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RESEARCH ARTICLE

EFFECTS OF SMOKERS' RECENT CESSATION FAILURE ON THEIR RESPONSES TO THREAT APPEALS IN ANTI-SMOKING ADS

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ABSTRACT

BACKGROUND:

Quitting smoking often involves multiple cessation attempts before smokers succeed. Recent cessation failure can influence how smokers respond to smoking-related threat appeals in anti-smoking advertisements (ads) that may encourage them to quit smoking. This study aims to investigate the effects of smokers' recent cessation failure on their responses to smoking-related threat appeals in anti-smoking ads.

METHODS:

This study conducted a 2 (strong vs. weak verbal threat appeal) x 2 (strong vs. weak visual threat appeal) pretest-posttest experiment online with a smoker segment (Korean male smokers in their 30's) who had the highest rate of attempted smoking cessation across all gender and age groups in Korea. Participants' recent cessation failure (quit attempts within the previous 12 months) was measured in pretest session. Participants' cessation intention and defensive responses (e.g., wishful thinking) were assessed during pretest and posttest sessions.

RESULTS:

For participants with a recent cessation failure (n = 84), anti-smoking ad exposure increased their fatalism and hopelessness. Among participants without a recent cessation failure (n = 41), anti-smoking ad exposure intensified their cessation intention. However, exposure to strong visual threat appeal in anti-smoking ads increased their wishful thinking.

CONCLUSION:

Verbal and visual threat appeals in anti-smoking ads had a differential effect on adaptive (e.g., cessation intention) and maladaptive (e.g., fatalism) responses between smokers with and without a recent cessation failure. Study findings expand our understanding of the empirical linkage between recent cessation failure, smoking prevention messaging in anti-smoking ads, and psychological coping mechanism among smokers.

KEYWORDS

anti-smoking ads, cessation attempt failure, Korean male smokers, adaptive and maladaptive coping, smoking cessation, verbal and visual threat appeals

INTRODUCTION

From seeing images of disfigured lungs on cigarette packages to hearing testimonials from former smokers about their health woes, smokers can be exposed to a plethora of smoking cessation messages. Due to exposure to such messaging, smokers are aware of the serious health impact of smoking leading to attempting to quit smoking. However, most smokers tend to fail in their cessation attempts. In 2018, 55.1% of American adult smokers made at least one cessation attempt to quit in the past year, but only 7.5% of them quit. [1] Similarly, in Korea, 47.3% of adult smokers made at least one cessation attempt in the previous 12 months but only 4-7% of them succeeded. [2]

Governments and non-profit organizations worldwide have identified the importance of urging smokers to quit smoking by implementing a variety of risk communication strategies. Smoking-related threat, an event that questions smokers' positive self-regard via portending negative consequences of their smoking, is a common communication strategy used by practitioners. [3] For instance, *Tips from a Former Smoker* was a widely popular anti-smoking campaign in the United States (2012-2018) that used real people's testimonials about long-term health effects stemmed from smoking. [4] In this case, the goal of the campaign was to inspire smokers to quit smoking by presenting smoking-related threats. Typically, it is common to use verbal or visual threats in anti-smoking messaging. [5] A smoker's perception of these smoking-related threats is usually the first step for considering smoking cessation. [6]

Verbal threat appeal in anti-smoking advertisements (ads) can be manipulated by using message framing that presents the relationship between a smoking-related act and its consequence valence. [7] A strong verbal threat in anti-smoking ads presents negative consequences (e.g., an increase in the onset of lung cancer) resulting from noncompliance with smoking cessation. By contrast, weak verbal threats in anti-smoking ads focus on the relationship between compliance with smoking cessation and its positive consequences (e.g., a decrease in the onset of lung cancer). On the other hand, a visual threat presented in anti-smoking ads can be manipulated by using visual images that display serious and negative smoking consequences such as an image of disfigured lungs (strong visual threat appeal), compared to an image of healthy lungs (weak visual threat appeal). [8]

Exposure to verbal and visual threat appeals in anti-smoking ads can encourage smokers to quit smoking, which is an adaptive and desirable response sought by practitioners. [5] However, exposure to such threat appeals could also evoke defensive responses among smokers [9] such as avoidance, denial or wishful thinking, [10-12] which could offer a 'cognitive escape' for ignoring, dismissing or underestimating the negative health consequences of smoking. Upon exposure to the threat appeals in anti-smoking ads, smokers could develop fatalism and hopelessness [10, 12] to manifest a 'cognitive withdrawal' due to the feeling of powerlessness. Both cognitive escape and withdrawal reflect a maladaptive coping strategy to control their negative emotions (e.g., fear, anxiety) but not the threat itself. [13] These potential maladaptive responses to visual or verbal threat appeals commonly found in anti-smoking ads can negate intended effects.

While anti-smoking ads can be effective as a tool to encourage smokers to quit smoking, most smokers who attempt to quit smoking fail in their smoking cessation. [1-2] Smokers with a recent cessation failure tend to experience lower smoking abstinence self-efficacy that discourages them to retry smoking cessation. [14] It is not uncommon for smokers with a failed cessation attempt to actively engage in defensive responses (maladaptive responses) to protect themselves against smoking-related fear elicited by threat appeals in anti-smoking ads. [15] In the event that a smoker who has not experienced a recent failed cessation attempt is exposed to smoking-related threat appeals in anti-smoking ads, they could feel anxiety due to the discrepancy between their current smoking status and social obligation to stop smoking. [16] This anxiety in turn motivates them to find a coping strategy to reduce the probable occurrence of a future threat. [17] For example, after viewing an anti-smoking ad about the negative effects of second-hand smoke, a smoker without a recent cessation failure might experience anxiety because they do not want to be socially blamed for causing harm to others. Consequently, they may attempt to quit smoking (adaptive response) since smoking cessation as a coping strategy can be strongly linked to their higher self-efficacy in smoking abstinence. [18]

Extant literature is limited on whether smokers with a recent failed quit attempt will enhance their defensive responses and smokers without a recent cessation attempt will increase their intention to quit smoking because of exposure to the smoking-related threats presented in anti-smoking ads. In addition, empirical research that examines the differential effects of exposure to verbal and/or visual threat appeals in anti-smoking ads on adaptive (e.g., an increase in cessation intention) or maladaptive (e.g., increases in reactant defensiveness) responses between smokers with and without a recent cessation failure remains limited. Hence, the objective of this study is to fill this empirical gap to further our understanding of how smoking-related threat appeals in anti-smoking ads may influence smokers with different recent cessation failure experiences. Specifically, this study explores how smokers who recently tried to quit smoking and failed may respond to verbal and visual threat appeals in anti-smoking ads, compared to those who did not recently try to quit smoking.

METHODS

PARTICIPANTS:

The study population was Korean male smokers in their 30's who had the highest rate of attempted smoking cessation (55.1%) across all gender and age groups in Korea [19], a country with one of the highest smoking rates in the world. [2] One hundred twenty-five Korean male smokers aged 30-39 years completed a pretest-posttest experiment online. Participants were recruited through an email invitation that were delivered to a national consumer panel of Korean males in their 30's by a Korean market research company. The average participant age was 34.43 years old (SD = 2.69); 49.6% of them were married and 44.0% of them had at least one child. While 76.8% of participants had at least a 2-year college degree, 76.0% of them were in clerical or service work and 64.0% of them reported an average monthly household income of 2-3.99 million KRW (lower-middle- and middle-income class). On average, participants smoked 11.9 cigarettes per day and had been smoking for 12.7 years; 67.2% of them attempted to quit smoking in the last 12 months.

A power analysis targeting an ANCOVA with a 2 (recent cessation failure: yes vs. no) x 2 (verbal threat appeal: strong vs. weak) x 2 (visual threat appeal: strong vs. weak) between-participants design was conducted. The results confirmed that the sample size (N = 125) was sufficient to detect a large effect size (f = .40) at the .05 level.

STIMULUS DEVELOPMENT:

Two verbal threat messages (strong vs. weak verbal threat appeal) were developed based on a previous study. [20] The two messages contained the same number of Korean syllables. The strong and weak visual threat images (strong vs. weak visual threat appeal) featured a pair of disfigured and healthy lungs, respectively. The messages of the ads were made to appear slightly larger than the images to attract an equal level of participant attention to both messages and images. Consequently, 2 (strong vs. weak verbal threat appeal) x 2 (strong vs. weak visual threat appeal) anti-smoking ads (four experimental conditions) were developed by a graphic designer.

Twenty-seven male smokers in their 30's completed the manipulation checks for the four experimental anti-smoking ads online. Two paired t-tests showed that the strong verbal threat appeal (M = 4.70, SD = 1.59) was more negative than the weak verbal threat appeal (M = 3.56, SD = 1.78) [t (26) = 4.01, p < .001]. The strong visual threat appeal (M = 5.48, SD = 1.28) was found to be scarier than the weak visual threat appeal (M = 4.11, SD = 1.34) [t (26) = 4.53, p < .001].

With help from a Korean magazine editor, a webzine containing the six most popular topics (health, personal finance, wine, jazz, travel, food) among Korean readers in their 30's was developed as the media platform for inserting the experimental anti-smoking ads. The content of the articles on the six topics was not relevant to the smoking context. Each ad was inserted into the webzine three times at an equal interval to achieve effective reach for each ad.

PROCEDURE:

In the online experiment, participants completed a pretest instrument that contained the following variables: cessation intention [21] (a = .85), avoidance [10] (a = .87), denial [11, 22] (a = .83), wishful thinking [10, 12] (a = .83), fatalism [10, 12]

(a = .81), hopelessness [12, 23] (a = .87), whether to try to quit smoking within the past year or not, smoker attributes (e.g., smoking duration) and demographic characteristics (e.g., occupation). Two and half weeks later, the participants were randomly assigned to one of 2 (strong vs. weak verbal threat appeal) x 2 (strong vs. weak visual threat appeal) anti-smoking ad exposure conditions. Upon reviewing the webzine and the anti-smoking ads, they completed a posttest evaluation instrument that measured the following variables: cessation intention [21] (a = .82), avoidance [10] (a = .89), denial [11, 22] (a = .88), wishful thinking [10, 12] (a = .85), fatalism [10, 12] (a = .68) and hopelessness [12, 23] (a = .86).

ETHICS:

The study protocol was reviewed and approved by the Institutional Review Board of the University of Connecticut with approval number X11-170 before data collection was commenced. There was no identifiable participant information included in the study and data.

RESULTS

Twelve paired t-tests showed the following results (TABLE 1). For participants with a recent cessation failure (n = 84), exposure to the anti-smoking ads generated an increase in their fatalism [t (83) = 2.53, p = .014] and hopelessness [t (83) = 2.49, p = .015], but not their cessation intention, avoidance, denial and wishful thinking. For participants without a recent cessation failure (n = 41), exposure to the anti-smoking ads led to an increase in their cessation intention [t (40) = 2.33, p = .025]. However, the exposure generated no change in the defensive responses including avoidance, denial, wishful thinking, fatalism and hopelessness.

TABLE 1: EFFECTS OF EXPOSURE TO THREAT APPEALS IN ANTI-SMOKING ADS

	PRE-EXPOSURE M (SD)	POST-EXPOSURE M (SD)	t (df = 83)
Participants *with* a recent cessation failure (n = 84)			
Cessation intention	4.52 (1.17)	4.65 (1.24)	1.24
Avoidance	4.56 (1.12)	4.60 (1.30)	.30
Denial	4.24 (1.08)	4.16 (1.28)	.60
Wishful thinking	4.19 (1.12)	4.31 (1.20)	1.09
Fatalism	4.85 (1.03)	5.13 (.93)	2.53*
Hopelessness	3.87 (1.17)	4.16 (1.26)	2.49*
Participants *without* a recent cessation failure (n = 41)			
Cessation intention	3.85 (1.36)	4.27 (1.30)	2.33*
Avoidance	4.47 (1.04)	4.72 (.83)	1.39
Denial	3.96 (.95)	4.19 (1.00)	1.57
Wishful thinking	3.92 (1.08)	4.11 (1.04)	1.48
Fatalism	4.84 (1.06)	4.98 (.90)	.67
Hopelessness	3.63 (1.21)	3.83 (1.17)	1.08

Note. All the tests were two-tailed; * p < .05

A three-factor ANCOVA procedure separately tested the posttest cessation intention measure and each posttest defensive response measure – with the corresponding pretest measure as the covariate – across the factors of recent cessation failure (yes vs. no), verbal threat appeal (strong vs. weak) and visual threat appeal (strong vs. weak). The two statistically significant ANCOVA results for posttest measure of wishful thinking and posttest measure of hopelessness are reported below.

For posttest measure of wishful thinking, the three-factor ANCOVA test indicated an interaction effect between recent cessation failure and visual threat appeal [F (1, 116) = 3.95, p = .045] (TABLE 2). Two post-hoc one-factor ANCOVA tests

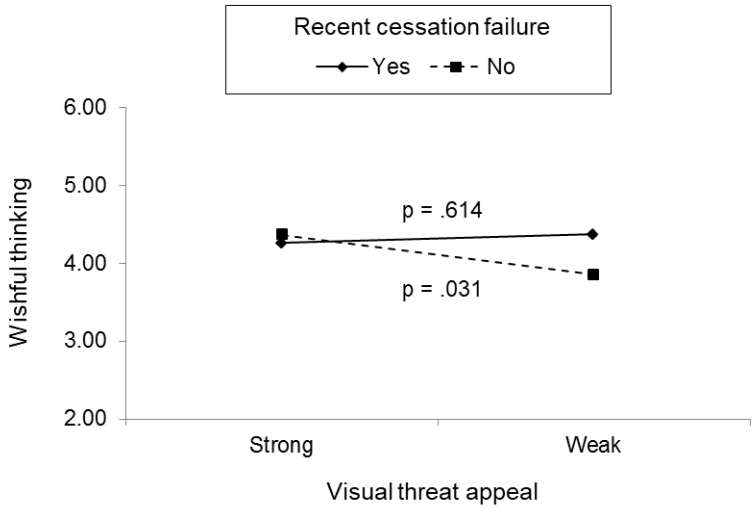
showed that for participants with a recent cessation failure, posttest measure of wishful thinking did not differ between the strong (estimated M = 4.26, SE = .15) and weak (estimated M = 4.37, SE = .16) visual threat appeal exposure conditions [F (1, 81) = .26, p = .614]. However, for participants without a recent cessation failure, posttest measure of wishful thinking was higher in the strong visual threat appeal exposure condition (estimated M = 4.36, SE = .16) than in the weak visual threat appeal exposure condition (estimated M = 3.85, SE = .16) [F (1, 38) = 5.00, p = .031] (FIGIRE 1).

TABLE 2: ANCOVA REUSLTS FOR POSTTEST WISHFUL THINKING MEASURE

VARABLE	F (df = 1, 116)
Pretest measure of wishful thinking (covariate)	68.08
Recent cessation failure (factor A)	.04
Verbal threat appeal (factor B)	.05
Visual threat appeal (factor C)	2.32
(factor A) x (factor B)	2.80
(factor A) x (factor C)	3.95*
(factor B) x (factor C)	3.12
(factor A) x (factor B) x (factor C)	.52

Note. Adjusted R^2 = .39; * p < .05

FIGURE 1: INTERACTION EFFECT BETWEEN RECENT CESSATION FAILURE AND VISUAL THREAT APPEAL ON POSTTET WISHFUL THINKING MEASURE



For posttest measure of hopelessness, the three-factor ANCOVA test revealed two interaction effects between recent cessation failure and either (1) verbal threat appeal [F (1, 116) = 6.21, p = .014] or (2) visual threat appeal [F (1, 116) = 6.51, p = .012] (TABLE 3). However, four post-hoc one-factor ANCOVA tests did not show how verbal (FIGURE 2) and visual (FIGURE 3) threat appeals had significantly different effects on posttest measure of hopelessness between participants with and without a recent cessation failure. The results are reported below.

First, two post-hoc one-factor ANCOVA tests indicated that for participants with a recent cessation failure, posttest measure of hopelessness did not differ between the strong (estimated M = 3.97, SE = .15) and weak (estimated M = 4.36, SE = .15) verbal threat appeal exposure conditions [F (1, 38) = 3.28, p = .074]. Likewise, for participants without a recent cessation failure, posttest measure of hopelessness did not differ between the strong (estimated M = 4.05, SE = .26) and weak (estimated M = 3.69, SE = .20) verbal threat appeal exposure conditions [F (1, 38) = 1.18, p = .284].

Second, two post-hoc one-factor ANCOVA tests revealed that for participants with a recent cessation failure, posttest measure of hopelessness did not differ between the strong (estimated M = 4.04, SE = .15) and weak (estimated M = 4.30, SE = .16) visual threat appeal exposure conditions [F (1, 81) = 1.49, p = .226]. Similarly, for participants without a recent

cessation attempt failure, posttest measure of hopelessness did not differ between the strong (estimated M = 4.08, SE = .22) and weak (estimated M = 3.57, SE = .22) visual threat appeal exposure conditions [F (1, 38) = 2.75, p = .105].

TABLE 3: ANCOVA RESULTS FOR POSTTEST HOPELESSNESS MEASURE

VARIABLE	F (df = 1, 116)
Pretest measure of hopelessness (covariate)	72.68
Recent cessation failure (factor A)	.11
Verbal threat appeal (factor B)	.35
Visual threat appeal (factor C)	1.82
(factor A) x (factor B)	6.21*
(factor A) x (factor C)	6.51*
(factor B) x (factor C)	2.55
(factor A) x (factor B) x (factor C)	1.74

Note. Adjusted R^2 = .38; * p < .05

FIGURE 2: INTERACTION EFFECT BETWEEN RECENT CESSATION FAILURE AND VERBAL THREAT APPEAL ON POSTTET HOPELESSNESS MEASURE

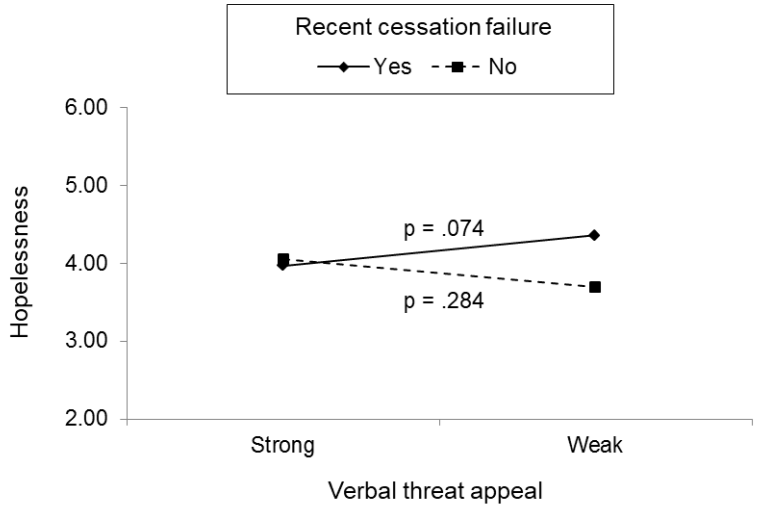
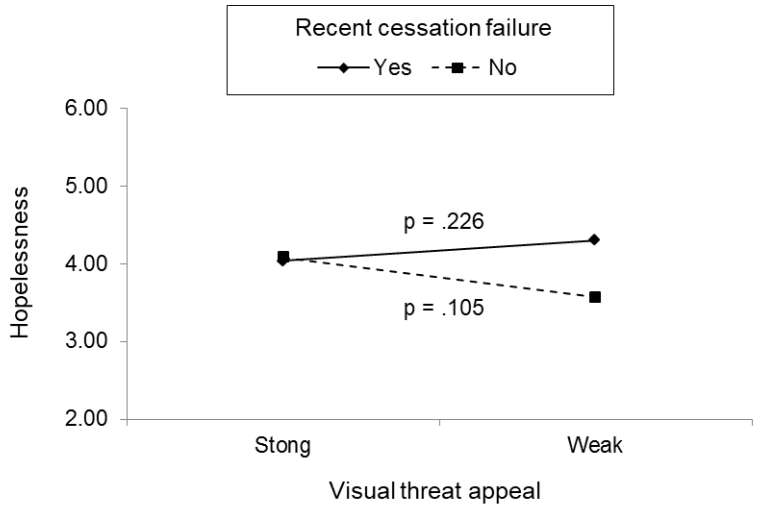


FIGURE 3: INTERACTION EFFECT BETWEEN RECENT CESSATION FAILURE AND VISUAL THREAT APPEAL ON POSTTET HOPELESSNESS MEASURE



DISCUSSION

To the best of the authors' knowledge, the current study is among the first to examine how recent cessation failure can influence smoker's responses to smoking-related threat appeals in anti-smoking ads. Specifically, it examines both adaptive (an increase in cessation intention) and maladaptive (increases in reactant defensiveness) responses to verbal and visual threat appeals in anti-smoking ads between smokers with and without a cessation failure in the previous 12 months. Study findings expand our understanding of the empirical linkage between recent cessation failure, smoking prevention messaging and psychological coping mechanism among long-term habitual smokers.

Results showed that exposure to anti-smoking threat appeals did not significantly change the cessation intention among participants who failed in a cessation attempt in the past year. Instead, it increased their maladaptive responses (fatalism, hopelessness) which reflects a 'cognitive withdrawal' from dealing with their current smoking behavior. At the same time, the level of other types of maladaptive responses indicative of a 'cognitive escape' (avoidance, denial, wishful thinking) remained unchanged. These findings suggest that for smokers with a recent cessation failure, exposure to anti-smoking ads could have a negative impact on their perceived ability to cope with the smoking-related threat posed by their current smoking behavior. Past research has shown that it is not uncommon to observe comorbidity of depression and hopelessness, especially among smokers with a recent cessation failure. [24] The depression and hopelessness experienced by smokers with a recent cessation failure during exposure to threat appeals in anti-smoking ads were found to enhance smokers' perception of the uncontrolled aspects of future smoking-related health problems. [25]

By contrast, exposure to smoking-related threat appeals did trigger an adaptive response via an increase in cessation intention among participants who did not try quitting smoking in the previous year. Study findings also indicated that smoking-related threat appeals in anti-smoking ads did not increase participants' level of maladaptive responses (defensive responses). These findings seem consistent with past research that reported how feelings of anxiety could motivate individuals to seek a coping strategy in response to the danger that they may encounter in the future. [17] By implication, this anxiety, if it does not lead to a depressive state, could encourage smokers without a recent cessation failure to turn to an adaptive or efficacious response such as cessation intention.

Results indicated no significant main effects across the factors of recent cessation failure (yes vs. no), verbal threat appeal (strong vs. weak) and visual threat appeal (strong vs. weak) on posttest cessation intention measure or defensive response measures, after controlling for their corresponding pretest measures. However, a significant interaction effect was found between a recent cessation failure and visual threat appeal on the posttest wishful thinking measure. Specifically, exposure to a strong visual threat appeal enhanced wishful thinking among participants without a recent cessation failure. As wishful thinking is a cognitive escape outcome, this suggests that a strong anti-smoking visual threat could elicit such maladaptive defensive response, which smokers without a recent cessation failure could use to convince themselves of their invulnerability to future smoking-related health problems. Nonetheless, it is also possible that for smokers without a recent cessation failure, wishful thinking may help them reduce their anxiety facilitated by smoking-related threat appeals in anti-smoking ads.

Two significant interaction effects were also identified between a recent cessation failure and either (1) verbal threat appeal or (2) visual threat appeal on the posttest hopelessness measure, but post-hoc analyses did not significantly differentiate the posttest hopelessness measure by the two separate sets of factors (verbal and visual threat appeal exposure conditions). Therefore, hopelessness, a cognitive withdrawal state, could be elicited when smokers with and without a recent cessation failure were exposed to verbal and visual threat appeals in an anti-smoking ad. It is probable that hopelessness may help smokers justify their current smoking status after being exposed to verbal and visual threat appeals in anti-smoking ads.

When interpreting the current findings, several limitations should be considered. First, the online experiment conducted in this study has less control over the environments in which participants completed their experimental tasks, relative to a

laboratory setting. [26] Second, participants were exposed to the experimental anti-smoking ad only three times in the experiment. It is possible that the potential effects of these anti-smoking ads could have been stronger through repeated exposures outside of the study setting. Third, the pretest-posttest experimental design only provided a snapshot of the effects under observation, since the study did not use a longitudinal design to measure the outcomes (e.g., avoidance, denial) in multiple waves. Lastly, the experimental anti-smoking ads could have a weaker effect on the long-term heavy smokers who participated in the current study than smokers with a shorter smoking history or light smokers [27], due to message fatigue over time. [9]

CONCLUSIONS

Even though cigarette smoking poses a serious health threat, limited research has addressed how long-term smokers may react to risk communication strategies involving anti-smoking ads. This study is novel because it addressed this gap in research by using Korean male smokers as a sample. [28] The current study conducted with a sample of Korean male smokers in their 30's showed that for smokers without a recent cessation failure, their exposure to anti-smoking ads increased their cessation intention. Weak (vs. strong) visual threat appeal in anti-smoking ads reduced their wishful thinking as cognitive escape from anxiety evoked by anti-smoking ads. However, such exposure also facilitated fatalism and hopelessness as cognitive withdrawal from fear elicited by anti-smoking ads among smokers with a recent cessation failure. These study findings suggest that it is crucial for practitioners to construct verbal and visual threat appeals that could temper the smoking-related threat in anti-smoking ads to elicit adaptive coping responses (e.g., cessation intention) and suppress maladaptive coping responses (cognitive withdrawal and escape) among smokers with and without a recent cessation failure.

With the proliferation of the smartphone and advancements in mobile medical technology, mobile health interventions for smoking cessation delivered via smartphone applications have emerged as new forms of smoking cessation treatment. [29] The smartphone applications can reduce such barriers as cost, schedule conflict, spatial limitation when smokers try to engage with cessation treatments. In addition, smartphone applications are equipped to offer smokers interactive and customizable tools for real-time messaging of social support, self-monitoring, smoking cessation progress tracking, daily reminder and the like. A variety of these smartphone applications are made available by governmental agencies (e.g., Korea Health Promotion Institute) and corporations in Korea.

As past research has shown that both hopeful and fearful feelings can be positively connected to risk information engagement, [30] we provide the following recommendations to practitioners who wish to develop smartphone applications for smoking cessation in Korea. First, smokers should be classified into groups with and without a cessation failure in the last year when registering for the smartphone applications to allow for delivering tailored cessation messaging. Next, weak visual threat appeal in anti-smoking ads can be strategically timed for delivery to those smokers without a recent cessation failure to increase their cessation intention and decrease their wishful thinking from inaction. Third, when showing anti-smoking ads to the group of recently failed quitters to prevent occurrences of fatalism and hopelessness, these messages should reduce the fearful feeling and increase the hopeful feeling to help motivate smoking cessation action.

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