



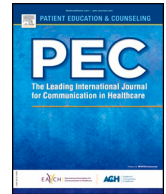
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Contents lists available at ScienceDirect

Patient Education and Counseling

journal homepage: www.elsevier.com/locate/pec

Motivating COVID-19 mitigation actions via personal norm: An extension of the norm activation model

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ARTICLE INFO

Article history:

Received 19 September 2021

Received in revised form 30 November 2021

Accepted 5 December 2021

Keywords:

Awareness of consequences

Ascription of responsibility

Norm activation model

Outcome efficacy

Ideology

COVID-19

ABSTRACT

Objective: Given the prosocial nature of COVID-19 mitigation actions, the norm activation model (NAM) provides a theoretical framework to understand how these mitigation behaviors may be driven by activating personal norms. Aimed at delineating the relationship between awareness of consequences and ascription of responsibility, two key variables in the model, the present study examined to what extent this relationship was moderated by political ideology, individual efficacy, and collective efficacy.

Method: A cross-sectional online survey (N = 560) was implemented with a sample that matched the demographics of the national population in the U.S.

Results: The relationship between awareness of consequences and ascription of responsibility was stronger among liberals and those reporting low levels of individual efficacy and collective efficacy.

Conclusion: Health behaviors such as COVID-19 mitigation actions can be motivated by activating individuals' sense of moral obligation, but the effectiveness of this approach depends on their political ideology and efficacy beliefs.

Practice implications: Campaigns can promote health behaviors by triggering the moral responsibility of the target audience through emphasizing severity of the consequences. This approach can be more effective for liberals and those that lack confidence in individual and collective abilities to avert the threat.

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1. Introduction

As of July 7, 2021, COVID-19 has caused nearly 4 million deaths globally, including over 600,000 deaths in the U.S. [1]. Although vaccine has become increasingly available, about half of the U.S. population is still not fully vaccinated [2]. Besides, the mutation of the virus elevated the level of risks. Therefore, it is necessary to continue to take COVID-19 mitigation actions, including wearing masks, keeping social distance, and personal hygiene.

Prior research examined what factors affect compliance with COVID-19 mitigation from multiple perspectives such as reactance [3], risk perception [4], and efficacy beliefs [5]. The present research proposes an additional approach to COVID-19 mitigation promotion. Given the high infectiousness of the pandemic, engaging in COVID-19 mitigation actions not only protects oneself but others and thereby is prosocial in nature [6,7]. Thus, these actions may be

driven by triggering the moral responsibilities of the target audience, which the norm activation model (NAM) addresses [8].

NAM contends that engagement in prosocial behaviors can be motivated through *personal norm*, conceptualized as the feeling of “moral obligation to perform or refrain from specific actions” [9, p.191]. The original version of NAM proposes a linear model, which posits that awareness of consequences activates personal norm via ascription of responsibility [10], which subsequent research validated [11–14].

However, different relationships were proposed between these variables, particularly between awareness of consequences and ascription of responsibility [15–17]. Given these mixed findings, this study aims to examine the relationship between awareness of consequences and ascription of responsibility in the context of COVID-19 mitigation, particularly explore the moderating role of political ideology and outcome efficacy.

Specifically, research suggests that individual value [18] may change the perception of the consequences and dampen the influence of personal norm on prosocial behaviors. Given the intertwined relationship between politics and COVID-19 [19], political ideology

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may moderate the relationship between awareness of consequences and ascription of responsibility. Additionally, outcome efficacy is a variable that the linear model of NAM does not consider [10–14] but can motivate prosocial behavior [16,17,20,21]. As outcome efficacy is conceptualized as one's confidence in controlling the negative consequences [21], individuals exhibiting high outcome efficacy are more likely to translate awareness of consequences into ascription of responsibility. We extend previous studies by examining whether outcome efficacy may moderate the relationship between awareness of consequences and ascription of responsibility. By testing these potential moderation relationships, this study is expected to provide directions for developing NAM and offer an additional approach to health promotions. More specifically, understanding the awareness and consequences is important for health care providers and communicators as a pathway to effective patient education.

1.1. An overview of NAM

NAM contends that individuals are driven to engage in prosocial behaviors because of their moral obligation, which NAM terms as personal norm [8,9]. Originally, NAM posits that *awareness of consequences*, conceptualized as the extent to which individuals are conscious of negative consequences of the given threat [8,9], predicts *ascription of responsibility* – the extent to which individuals feel personally responsible for the negative consequences [5]– which then predicts personal norm and subsequently prosocial behaviors [10]. This linear model received empirical support such as De Groot and Steg's five studies of different samples and behaviors (2009) [11]. Although other research added variables such as affect [12,13] and social norm [14], the linear relationship between awareness of consequences, ascription of responsibility, personal norm, and behavior was not changed [12–14].

However, this serial mediation between variables mentioned above is inconsistent [17]. One discrepancy in the extant research is the relationship between awareness of consequences and ascription of responsibility. Some research argues that awareness of consequences predicts ascription of responsibility positively [10–14,17]. For instance, participants informed of health problems arising from emissions of particulate matters demonstrated a higher level of ascribed responsibility [17]. However, other studies proposed no relationship between them and suggested that they should drive personal norm independently [15,16].

This inconsistency suggests that there may be other influencing factors in the relationship. Indeed, several variables may moderate the relationship between awareness of consequences and ascription of responsibility [18,22]. Particularly, for those reporting high levels of responsibility denial, the relationship between personal norm and volunteering was weaker because these individuals tended to dissociate the connection between individual behavior and negative consequences of the given threat [18]. Hence, personal value may change how individuals interpret the given threat. If people do not think personal behavior contributed to the threatening situation, they may not feel obligated to take mitigating actions. This reappraisal of the given threat may also apply to the politicalized COVID-19 mitigation in the U.S.

1.2. Extending NAM

1.2.1. NAM and political ideology

Political ideology describes the views that individuals hold about how the society should run. One major difference between American liberalism and conservatism is the boundary of the governance. While the former believes that the government should provide social services including public health services, the latter prefers to rely on private sectors [23].

This difference has extended to COVID-19 mitigation. Republicans (i.e., American conservatives) were less likely to comply with COVID-19 mitigation regulations than Democrats (i.e., American liberals) [19,24], more likely to underestimate the level of risk of the pandemic [25,26], and more susceptible to misinformation and conspiracy theories related to COVID-19 [19]. This might explain why a large number of Americans did not comply with the government's recommendations about COVID-19 mitigation and this choice of compliance/noncompliance was often related to their political ideology. Therefore, although American conservatives may be equally aware of the consequences of COVID-19, this awareness may not necessarily translate into personal responsibility for controlling the spread of the pandemic as they may reject the necessity of mitigation actions.

H1: Political ideology moderates the relationship between awareness of consequences and ascription of personal responsibility such that this relationship should be stronger among liberals compared to conservatives.

1.2.2. NAM and outcome efficacy

One variable that is not included in the linear model of NAM but mentioned in other NAM research is outcome efficacy [16,17,20,21], conceptualized as one's confidence in taking actions that can mitigate severe consequences of the given threat [21]. The effect of outcome efficacy has been supported in NAM research [16,17,20,21]. For instance, outcome efficacy explained additional variances in using non-motor vehicle transportations and turning off the faucet [16] and contributed more variances to personal norm compared to awareness of consequences and ascription of responsibility [20].

However, the position of outcome efficacy in NAM is unclear [17,21]. One study found that outcome efficacy could replace ascription of responsibility [21]. In other words, there was a serial mediation between awareness of consequences and environmental conservation behavior through outcome efficacy (rather than ascription of responsibility) and personal norm [21]. Another study proposed an interaction effect between awareness of consequences and outcome efficacy, but their findings were inconsistent [17]. Specifically, awareness of consequences and outcome efficacy interacted to predict individual involvement in public welfare activities (study 2) but this interaction effect was not replicated on willingness to ban children-made products (study 3).

As outcome efficacy indicates one's confidence in mitigating the negative consequences of the threatening situation [21], this confidence may change how individuals appraise the given threat. Individuals with high outcome efficacy tend to believe that they can avert the threat through personal effort [21,27]. Hence, when they are aware of the negative consequences of COVID-19, they should be more motivated to feel personally responsible for controlling the spread of the pandemic. Conversely, for individuals that do not believe they are capable to mitigate the given threat through personal actions, they might attribute the threat to factors beyond their control. For instance, they might think even if they perform COVID-19 mitigation actions, as long as others fail to do the same, it is still impossible to control the pandemic [28]. This mindset of diffusion of responsibility could lower their motivation for compliance [28]. Thus, awareness of consequences may not necessarily translate into ascription of responsibility unless individuals exhibit a high level of outcome efficacy.

We operationalize outcome efficacy as individual efficacy and collective efficacy. While the former refers to confidence in individual ability to complete the target behavior, the latter refers to confidence in collective ability to take the recommended action [27]. Given the wide spread of COVID-19, controlling the pandemic requires individual effort and collaborations across groups and communities. Hence, both individual efficacy and collective efficacy may moderate the relationship between awareness of consequences and

Table 1
Descriptive Statistics and Zero-Order Correlations for Continuous Variables; Means (Standard Deviations) Presented Along the Diagonal.

	Awareness of consequences	Ascription of responsibility	Personal norm	Individual behavior	Public engagement	Communication behavior	Individual efficacy	Collective efficacy	Ideology
Awareness of consequences	3.87 (0.82)								
Ascription of responsibility	.36 ***	3.79 (1.33)							
Personal norm	.61 ***	.52 ***	4.24 (0.80)						
Individual behavior	.59 ***	.36 ***	.62 ***	4.24 (0.82)					
Public engagement	.39 ***	.43 ***	.53 ***	.80 ***	3.26 (1.02)				
Communication behavior	.32 ***	.36 ***	.44 ***	.311 (1.24)	.32 ***	3.11 (1.24)			
Individual efficacy	.32 ***	.26 ***	.43 ***	.38 ***	.32 ***	.38 ***	3.91 (0.83)		
Collective efficacy	.57 ***	.71 ***	.53 ***	.47 ***	.53 ***	.53 ***	.421 (0.85)		
Ideology	-0.23 ***	-0.16 ***	-0.21 ***	-0.21 ***	-0.13 ***	-0.20 ***	-0.26 ***	4.10 (0.172)	

Note. *** $p < .001$.

ascription of responsibility such that this relationship should be enhanced for a high level of both types of outcome efficacy.

H2: Individual efficacy moderates the relationship between awareness of consequences and ascription of responsibility such that this relationship is stronger at a high level of individual efficacy compared to a low level.

H3: Collective efficacy moderates the relationship between awareness of consequences and ascription of responsibility such that this relationship is stronger at a high level of collective efficacy compared to a low level.

2. Material and methods

2.1. Study procedure

An online survey was launched in March 2021 via Qualtrics. Participants' gender, age, income, race, education, and region were matched to the national population in the U.S. After presenting the informed consent form, participants were asked about their demographic information, followed by questions measuring NAM variables and their engagement in COVID-19 mitigation actions on 5-point scales. This procedure received IRB approval from one co-author's university. A final sample of 560 complete responses was received.

2.2. Measures

We included three types of COVID-19 mitigation actions: individual behavior, public engagement, and communication behavior, adapted from a study on climate change mitigation [29]. We asked participants how likely they would engage in these three types of behaviors in the next six months (1 = extremely unlikely, 5 = extremely likely). *Individual behavior* describes protective behaviors against COVID-19 at the personal level, including keeping social distance, staying at home, washing hands regularly, wearing face mask, and disinfecting frequently touched surfaces (Cronbach's $\alpha = 0.81$, $M = 4.24$, $SD = 0.82$). *Public engagement* refers to involvement in public-sphere activities aimed at mitigating COVID-19, specifically voting to support mitigation policies or regulations, donating money to support organizations or groups working on COVID-19 recovery, and writing letters to media about COVID-19 (Cronbach's $\alpha = 0.74$, $M = 3.26$, $SD = 1.02$). *Communication behavior* refers to talking to people in one's network about COVID-19 and participating or volunteering at events related to COVID-19 (Cronbach's $\alpha = 0.78$, $M = 3.11$, $SD = 1.24$).

We adapted the scale by Onwezen et al. to measure awareness of consequences, ascription of responsibility, and personal norm [12]. *Awareness of consequences* was measured with four items such as "the effects of COVID-19 on public health are worse than we realize" (Cronbach's $\alpha = 0.75$, $M = 3.87$, $SD = 0.82$). *Personal norm* was measured with four items such as "I feel a moral obligation to control the spread of COVID-19" (Cronbach's $\alpha = 0.87$, $M = 4.24$, $SD = 0.80$). *Ascription of responsibility* was assessed with two items ("every citizen must take responsibility for controlling the spread of COVID-19" and "I feel partly responsible for controlling the spread of COVID-19"). However, the reliability of this measure was low in this study (Cronbach's $\alpha = 0.58$) and the original study (0.65) [12]. Therefore, based on the conceptualization of ascription of responsibility [5], we chose the second item to measure this variable ($M = 3.79$, $SD = 1.33$).

Political ideology was assessed by asking participants the extent to which they considered themselves as liberal or conservative (1 = very liberal, 5 = very conservative; $M = 4.10$, $SD = 1.72$). *Individual efficacy* was measured with three items (e.g., "I am able to prevent spreading COVID-19"; Cronbach's $\alpha = 0.75$, $M = 3.91$, $SD = 0.83$) and *collective efficacy* was measured with two items (e.g., "the impacts of COVID-19 can be averted by mobilizing collective effort"; Cronbach's

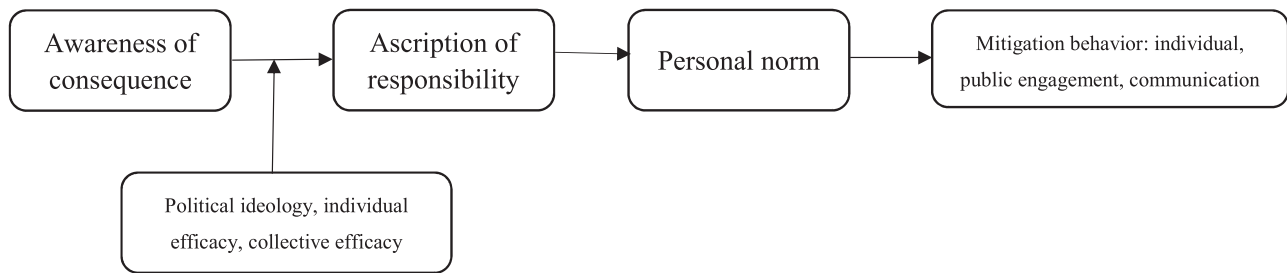


Fig. 1. The Proposed Model.

Table 2
The Linear Model of NAM with Political Ideology as the Moderator.

	Ascription of responsibility	Personal norm	Individual behavior	Public engagement	Communication behavior
Awareness of consequences	.51 ***	.40 ***	.21 ***	.05	.02
Political ideology	-0.03	NA	NA	NA	NA
Awareness of consequences * political ideology	-0.09 *	NA	NA	NA	NA
Ascription of responsibility	NA	.23 ***	-0.01	.05	.05
Personal norm	NA	NA	.40 ***	.34 ***	.37 ***
Gender	.00	.00	-0.00	.01	.00
Age	-0.002	.01 ***	-0.00	-0.01 **	-0.01 ***
Education	.09 *	-0.03	.00	.06 *	.07 *
Income	.05	.02	.00	.10 ***	.10 ***
Race	-0.01	.01	-0.00	-0.21 **	-0.12
Region	.12	.14 **	-0.01	-0.01	-0.08
Perceived severity	.16 *	.06 *	.21 ***	.28 ***	.30 ***
R ² , F	.20 ***, 13.48	.52 ***, 65.18	.52 ***, 57.92	.39 ***, 34.59	.31 ***, 24.14

Note. *** $p < .001$, ** $p < .01$, * $p < .05$.

$\alpha = 0.96$, $M = 4.21$, $SD = 0.85$), adopted from Chu and Yang (2020) [30].

We included following control variables: gender, age, race (1 = white, 0 = others), region (1 = South, 0 = others), education, income, and perceived severity of COVID-19. *Perceived severity* was assessed by asking participants to indicate the level of severity of COVID-19 around them and in the world on two 5-point questions (1 = not at all, 5 = extremely; Cronbach's $\alpha = 0.81$, $M = 3.34$, $SD = 1.06$). Table 1 presents descriptive statistics of the bivariate correlations between continuous variables mentioned above.

2.3. Statistical analysis

The goal of this study is to re-examine and elaborate the linear model of NAM by considering potential moderators for the relationship between awareness of consequences and ascription of responsibility. Therefore, although our hypotheses only focus on the link from awareness of consequences to ascription of responsibility, we tested the entire two-step moderated mediation relationship (Fig. 1) through Hayes' Macro Process 3.4 with 5000 bootstrapping [31]. Simple effect tests were performed when a significant moderation effect emerged. The relationship between awareness of consequences and ascription of responsibility was compared between a high (one standard deviation above the standardized mean) and low (one standard deviation below the standardized mean) level of all moderators.

3. Results

3.1. Demographics

The final sample includes more female participants (53.6%) than male (46.1%), with two not indicating their gender (0.4%). On average, our participants were around 48 years old ($M = 48.44$, $SD = 17.85$). Two thirds of the participants identified themselves as Caucasian (67%), followed by Hispanics/Latino (17.3%), African

American (13.6%), Asian or Asian Indian (6.4%), American Indian or Alaska Native (2.9%), other races (2.1%), Native Hawaiian or other Pacific Islander (0.9%), and Middle Eastern or North African (0.2%). At the time of data collection, 209 participants lived in the South (37.3%), followed by 126 in the West (22.5%), 118 in the Midwest (21.1%), and 107 in the Northeast (19.1%). One hundred and fifty-three participants (27.3%) finished high school, followed by some college education (22.7%), bachelor's degree (20.2%), master's degree (16.4%), associate degree (7.0%), some high school education (2.7%), doctorate degree (2.0%), professional degree (1.6%), and middle school or lower (0.2%). One hundred and thirty participants reported their annual family income between \$25,000 and \$49,999 (23.2%), followed by 94 with \$50,000-\$74,999 (16.8%), 91 with \$10,000-\$24,999 (16.3%), 61 with \$75,000-\$99,999 (10.9%), 56 with \$150,000 or more (10.0%), 53 with \$125,000-\$149,999 (9.5%), 43 with \$100,000-\$124,999 (7.7%), and 32 with less than \$10,000 (5.7%).

3.2. Hypotheses testing

3.2.1. Political ideology

Awareness of consequences, political ideology, their interaction, and control variables explained 20.03% of total variances in ascription of responsibility ($R^2 = .2003$, $F(10, 538) = 13.48$, $p < .001$, Table 2). While the direct effect of political ideology on ascription of responsibility was not significant, it moderated the relationship between awareness of consequences and ascription of responsibility ($B = -0.09$, $p < .02$) such that this relationship was stronger when individuals identified themselves as liberal ($B = 0.66$, $p < .001$, Fig. 2) compared to conservative ($B = 0.37$, $p < .001$). H1 was supported.

Additionally, awareness of consequences predicted ascription of responsibility ($B = 0.51$, $p < .001$) which predicted personal norm ($B = 0.23$, $p < .001$) which then affected individual behavior ($B = 0.40$, $p < .001$), public engagement ($B = 0.34$, $p < .001$), and communication behavior ($B = 0.37$, $p < .001$). Thus, the linear model of NAM was supported.

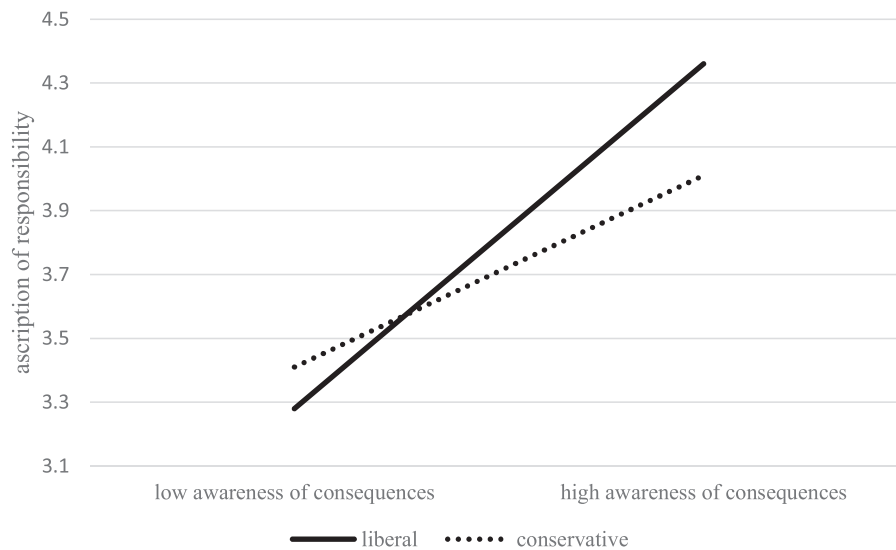


Fig. 2. Political Ideology Moderated the Relationship Between Awareness of Consequences and Ascription of Responsibility.

The two-step moderated mediation was supported for all mitigation behaviors (individual: [-0.02, -0.001], public: [-0.01, -0.0004], communication: [-0.02, -0.001]) such that the linear model of NAM was stronger for liberals (individual: [.03,.09], public: [.03,.08], communication: [.03,.09]) compared to conservatives (individual: [.01,.06], public: [.01,.05], communication: [.01,.06]). However, all effects were small (individual: -0.01, public: -0.01, communication: -0.01).

3.2.2. Individual efficacy

Awareness of consequences (B =0.41, p < .001) and individual efficacy (B =0.19, p < .01) were related to ascription of responsibility (R² =.22, F(10, 538) = 15.00, p < .001, Table 3). Individual efficacy moderated the relationship between awareness of consequences and ascription of responsibility (B = -0.19, p < .01) such that this relationship was stronger at a low level of individual efficacy (B =0.57, p < .001, Fig. 3) than a high level (B =0.26, p < .02). Thus, H2 was only partially supported.

Next, awareness of consequences predicted ascription of responsibility (B =0.41, p < .001) which predicted personal norm (B =0.23, p < .001) which then motivated individual behavior (B =0.40, p < .001), public engagement (B =0.34, p < .001), and communication behavior (B =0.37, p < .001). Again, the linear model of NAM was supported.

The two-step moderated mediation was significant (individual: [-0.03, -0.01], public: [-0.03, -0.005], communication: [-0.03, -0.01]) such that the linear model of NAM was stronger at a low level

of individual efficacy (individual: [.03,.08], public: [.02,.07], communication: [.02,.08]) than a high level (individual: [.003,.05], public: [.002,.04], communication: [.002,.05]). Again, the results should be interpreted with caution as all effects were small (individual: -0.02, public: -0.01, communication: -0.02).

3.2.3. Collective efficacy

Awareness of consequences (B =0.26, p < .01) and collective efficacy (B =0.35, p < .001) were related to ascription of responsibility (R² =.25, F(10, 538) = 17.73, p < .001, Table 4). Similarly, collective efficacy moderated the relationship between awareness of consequences and ascription of responsibility (B = -0.15, p < .02) such that this relationship was only significant at a low level of individual efficacy (B =0.39, p < .001, Fig. 4). H3 was partially supported.

In addition, awareness of consequences predicted ascription of responsibility (B =0.26, p < .01) which predicted personal norm (B =0.23, p < .001) which then affected individual behavior (B =0.40, p < .001), public engagement (B =0.34, p < .001), and communication behavior (B =0.37, p < .001). This supported the linear model of NAM.

The two-step moderated mediation was significant (individual: [-0.02, -0.004], public: [-0.02, -0.003], communication: [-0.03, -0.003]) such that the linear model of NAM was only significant at a low level of individual efficacy (individual: [.02,.06], public: [.01,.05], communication: [.01,.06]). All effects were small (individual: -0.01, public: -0.01, communication: -0.01).

Table 3 The Linear Model of NAM with Individual Efficacy as the Moderator.

	Ascription of responsibility	Personal norm	Individual behavior	Public engagement	Communication behavior
Awareness of consequences	.41 ***	.40 ***	.21 ***	.05	.02
Individual efficacy	.19 **	NA	NA	NA	NA
Awareness of consequences * individual efficacy	-0.19 **	NA	NA	NA	NA
Ascription of responsibility	NA	.23 ***	-0.01	.05	.05
Personal norm	NA	NA	.40 ***	.34 ***	.37 ***
Gender	.01	.00	-0.00	.01	.00
Age	-0.00	.01 ***	-0.00	-0.01 **	-0.01 ***
Education	.10 **	-0.03	.00	.06 *	.07 *
Income	.04	.02	.00	.10 ***	.10 ***
Race	.01	.01	-0.00	-0.21 **	-0.12
Region	.08	.14 **	-0.01	-0.01	-0.08
Perceived severity	.13 *	.06 *	.21 ***	.28 ***	.30 ***
R ² , F	.22 ***, 15.00	.52 ***, 65.18	.52 ***, 57.92	.39 ***, 34.59	.31 ***, 24.14

Note. *** p < .001, ** p < .01, * p < .05.

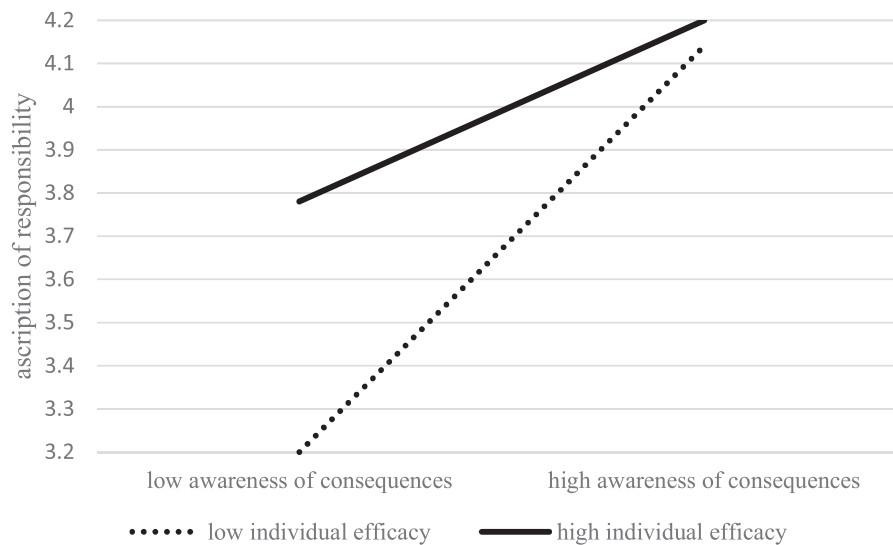


Fig. 3. Individual Efficacy Moderated the Relationship Between Awareness of Consequences and Ascription of Responsibility.

4. Discussion and conclusion

4.1. Discussion

Drawing upon NAM, this study seeks to provide a different approach to promoting COVID-19 mitigation actions. Theoretically, this study tested and elaborated the linear model of NAM by exploring the moderating role of political ideology and outcome efficacy for the relationship between awareness of consequences and ascription of responsibility, a path on which prior research disagrees. In addition, this study offers practice implications on motivating health behaviors by triggering moral obligation.

First, political ideology moderated the relationship between awareness of consequences and ascription of responsibility such that this relationship was stronger among American liberals than conservatives. As reviewed earlier, American conservatives were often exposed to misinformation about COVID-19 [19], which could affect their appraisal of the threatening situation. Politized vaccine messages on mass media may contribute to how conservatives view the pandemic. Thus, they might think that individual effort cannot control the spread of the pandemic or that debates over vaccines are political opinions instead of scientific facts. This perception might weaken the relationship between awareness of consequences and ascription of responsibility. Along with Schwartz and Howard (1980), both studies suggest that attribution of the given threat may influence the relationship between awareness of consequences and ascription of responsibility, offering a direction for future research.

In addition, our results demonstrate that outcome efficacy moderated the relationship between awareness of consequences and ascription of responsibility. However, opposite to our prediction, the relationship between awareness of consequences and ascription of responsibility was weaker among those reporting high individual and collective efficacy. One possible explanation is that being aware of the negative consequences that the given threat causes may provide individuals with a sense of mission that they should do something to revert the threat. This boost may be needed for those lacking outcome efficacy. However, those reporting a high level of outcome efficacy may already have this sense of mission because of their strong confidence in reverting the threat either through individual or collective efforts. Hence, informing them of the negative consequences may not heighten their sense of responsibility to a greater extent compared to those lacking in outcome efficacy.

Notably, many theories on health promotion show that efficacy beliefs could enhance the effect of risk perception on health behavior [32,33]. Our findings provide a seemingly contradictory result to this conclusion. As Witte (1992) argued, the relationship between risk perception and health behavior was inconsistent because of the moderation effect of efficacy beliefs [32]. Specifically, low efficacy beliefs and high risk perception may cause reactance and reject recommended health behaviors, whereas high efficacy beliefs and high risk perception may cause engagement in these behaviors [32]. However, the relationship between awareness of consequences and ascription of responsibility was consistently linear [10–14]. Unlike the relationship between risk perception and health behavior, even for

Table 4
The Linear Model of NAM with Collective Efficacy as the Moderator.

	Ascription of responsibility	Personal norm	Individual behavior	Public engagement	Communication behavior
Awareness of consequences	.26 **	.40 ***	.21 ***	.05	.02
Collective efficacy	.35 ***	NA	NA	NA	NA
Awareness of consequences * collective efficacy	-0.15 *	NA	NA	NA	NA
Ascription of responsibility	NA	.23 ***	-0.01	.05	.05
Personal norm	NA	NA	.40 ***	.34 ***	.37 ***
Gender	.01	.00	-0.00	.01	.00
Age	-0.00	.01 ***	-0.00	-0.01 **	-0.01 ***
Education	.09 *	-0.03	.00	.06 *	.07 *
Income	.04	.02	.00	.10 ***	.10 ***
Race	.04	.01	-0.00	-0.21 **	-0.12
Region	.08	.14 **	-0.01	-0.01	-0.08
Perceived severity	.10	.06 *	.21 ***	.28 ***	.30 ***
R ² , F	.25 ***, 17.72	.52 ***, 65.18	.52 ***, 57.92	.39 ***, 34.59	.31 ***, 24.14

Note. *** $p < .001$, ** $p < .01$, * $p < .05$.

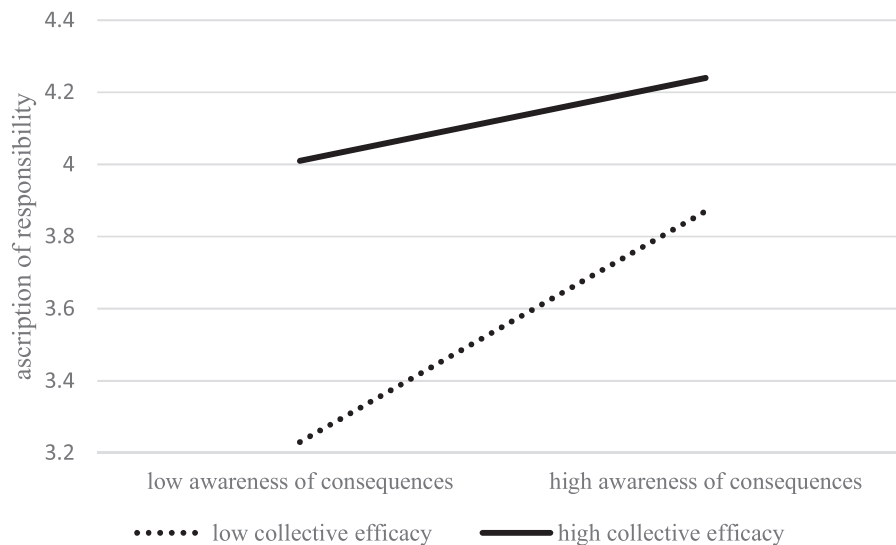


Fig. 4. Collective Efficacy Moderated the Relationship Between Awareness of Consequences and Ascription of Responsibility.

individuals with low outcome efficacy, awareness of consequences still predicts ascription of responsibility rather than causes reactance. Thus, adding outcome efficacy may not change the direction but magnitude of the relationship between awareness of consequences and ascription of responsibility.

The current study provides implications for the NAM scholarship. First, our study provides additional support to the linear model of NAM. Furthermore, this study extends the NAM scholarship by delineating the relationship between awareness of consequences and ascription of responsibility, a path over which previous research shows discrepancies. Our results suggest that personal value could change the magnitude of this relationship by affecting the attribution outcome. Additionally, outcome efficacy can dampen this relationship probably because individuals exhibiting high individual and collective efficacies were already equipped with a sense of mission of reverting the threat.

Despite these implications, findings of this study must be interpreted with following caveats. First, the cross-sectional nature of this study makes it impossible to establish causal relationships. Second, although we matched demographic characteristics of our sample to the national population in the U.S., given the method of participant recruitment that Qualtrics used, our sample is not random. Next, ascription of responsibility was measured with only one item because of the low reliability of the two-item scale [12]. Additionally, we only show that NAM might work better for American liberals, but how to motivate conservatives for COVID-19 mitigation needs further investigations.

Future research should address these limitations and extend this study in following directions. For example, future research can compare the effects of personal norm, risk perception, efficacy beliefs, and social norms on health behavior to further understand the strength of NAM in health promotion. Moreover, while this study focuses on cognitive variables, moral obligation can also be related to emotions. Future research can compare the effects of personal norm and related emotional approach such as the guilt appeal to further understand how moral functions in health promotion. Finally, the boundary of NAM such as who can be motivated more effectively through NAM is also worth investigations.

4.2. Conclusion

The current study confirms the direct relationship between awareness of consequences and ascription of responsibility, thereby

supporting the linear model of NAM [10–14]. Furthermore, this relationship was stronger among American liberals and those reporting a low level of individual and collective efficacies. These findings demonstrate the value of NAM to health promotion and suggests that this moral approach may be more effective for motivating health behaviors among certain populations.

4.3. Practice implications

Although the current study focuses on COVID-19, findings provide practice implications for health promotion in general, as many health threats are contagious. Moreover, given the social nature of human beings, one person’s health can affect the well-being of his/her social contacts such as family, significant other, and close friends. Thus, engaging in health behaviors can benefit others. Therefore, the present study provides a different approach to health campaigns in addition to focusing on individual-level variables such as risk perception and efficacy [32,33] or group-level variables such as social norms [34]. Specifically, this study suggests that health campaigns can motivate health behaviors by arousing moral obligation of the target audience. Campaign messages can highlight the severe consequences of the threatening situation and emphasize the contribution of personal efforts to the given threat. This message framing can trigger individuals’ sense of responsibility, which can drive health behavior through personal norm.

Additionally, our findings show that the moral approach is more effective for certain populations such as American liberals and those with low outcome efficacy. Practitioners may want to identify the population holding similar values to American liberals and reporting low levels of outcome efficacy. Campaigns targeted at those groups should consider activating their moral obligation by using the message framing above.

CRediT authorship contribution statement

Jian Raymond Rui and Shupeiyuan both designed the research and the survey. Peng Xu edited the questionnaire and collected the data. Jian Raymond Rui analyzed data and wrote the first draft along with Peng Xu. Shupeiyuan edited the manuscript.

Declarations of interest

None.

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