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ORIGINAL ARTICLE

Effects of positive–negative antismoking messages to quit smoking among male college students: A randomized field study

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Abstract

Aim: Based on the main concept of reasoned action theory, this study aimed to examine which of the attitude and subjective norms affect the intention of smoking cessation by using four types of antismoking messages: (1) positively and(2) negatively stimulating one's attitude toward smoking cessation; and (3) positively and (4) negatively reflected subjective norms for second-hand smoking.

Methods: We conducted a randomized field study in smoking areas in universities located in D city of South Korea. Two hundred and eighty-seven male students who smoke daily were recruited in the field and randomly divided into four experimental groups and one control group. The participants in each experimental group were asked to read attitude/positive, attitude/negative, norm/positive, and norm/negative message. The data of attitude, subjective norm, and intention to stop smoking were collected.

Results: There were significant differences in the intention to quit smoking in attitude/negative messages ($F = 4.311$, $p = .015$) and norm/positive messages ($F = 4.353$, $p = .014$). The effects of subjective norm were greater than those of attitude ($p < .001$).

Conclusion: Emphasizing the positive subjective norm for smoking cessation among young smokers might be effective in persuading them to quit smoking.

KEYWORDS

attitude, intention, message, smoking cessation, subjective norm

1 | INTRODUCTION

As smoking is a major risk factor for increasing preventable death and disease, various campaigns such as antismoking advertisements and educations have been initiated (World Health Organization, 2017). At a glance, such campaigns successfully reduced the smoking rate (Niederdeppe, Avery, Byrne, & Siam, 2016; US Federal Communications Commission, 2017). In Korea, tobacco control policy has been implemented in accordance with Health Plan 2020 to reduce the smoking rate (Korea Ministry of Health and Welfare, 2012). As a result of this national policy, the adult smoking rate in South Korea has steadily declined from 36.2% in 2015 to 31.4% in 2017 (Organisation for Economic Cooperation and Development, 2017). However, the smoking rate of young adults aged 19–29 has increased from 23.7% to 25.4% (Korea Ministry of Health and Welfare, 2017). This indicates that the importance of smoking cessation campaigns to effectively lower the smoking rate of people in their 20s should be emphasized.

In order to increase the satisfaction of smokers and finally to increase the success rate of smoking cessation,

it is important to select the appropriate intervention to increase the self-efficacy of the subject by constructing program contents based on the characteristics and specific needs of the subject (Herold et al., 2016; Lee & Park, 2017; Oh, Im, & Seo, 2018). College students are classified as a difficult group to participate in antismoking programs because they have relatively strong self-confidence with their health, compared with older adults (Kwon & Bang, 2013). In addition, the research on investigating the preference of smoking college students in Korea, describes that the program contents with long education time are not preferable for people in their 20s (Kim & Song, 2013). Therefore it is necessary to develop an antismoking program, considering the characteristics of college students.

In Clinical Practice Guideline Treating Tobacco Use and Dependence 2008 Update Panel, Liaisons, and Staff (2008), smokers can change their attitudes toward smoking and increase the success rate of smoking cessation significantly, with an intervention as brief as 3 min. According to the systematic review, even the use of short message interventions has been effective to change health behavior (Ludwig, Arthur, Sculthorpe, Fountain, & Buchan, 2018; Scott-Sheldon et al., 2016). The effects of message intervention were different depending on gender (Schnoll & Patterson, 2009), financial gain (Sindelar & O'Malley, 2014), and nicotine dependence (Fucito et al., 2011), as well as the types of positive/negative messages. Therefore, it would be meaningful to examine changes in the intention to quit before and after reading a positive–negative antismoking message focusing only on male college students who smoke.

Antismoking messages are generally based on the Theory of Reasoned Action (TRA). It is known that the intention to quit smoking, as a predictor of successful smoking cessation, is related to the smoker's personal attitude, and subjective or social norms about smoking cessation (Fishbein & Ajzen, 1975). In other words, the perception that smoking is a serious threat to their health makes the smokers' attitudes toward smoking cessation, and the social norm that smoking can endanger other people's health as well motivates smokers to try smoking cessation (Droomers et al., 2016; Kelley et al., 2018).

Therefore, this study tried to evaluate the changes of smoking cessation intention using four types of messages developed to emphasize attitudes and norms based on TRA. Specifically, this study compared the effectiveness of a positive message that emphasizes the positive effects of smoking cessation for male college students, and a negative message that emphasizes the negative effects that could result if they do not quit smoking, in terms of the intended changes of smoking cessation according to the types of the messages. The purpose of this study is to help the development of message-based smoking cessation programs including short text messages or social media services by identifying the types of message that give the most change to male college students' smoking intentions.

2 | METHODS

2.1 | Pretest

Based on previous studies (Paek, 2016), message framing about smoking cessation used in this study was selected to stimulate attitude and subjective norms as independent variables of the TRA. To check whether advertisements were appropriate, 20 smoking male college students completed a preliminary survey with two items on a seven-point scale (e.g., Do positive messages emphasize positive aspects? and Do negative messages emphasize negative aspects?). The survey results gained above average scores of four, so we used the four messages for smoking cessation.

2.2 | Participants

Participants were recruited in smoking areas in six universities in D city in South Korea between October and December 2017. The researcher conducted a 1:1 interview using a questionnaire with male college students who were daily smokers at the time of the interview, and who voluntarily agreed to participate in the study. Each participant was randomly assigned to one of five groups (1 to 4 – Experimental groups I to IV, and 5 – Control group) by rolling the dice. If the number is six, the participant rolls the dice again until the number is smaller than six. The study sample size was calculated using an effect size of .25, significance level (α) of .05, and power (1-β) of 90% through G*power 3.1. The total required sample size was 255, but considering drop-outs, we intended to survey 300 participants to have 60 people in each group.

2.3 | Experimental procedure

Consenting participants were randomly assigned to four experimental groups and one control group. Experiment Group I was provided a message that positively stimulated one's attitude toward smoking cessation (e.g., Smoking cessation has an effect on lifespan). Experiment Group II was provided a message that negatively emphasized attitudes toward smoking cessation (e.g., Smoking is a risk factor for various diseases).

Experiment Group III was provided a message positively suggesting subjective norms for second-hand smoking (e.g., No smoking area is assumed, even if there is no indication of a no-smoking sign). Experiment Group IV was provided a message that negatively reflected subjective norms for second-hand smoking (e.g., Smoking is an invisible violence to others). Figure 1a–d shows the messages assigned to Experiment Groups I to IV, respectively. The Control Group was not provided a message. Before reading the messages, we asked participants to answer questions that measured attitude, subjective norms, and intention to stop smoking. Then, we asked them to slowly read the message about smoking cessation for about 3 min. After reading the message, we reexamined participants' intention to stop smoking to confirm any changes in their intention. For checking out the consistency between pre- and post-test, the control group also repeated the same test even without a message.

2.4 | Ethical considerations

Before starting the study, we obtained approval from the Institutional Review Boards of E University for the ethical study of participants (No: 133–1). For participants who wanted to voluntarily participate in the study after reading the recruitment announcement posted at the campus, we visited participants' lecture rooms or the student lounge and explained the purposes and methods of research and the expected time for data collection. We used terms and expressions that were easy to understand. After receiving written consent, we conducted the experiment. As a token of reward for the participants' time, we provided some gifts after their completion of participation in the study.

2.5 | Measures

2.5.1 | Attitude toward smoking cessation

This instrument was developed by Jee (1993), built on a questionnaire of Ajzen (1991). It was composed of eight items on a seven-point Likert-type scale. Higher scores indicated more positive attitudes toward smoking cessation. The Cronbach's α was .90 in a previous study (Jee, 1993) and .93 in this study.

2.5.2 | Subjective norms of smoking cessation

The instrument developed by Jee (1993) composed of two items on a seven-point Likert-type scale. The measure of subjective norms included normative belief. Sample items were: "I think people who are important to me should quit smoking within 6 months," and "I usually try to comply with the opinions of each person who is important to me." Higher scores indicated greater pressure from surrounding people for smoking cessation. The Cronbach's α was .72 in a previous study (Jee, 1993) and .78 in this study.

2.5.3 | Intention to cease smoking

The instrument developed by Jee (1993) was composed of four items on a seven-point Likert-type scale that assessed the intention to stop smoking within 6 months. Higher scores indicated stronger intentions to stop smoking. The Cronbach's α was .94 in a previous study (Jee, 1993) and .95 in this study.

FIGURE 1 Stimulating one's attitude of smoking cessation (a) (b), and subjective norms for second-hand smoke (c) (d)

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TABLE 1 Comparison of demographical factors within groups ($N = 287$)

	Exp. I (n = 59)	Exp. II (n = 57)	Exp. III (n = 57)	Exp. IV (n = 59)	Cont. (n = 55)	Total (n = 287)	χ^2 or F	*p*
	Mean ± SD or n (%)							
Age at study time (years)	22.17 ± 2.79	21.32 ± 2.36	21.49 ± 2.68	22.05 ± 2.43	21.18 ± 2.58	21.65 ± 2.58	1.71	.149
Age at initial smoking (years)	17.03 ± 2.59	17.05 ± 2.47	17.05 ± 2.34	17.20 ± 2.62	16.64 ± 2.49	17.00 ± 2.49	0.40	.807
Smoking duration (months)	66.76 ± 33.37	56.09 ± 28.85	54.95 ± 36.60	60.29 ± 33.12	59.62 ± 35.98	59.60 ± 33.69	1.10	.357
Smoking rate (cigarettes/day)								
≤5	4 (6.8)	5 (8.8)	6 (10.5)	7 (11.9)	6 (10.9)	28 (9.8)	0.33	.857
6–10	21 (35.6)	25 (43.8)	19 (33.4)	24 (40.6)	18 (32.7)	107 (37.3)		
11–15	19 (32.2)	16 (28.1)	19 (33.3)	17 (28.8)	22 (40.0)	93 (32.4)		
16–20	14 (23.7)	8 (14.0)	10 (17.5)	8 (13.6)	6 (10.9)	46 (16.0)		
≥21	1 (1.7)	3 (5.3)	3 (5.3)	3 (5.1)	3 (5.5)	13 (4.5)		
Quitting smoking over 24 hr								
Yes	45 (76.3)	44 (77.2)	50 (87.7)	51 (86.4)	43 (78.2)	233 (81.2)	1.13	.344
No	14 (23.7)	13 (22.8)	7 (12.3)	8 (13.6)	12 (21.8)	54 (18.8)		
Attitude toward stopping smoking	44.44 ± 11.89	46.89 ± 8.57	46.07 ± 8.62	46.02 ± 9.19	46.20 ± 8.67	45.91 ± 9.46	0.53	.717
Subjective norm of stopping smoking	8.88 ± 3.12	9.37 ± 2.62	9.28 ± 3.14	9.98 ± 3.03	8.89 ± 2.49	9.29 ± 2.90	1.41	.232
Intention to stop smoking	13.85 ± 7.24	14.40 ± 7.69	15.37 ± 6.71	15.42 ± 7.42	15.13 ± 7.05	14.83 ± 7.20	0.52	.719

Abbreviations: Exp. = experiment; Cont. = control.

2.6 | Analysis

We analyzed the data using SPSS v. 21.0. (IBM Corporation, Armonk, NY, USA) software and used Chi-square test and analysis of variance (ANOVA) to examine the homogeneity of the experimental and control groups. We used a one-way ANOVA to analyze differences in intention for smoking cessation by message type, and Scheffe's analysis for post-hoc analysis. We performed multiple regression analyses to examine predictors of smoking intention.

3 | RESULTS

3.1 | Participant characteristics

We distributed 300 questionnaires: 60 to each group and collected 294 questionnaires. Of these, we used 287 (95.7%) for the final analysis because seven questionnaires were inappropriate for data processing. Experimental Groups I and IV had 59 usable questionnaires each; Experimental Groups II and III had 57 usable questionnaires each; the Control Group had 55 usable questionnaires. The general characteristics of participants measured in this study were age, smoking-initiation age, smoking period, daily smoking amount, and smoking cessation experience. The average age of participants was 21.65 ± 2.58 years: Experiment Group I, 22.17 ± 2.79; Experiment Group II, 21.32 ± 2.36; Experiment Group III, 21.49 ± 2.68; Experiment Group IV, 22.05 ± 2.43; and 21.18 ± 2.58 for the Control Group.

We measured scores on participants' attitudes, subjective norms, and intention to stop smoking before providing the message. The average score of the participants' intention to stop smoking was 14.83 ± 7.20, resulting in 13.85 ± 7.24 in Experiment Group I, 14.40 ± 7.69 in Experiment Group II, 15.37 ± 6.71 in Experiment Group III, 15.42 ± 7.42 in Experiment Group IV, and 15.13 ± 7.05 in the Control Group. No statistically significant difference emerged in scores, confirming the homogeneity of groups (Table 1).

3.2 | Effects of message type on the intention to stop smoking

Table 2 summarizes difference in intention to stop smoking, depending on message type stimulating attitude and subjective norms. Attitude messages showed a significant difference for Experiment Group II, who read the negative message (F = 4.311, p = .015). In the subjective norm messages, intention to stop smoking significantly increased in Experiment Group III, who read a positive message (F = 4.353, p = .014).

3.3 | Effects of attitudes and subjective norms on intention to stop smoking

Multiple liner regression analysis was performed with intention to stop smoking scale scores as the dependent variable (Table 3). The independent variables were entered into the models: attitude scores and subjective norms scores. The two variables explained 34.3% of the variance (adjusted R^2 = .343, F = 75.589, p < .001). There was no problem of collinearity among the variables. The variance inflation

TABLE 3 Multiple regression for intention to stop smoking (N = 287)

Variables	B	SE	β	t	p
Constant	−1.832	1.868		−0.981	.328
Attitude	1.125	.041	.158	3.027	.003
Subjective norms	1.258	.129	.508	9.734	<.001

Note: F (p) = 75.589 (<.001), R^2 = .347, Adjusted R^2 = .343, Durbin-Watson = 1.86.

TABLE 2 Differences in intention to cease smoking by message type within groups (N = 287)

Message type			Pretest Mean±SD	Post-test Mean±SD	Difference	F	p	Scheffe
Attitude message	Positive	Exp. I (n = 59)	13.85 ± 7.24	14.95 ± 7.48	1.10 ± 3.07	4.311	.015	II > C
	Negative	Exp. II (n = 57)	14.40 ± 7.69	16.09 ± 7.99	1.68 ± 3.83			
No message		Cont. (n = 55)	15.13 ± 7.05	15.02 ± 7.16	−0.11 ± 2.90			
Subjective norms message	Positive	Exp. III (n = 57)	15.37 ± 6.71	17.23 ± 7.09	1.86 ± 3.85	4.353	.014	III > C
	Negative	Exp. IV (n = 59)	15.42 ± 7.42	16.25 ± 7.57	0.83 ± 3.74			
No message		Cont. (n = 55)	15.13 ± 7.05	15.02 ± 7.16	−0.11 ± 2.90			

Abbreviations: Exp. = experiment, Cont. = control.

factor (VIF) and tolerance for the independent variables are as follows: Attitude, tolerance = 0.84, VIF = 1.187; Subjective norms, tolerance = 0.84, VIF = 1.187. The analysis showed that attitude (β = .158, p = .003) and subjective norms (β = .508, p <. 001) influenced intention to stop smoking, and subjective norms were a greater influence on intention to stop smoking than attitude.

4 | DISCUSSION

This study investigated the effects of intention to stop smoking among male college student smokers according to positive/negative framed messages on attitude and subjective norms. A statistically significant difference arose in change of smokers' intention to stop smoking according to message type. Results suggest that an effective combination of positive and negative framed messages may enhance the intention to quit smoking when emphasizing the attitude or norms of smoking cessation among male college students.

In the systematic review of public health messages (Stead et al., 2019), social norms messages such as designation of smoking areas and recognition that smoking harmed others were effective in increasing the smoking cessation rate, whether the message was positive or negative. In this study regarding the subjective norms message, the intention to stop smoking was increased in all experimental groups reading the positive or negative framed message. More specifically, the positive message increased the intention to smoking cessation higher than the negative message (F = 4.353, p = .014). This result supported that the message emphasizing the negative factor for second-hand smoke may lead to a side effect of socially stigmatizing smokers (Evans-Polce, Castaldelli-Maia, Schomerus, & Evans-Lacko, 2015; Park & Kang, 2015). Therefore, it would be effective to emphasize social norms in a positive way in smoking cessation education or communication campaigns targeting smokers, requiring a strategy to consider smokers' social stigma.

In this study, two elements of the TRA – attitude and subjective norms – showed a significant correlation with intention to stop smoking. This observation is consistent with a previous study (Taha & Tee, 2015). In addition, the intention of male college students to quit smoking was more affected by subjective norms than by their attitudes. In other words, adolescents and college students were more susceptible to viewing the importance of people around them and their social perspectives than their own beliefs and expectations, which was different from adults. These results were consistent with results of previous studies (Hohman, Crano, & Niedbala, 2016; Lee & Lee, 2013). Smoking cessation advertisements decreased the smoking rate of adolescents when they emphasized that smoking affects not only their own health but also the health of others (Niederdeppe et al., 2016). Therefore, we suggest that social norms of second-hand smoking should be emphasized in differentiated smoking cessation educations for young smokers.

The most important aspects of this study were that intention to stop smoking was measured before and after exposure to messages to measure effectiveness. Also, the message effect was verified through comparison of the control group. The homogeneity of the four experimental groups and a control group was confirmed in the general characteristics and the measured variables which may have affected the accuracy of the results. This study has some limitations. First, it was carried out with only six universities in one city. Second, the text message intervention was provided by the first author, who also was involved in data collection and analysis. Third, the intention to stop smoking was measured by exposure to only one advertisement message. Because advertising can drive effects through continuous exposure, generalizing the results of this study is limited. Fourth, this study assumed actual behavior merely by measuring intention to stop smoking without measuring actual behavior. Because measuring intention is not always a predictor of behavior, we suggest examining the entire TRA model in measuring smoking cessation behavior after a certain period of time following delivery of the message.

CONCLUSION

The study findings revealed that positive messages emphasizing attitudes and negative messages emphasizing subjective norms significantly increase smokers' intent to quit smoking. It was confirmed that the subjective norm of TRA improved the intention of smoking cessation. It is helpful to use a message that emphasizes the attitude of smoking cessation and norms of second-hand smoking in order to motivate smokers to quit smoking during smoking cessation programs.

CONFLICT OF INTERESTS

The authors declare no conflict of interest.

AUTHOR CONTRIBUTIONS

S.L. designed the study, collected the data, conducted the statistical analysis, and drafted the manuscript; H.P. designed the study and wrote and finalized the manuscript.

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