with conventional fear/disgust appeals emphasizing self-related health harms. While fear- and disgust-based appeals have long been central to tobacco control, particularly in research guided by the EPPM (Witte, 1992) and the Limited Capacity Model of Motivated Mediated Message Processing (LC4MP, Lang, 2000), our findings suggest that morally grounded persuasive messages, like those rooted in the care/harm foundation, are likely to have a persuasive advantage over other non-moral fear/disgust appeals in tobacco control. Conceptually, the abstract notion of morality in care-based appeals is operationalized through thematic emphasis on negative consequences of secondhand smoke to vulnerable innocents, which is distinct from the focus on self-focused harms. The fact that the moderation effects of pre-exposure care/harm foundation endorsement were specific to morally shocking care appeals further underscores the importance of visual depictions vividly portraying victimization. We speculate that shocking care appeals do not merely trigger emotions like fear but instead evoke morally charged emotions like guilt, outrage, and compassion (Haidt, 2003). We encourage future research to empirically verify these emotional mechanisms underlying the persuasive advantage of shocking care appeals.

Third, although our study focuses on the care/harm moral foundation, we do not claim this is the only morally relevant foundation for persuasive health messaging within or beyond tobacco control contexts. Previous research has highlighted the relevance of other moral foundations in predicting health behaviors beyond smoking, including healthy eating (Kiser, 2013) and vaccination hesitancy (Amin et al., 2017; Nan et al., 2022; O'Marr et al., 2023), though experimental studies directly manipulating moral appeals have remained relatively rare. An important advantage of grounding research on morality and health message effects in MFT is that its modular structure provides a succinct framework for categorizing systems along the primary foundation dimension. However, given the abstractness of moral foundations, each foundation may have differential applicability across specific health domains depending on sociocultural background and cumulative communication efforts to map abstract foundations to concrete health behaviors. We therefore encourage future research to examine the feasibility of developing a range of foundation-specific moral appeals and to test their differentiable effectiveness for a given health behavior domain. We hope our study provides a useful model for such efforts.

Lastly, our results revealed no three-way interaction between respondents' care/harm foundation, coded care-based moral appeals, and country-level differences. Nor did we find evidence that country moderated the effects of moral appeals. These important non-significant findings support the view that, unlike purity/degradation, care/harm is a universally recognized moral foundation, which is consistent across cultures (Graham et al., 2009, 2011). Thus, care-based moral appeals may be recognized as an effective cross-cultural tobacco control strategy. However, residual effects of the care/harm foundation after accounting for appeals hint at possible country-level differences. For instance, longstanding US campaigns on the harm of secondhand smoke may heighten Americans' sensitivity to messages emphasizing care/harm. This suggests contextual factors may still shape how PWs are perceived.

This study provides practical implications for tobacco control campaigns in the US and China, by identifying how two types of care-based moral appeals function in real-world multimodal tobacco control campaigns, we offer strategic guidance for cross-cultural anti-smoking message design that transcends cultural boundaries. Policymakers and campaign designers can leverage these insights to develop multimodal strategies that not only capture smokers' attention but also resonate with their moral orientations, which ultimately enhances the effect of tobacco control across two cultural contexts.

## Limitations

This study has limitations. First, as an early attempt to examine care-based moral appeals within real-world PWs, we focused solely on PME as the outcome variable. While this provides insights into the initial evaluation of care-based moral appeals, it is insufficient to fully assess the potential for health behavior change. Second, we only measured participants' immediate post-exposure reactions without tracking changes over time. Given that health behavior change is a gradual process influenced by repeated message exposure, future research should adopt longitudinal designs to assess the potential long-term or delayed effects of moral appeals in PWs, particularly in terms of message perceptions and behavioral outcomes.

Additionally, regarding the participants' demographics, the exclusion of women in the Chinese sample, though justifiable given the low prevalence of smoking among Chinese women and practical recruitment constraints, limits the generalizability of our findings across gender. In addition, the imbalance in parental status across samples may have influenced how participants interpreted child-centered moral appeals. While our study takes advantage of the randomized multiple-message design to mitigate the threat from imbalances in key sample demographic

characteristics to internal validity, future research should aim to recruit a more representative sample of Chinese smokers when resources permit.

Last but not least, we recognize that repeated exposure to multiple PWs may influence participants' PME ratings. Prior studies have shown that perceptions of message effectiveness can change across repeated viewings due to ordering, carryover, contrast effects, and exposure fatigue (Jang et al. 2025). Although we randomized the display order of PWs for each participant and limited total exposure to six messages to minimize these concerns, we recognize that residual effects of repeated exposure cannot be entirely ruled out. We encourage future research to investigate how the effectiveness of care-based moral appeals may vary under different message exposure patterns.

## Conclusion

In summary, this study analyzed data from two large-scale, multiple-message experiments conducted among American and Chinese smokers, utilizing the largest set of real-world PWs examined to date. By comparing responses across distinct sociocultural contexts, we differentiated between two types of care-based moral appeals, demonstrated the ecological validity of moral messaging in tobacco control, and identified both universal and culturally specific patterns of message effectiveness. These findings offer valuable insights for designing morally resonant tobacco control messages tailored to diverse populations.

## Electronic Supplementary Materials

The following electronic supplementary material is available with this article at https://doi.org/10.1027/1864-1105/a000495.
ESM 1. Supplementary reports.

## References

Amin, A. B., Bednarczyk, R. A., Ray, C. E., Melchiori, K. J., Graham, J., Huntsinger, J. R., & Omer, S. B. (2017). Association of moral values with vaccine hesitancy. *Nature Human Behaviour, 1*(12), 873–880. https://doi.org/10.1038/s41562-017-0256-5

Atari, M., Haidt, J., Graham, J., Koleva, S., Stevens, S. T., & Dehghani, M. (2023). Morality beyond the WEIRD: How the nomological network of morality varies across cultures. *Journal of Personality and Social Psychology, 125*(5), 1157. https://doi.org/10.1037/pspp0000470

Bandura, A. (2014). Social cognitive theory of moral thought and action. In W. M. Kurtines & J. L. Gewirtz (Eds.), *Handbook of moral behavior and development* (Vol. 1, pp. 45–103). Psychology Press.

Bigsby, E., Cappella, J. N., & Seitz, H. H. (2013). Efficiently and effectively evaluating public service announcements: Additional

evidence for the utility of perceived effectiveness. *Communication Monographs, 80*(1), 1–23. https://doi.org/10.1080/03637751.2012.739706

Brandt, A. M., & Rozin, P. (2013). *Morality and health*. Routledge.

Chinese Center for Disease Control and Prevention. (2019, May 30). *2018 China adult tobacco survey results released: Smoking rate among people aged 15 and above shows a downward trend* [in Chinese]. https://chinacdc.cn/jksj/jksj04/202407/t20240731_2878263.html

Cho, H., Guo, Y., & Torelli, C. (2022). Collectivism fosters preventive behaviors to contain the spread of COVID-19: Implications for social marketing in public health. *Psychology & Marketing, 39*(4), 694–700. https://doi.org/10.1002/mar.21613

Clifford, S., Jerit, J., Rainey, C., & Motyl, M. (2015). Moral concerns and policy attitudes: Investigating the influence of elite rhetoric. *Political Communication, 32*(2), 229–248. https://doi.org/10.1080/10584609.2014.944320

Dillard, J. P., Weber, K. M., & Vail, R. G. (2007). The relationship between the perceived and actual effectiveness of persuasive messages: A meta-analysis with implications for formative campaign research. *Journal of Communication, 57*(4), 613–631. https://doi.org/10.1111/j.1460-2466.2007.00360.x

Feinberg, M., & Willer, R. (2015). From gulf to bridge: When do moral arguments facilitate political influence? *Personality and Social Psychology Bulletin, 41*(12), 1665–1681. https://doi.org/10.1177/0146167215607842

Graham, J., Haidt, J., & Nosek, B. A. (2009). Liberals and conservatives rely on different sets of moral foundations. *Journal of Personality and Social Psychology, 96*(5), 1029–1046. https://doi.org/10.1037/a0015141

Graham, J., Haidt, J., Koleva, S., Motyl, M., Iyer, R., Wojcik, S. P., & Ditto, P. H. (2013). Moral foundations theory: The pragmatic validity of moral pluralism. In J. M. Olson & M. P. Zanna (Eds.), *Advances in experimental social psychology* (Vol. 47, pp. 55–130). Academic Press. https://doi.org/10.1016/B978-0-12-407236-7.00002-4

Graham, J., Nosek, B. A., Haidt, J., Iyer, R., Koleva, S., & Ditto, P. H. (2011). Mapping the moral domain. *Journal of Personality and Social Psychology, 101*(2), 366–385. https://doi.org/10.1037/a0021847

Grizzard, M., Shaw, A. Z., Dolan, E. A., Anderson, K. B., Hahn, L., & Prabhu, S. (2017). Does repeated exposure to popular media strengthen moral intuitions? Exploratory evidence regarding consistent and conflicted moral content. *Media Psychology, 20*(4), 557–583. https://doi.org/10.1080/15213269.2016.1227266

Haidt, J. (2001). The emotional dog and its rational tail: A social intuitionist approach to moral judgment. *Psychological Review, 108*(4), 814–834. https://doi.org/10.1037/0033-295X.108.4.814

Haidt, J. (2003). The moral emotions. In R. J. Davidson, K. R. Scherer, & H. H. Goldsmith (Eds.), *Handbook of affective sciences* (pp. 852–870). Oxford University Press.

Haidt, J. (2012). *The righteous mind: Why good people are divided by politics and religion*. Vintage.

Heatherton, T. F., Kozlowski, L. T., Frecker, R. C., & Fagerstrom, K. O. (1991). The Fagerström test for nicotine dependence: A revision of the Fagerstrom Tolerance Questionnaire. *British Journal of Addiction, 86*(9), 1119–1127. https://doi.org/10.1111/j.1360-0443.1991.tb01879.x

Hansen, S. L., Eisner, M. I., Pfaller, L., & Schicktanz, S. (2018). "Are you in or are you out?!" Moral appeals to the public in organ donation poster campaigns: A multimodal and ethical analysis. *Health Communication, 33*(8), 1020–1034. https://doi.org/10.1080/10410236.2017.1331187

Horn, K., Fernandes, A., Dino, G., Massey, C. J., & Kalsekar, I. (2003). Adolescent nicotine dependence and smoking cessation outcomes. *Addictive Behaviors, 28*(4), 769–776. https://doi.org/10.1016/S0306-4603(02)00229-0

Jang, Y., Brewer, N. T., Gottfredson O'Shea, N., Hall, M. G., & Noar, S. M. (2025). Do perceived message effectiveness ratings change in response to repeated message exposures? Online first publication. https://doi.org/10.1080/10410236.2025.2466115

Jasper, J. M., & Poulsen, J. D. (1995). Recruiting strangers and friends: Moral shocks and social networks in animal rights and anti-nuclear protests. *Social Problems, 42*(4), 493–512. https://doi.org/10.2307/3097043

Jin, Y., Wang, L., Lu, B., & Ferketich, A. K. (2014). Secondhand smoke exposure, indoor smoking bans and smoking-related knowledge in China. *International Journal of Environmental Research and Public Health, 11*(12), 12835–12847. https://doi.org/10.3390/ijerph111212835

Jordan, J. J., Yoeli, E., & Rand, D. G. (2021). Don't get it or don't spread it: Comparing self-interested versus prosocial motivations for COVID-19 prevention behaviors. *Scientific Reports, 11*(1), Article 20222. https://doi.org/10.1038/s41598-021-97617-5

Joseph, J., Berry, K., & Deshpande, S. P. (2009). Impact of emotional intelligence and other factors on perception of ethical behavior of peers. *Journal of Business Ethics, 89*, 539–546. https://doi.org/10.1007/s10551-008-0015-7

Kiser, S. (2013). *Associations between moral foundations and healthy eating identity and self-efficacy* (Doctoral dissertation). Arizona State University.

Kaplan, J. T., Vaccaro, A., Henning, M., & Christov-Moore, L. (2023). Moral reframing of messages about mask-wearing during the COVID-19 pandemic. *Scientific Reports, 13*(1), Article 1. https://doi.org/10.1038/s41598-023-37075-3

Keating, D. M., & Skurka, C. (2024). Meta-analytic evidence that message fatigue is associated with unintended persuasive outcomes. *Communication Research*. Online first publication. https://doi.org/10.1177/00936502241287875

Kim, M., Shi, R., & Cappella, J. N. (2016). Effect of character-audience similarity on the perceived effectiveness of antismoking PSAs via engagement. *Health Communication, 31*(10), 1193–1204. https://doi.org/10.1080/10410236.2015.1048421

Lang, A. (2000). The limited capacity model of mediated message processing. *Journal of Communication, 50*(1), 46–70. https://doi.org/10.1111/j.1460-2466.2000.tb02833.x

Leshner, G., Bolls, P., & Wise, K. (2011). Motivated processing of fear appeal and disgust images in televised anti-tobacco ads. *Journal of Media Psychology, 23*(2), 77–89. https://doi.org/10.1027/1864-1105/a000037

Luttrell, A., & Trentadue, J. T. (2024). Advocating for mask-wearing across the aisle: Applying moral reframing in health communication. *Health Communication, 39*(2), 270–282. https://doi.org/10.1080/10410236.2022.2163535

Mongeau, P. A. (2012). Fear appeals. In J. P. Dillard & L. Shen (Eds.), *The SAGE handbook of persuasion: developments in theory and practice* (2nd ed., pp. 184–198). SAGE.

Morgan, J. C., Golden, S. D., Noar, S. M., Ribisl, K. M., Southwell, B. G., Jeong, M., Hall, M. G., & Brewer, N. T. (2018). Conversations about pictorial cigarette pack warnings: Theoretical mechanisms of influence. *Social Science & Medicine, 218*, 45–51. https://doi.org/10.1016/j.socscimed.2018.09.063

Nabi, R. L. (2015). Emotional flow in persuasive health messages. *Health Communication, 30*(2), 114–124. https://doi.org/10.1080/10410236.2014.974129

Nan, X., Wang, Y., Thier, K., Adebamowo, C., Quinn, S., & Ntiri, S. (2022). Moral foundations predict COVID-19 vaccine hesitancy: Evidence from a national survey of black Americans. *Journal of Health Communication, 27*(11–12), 801–811. https://doi.org/10.1080/10810730.2022.2160526

O'Keefe, D. J. (2015). Message generalizations that support evidence-based persuasive message design: Specifying the evidentiary requirements. *Health Communication, 30*(2), 106–113. https://doi.org/10.1080/10410236.2014.974123

O'Marr, J. M., Raoul, A., James, E. K., Winters, M., Amin, A. B., Bednarczyk, R. A., Graham, J., Huntsinger, J. R., & Omer, S. B. (2023). Moral foundations and HPV vaccine acceptance in the United States: State, parental, and individual factors. *Social Science & Medicine, 336*, Article 116257. https://doi.org/10.1016/j.socscimed.2023.116257

Stockdale, K. (2022). Moral shock. *Journal of the American Philosophical Association, 8*(3), 496–511. https://doi.org/10.1017/apa.2021.15

Suh, Y. J., & Kim, H. S. (2025). How moral reframing enhances political persuasion: The role of processing fluency and self-affirmation. *Communication Research, 52*(1), 61–88. https://doi.org/10.1177/00936502241263941

Tao, R., Wang, X., Wang, Y., Yao, H., Wu, S., Liu, J., & Yang, S. (2024). Emotional appeals and norms: How normative perceptions moderate the persuasive impacts of discrete emotional appeals within tobacco pictorial warnings in China. *Health Communication, 39*(12), 2561–2576. https://doi.org/10.1080/10410236.2023.2277036

Waldron, V. R., Reutlinger, C., Martin, J., O'Neil, E., & Niess, L. C. (2024). "We are all in this together": Which memorable moral messages guided student responses to the COVID-19 pandemic? *Health Communication, 39*(12), 2744–2755. https://doi.org/10.1080/10410236.2023.2286695

Wang, Y., Xu, Y. A., Wu, J., Kim, H. M., Fetterman, J. L., Hong, T., & McLaughlin, M. L. (2023). Moralization of e-cigarette use and regulation: A mixed-method computational analysis of opinion polarization. *Health Communication, 38*(8), 1666–1676. https://doi.org/10.1080/10410236.2022.2027640

Witte, K. (1992). Putting the fear back into fear appeals: The extended parallel process model. *Communications Monographs, 59*(4), 329–349. https://doi.org/10.1080/03637759 209376276

Wisneski, D. C., & Skitka, L. J. (2017). Moralization through moral shock: Exploring emotional antecedents to moral conviction. *Personality and Social Psychology Bulletin, 43*(2), 139–150. https://doi.org/10.1177/0146167216676479

Wu, J., Wang, Y., Xu, Y. A., Fetterman, J. L., & Hong, T. (2023). Morally driven and emotionally fueled: The interactive effects of values and emotions in the social transmission of information endorsing e-cigarettes. *International Journal of Communication, 17*, 1190–1210. https://ijoc.org/index.php/ijoc/article/view/19860/4045

Yang, F., & Yang, S. (2023). Effects of moral frames within vaping prevention messages on current smokers' support for electronic cigarette regulations. *Journal of Health Communication, 28*(7), 412–424. https://doi.org/10.1080/10810730.2023. 2217104

Yang, S. (2019). *Morality in tobacco control messaging: Effects of moral appeals on persuasion and retransmission* (Doctoral dissertation). University of Pennsylvania.

Yang, S., Maloney, E. K., Tan, A. S., & Cappella, J. N. (2018). When visual cues activate moral foundations: Unintended effects of visual portrayals of vaping within electronic cigarette video advertisements. *Human Communication Research, 44*(3), 223–246. https://doi.org/10.1093/hcr/hqy004

Youk, S., Malik, M., Chen, Y., Hopp, F. R., & Weber, R. (2024). Measures of argument strength: a computational, large-scale analysis of effective persuasion in real-world debates. *Communication Methods and Measures, 18*(1), 7–29. https://doi.org/10.1080/19312458.2023.2230866

Zhang, T. H. (2025, August 4). Care-based moral appeals in pictorial tobacco control messages: A cross-cultural comparison of American and Chinese smokers using real-world campaign messages [Code, Data, Materials]. https://osf.io/tywja

Zhu, Y., Wei, R., Lo, V. H., Zhang, M., & Li, Z. (2021). Collectivism and altruistic behavior: A third-person effect study of COVID-19 news among Wuhan residents. *Global Media and China, 6*(4), 476–491. https://doi.org/10.1177/20594364211 045568

## ORCID
Sijia Yang
https://orcid.org/0000-0003-4209-9881
Thomas H. Zhang
https://orcid.org/0000-0002-0617-4787
Xiaohui Cao
https://orcid.org/0009-0004-0185-1912
Yidi Wang
https://orcid.org/0009-0003-7993-5609
Jiaying Liu
https://orcid.org/0000-0001-8461-0954

## Sijia Yang
School of Journalism and Mass Communication
University of Wisconsin-Madison
5160 Vilas Hall
821 University Avenue
Madison, WI 53706
USA
sijia.yang@alumni.upenn.edu

Sijia Yang (PhD) is an Associate Professor in the School of Journalism and Mass Communication at the University of Wisconsin–Madison. He studies message effects, health communication, and computational communication science.


Thomas H. Zhang (MSc) is a PhD student in the School of Journalism and Mass Communication at the University of Wisconsin–Madison. His research centers on health communication, message effects, and evaluation in health promotion and moral persuasion.


Xiaohui Cao (MA) is a PhD student in the School of Journalism and Mass Communication at the University of Wisconsin–Madison. Her research interests include health communication, health campaign design, and emerging communication technologies.


Yidi Wang (MA) is a PhD candidate in the Department of Communication at the University of California, Santa Barbara. Her research focuses on strategies to enhance message effectiveness in health communication for underserved groups using psychophysiological methods.


Jiaying Liu (PhD) is an Associate Professor in the Department of Communication at the University of California, Santa Barbara. Her research looks into the intersection of health communication, social psychology, message effects, and computational social science methods.


Shiwen Wu (PhD) is a Professor in the School of Journalism and Communication at Wuhan University. His research focuses on the history of the internet, media memory, health communication, and online communication.