



Effects of Anti-Smoking Public Service Announcements on the Attitudes of Korean College Students toward Smoking

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Objectives: This study aimed to identify the effects of anti-smoking public service announcements on the attitudes of Korean college students toward smoking.

Methods: This study involved students via convenience sampling from seven universities who were randomly assigned to four groups. All groups completed a preliminary questionnaire, before being shown a public service announcement twice, and then completed a post viewing questionnaire.

Results: For announcements with positive messages, the proportion of changes in beliefs and attitudes were 39.1% and 19.8%, respectively, whereas those with negative messages showed a greater proportion of changes in the beliefs (59.7%) and attitudes (40.3%). After adjusting for sex and change in belief, the message types and smoking status were identified as factors affecting the change in the participants attitudes. A negative message resulted in a greater change in attitudes (odds ratio [OR], 3.047; 95% confidence interval [CI], 1.847–5.053). Ever-smokers including current smokers showed a greater positive change in attitude than never-smokers (OR, 6.965; 95% CI, 4.107–11.812).

Conclusion: This study found that positive anti-smoking public service announcements were more effective on attitude change than negative messages. Additionally these announcements were more effective among viewers who were current smokers or had a prior smoking experience.

Key Words: smoking prevention, advertisement, knowledge, message, attitude

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INTRODUCTION

As a ratified member country of the FCTC (Framework Convention on Tobacco Control), the Korean government has implemented stricter anti-smoking policies including increasing the cost of cigarettes, introducing stronger and mandatory graphic health warning labels, and restricting the number of smoking areas. The policies on anti-smoking also encourage the development of anti-smoking campaigns targeting specific audiences through different media channels such as public service announcements (PSAs) on television and radio, documentary special reports, and internet portals [1].

Smoking before the age of 30 years is directly linked to premature deaths and is an important



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health risk factor. The period before age 30 years is thus a crucial stage for preventing progressive damage from smoking and enabling a smoker to quit. For this reason, developing effective prevention and intervention programs at both the workplaces and universities have been a long-term public health priority in the United States [2–4]. The Korean Ministry of Health and Welfare has been producing and airing anti-smoking PSAs on television and radio since 2000 [5].

Results from a recent study on the effects of anti-smoking PSAs indicated that positive messages were more effective on smokers [6], whereas negative messages were more effective on non-smokers [7]. On the other hand, a study examining the effects of message framing depending on the consumer's motivations showed that utilitarian consumers responded better to positive messages, whereas hedonic consumers responded better to negative messages [8]. Similarly other studies have also reported of the effects of message framing on the impact of anti-smoking PSAs [6–11]. According to Dale's theory of audiovisual education, meaning is transmitted not only through the content but also by the format of the message and its medium. Audiovisual media were classified as being closer to real life experience than simple photographic media [12]. This study thus aimed to utilize the relatively ignored audiovisual medium in examining the effects of anti-smoking PSAs depending on message framing. Although earlier studies were conducted to examine the changes in the participants' attitude after exposure to anti-smoking messages [6–10], this study was conducted to verify the effects of message framing on the audience characteristics such as smoking status and their attitudes toward smoking. Thus, this study aimed to identify the factors that caused changes in attitude toward smoking and compared these attitudinal changes between different smoking statuses and types of message framing in anti-smoking PSAs.

MATERIALS AND METHODS

1. Participants

This study was conducted from November 5 to 16, 2012 on students from seven universities selected via convenience sampling. The selected participants were randomly divided into four groups. All four groups were given identical questionnaires, and were familiarized with the objectives and methods of the study by a researcher before the completing the questionnaires. A small amount of compensation was given to ensure the accuracy of questionnaire responses. After completing the pre-questionnaire, each group was exposed twice to one of the four PSA, and then asked to complete a post-questionnaire. A total of 449 sets of

questionnaires were collected, and 423 of these were used for the final analysis, after eliminating 26 insincere responses. This study, which was conducted in 2012, received informed consent from participants. The approval of the institutional review board was not a requirement and therefore was not approved.

2. Questionnaires

The pre-questionnaire consisted of 10 questions on knowledge and beliefs regarding smoking, 3 questions regarding attitudes toward smoking, and 1 question on the participant's current smoking status. The post-questionnaire in addition to having had the same set of questions as the pre-questionnaire, also comprised additional 8 questions evaluating the PSAs, and 7 questions regarding sociodemographic characteristics such as sex, age, and student year. The responses to all questions, except those regarding smoking status and sociodemographic characteristics, were measured using a 7-point scale (–3 to +3: minus points indicated favorable attitudes of smoking and plus points meant unfavorable attitudes of smoking). The 10 questions measuring knowledge and beliefs were a modified version of the questions used by Murphy-Hoefler et al. [2]. Chang's study [13] was used as a reference for questions regarding attitude, involvement, and evaluation of the PSAs. The three types of dichotomous scales measuring attitude change were “like smoking more”/“like smoking less,” “more negative”/“more positive,” and “more unfavorable”/“more favorable. Each was evaluated on a 7-point scale, with 21 being the maximum number of points. The final score for the changes in attitude toward smoking was the sum of scores from post-questionnaire minus the scores from pre-questionnaire (Supplementary Table 1).

3. Public anti-smoking advertisement

In order to enhance the validity of the PSAs in the study, four anti-smoking PSAs produced by the Ministry of Health and Welfare since 2004 were selected for two message framing types: positive and negative frames. Positive and negative message frames for each PSA were decided based on the study conducted by Murphy-Hoefler et al. [2].

The contents of the two positive message framing announcements were as follows. The first says, “I expanded my bookshelf, it broadened my knowledge. I expanded my map, it broadened my horizons. I expanded my garden, it broadened my mind. We expanded no smoking zones, health spread wider across our land. Thank you. Thanks to your thoughtfulness, better health is spreading across Korea. No smoking is the norm, even where there are no signs.” The second announcement shows a father riding on a bicycle with his daughter after quitting smoking. They laugh as they talk about how his body feels lighter after

quitting. A message was played saying, “Let’s take charge of our health by quitting smoking, drinking in moderation, and exercising. Healthy promises are made to be kept.”

The contents of the two negative message framing announcements were as follows. The first announcement shows people collapsing from cigarette smoke coming from a smoker. The message is that smoking is an invisible violence. The second shows a variety of cancers along with pictures of cigarettes. The message was, “Smoking causes a variety of cancers.” Interviews with heavy smokers who have developed throat cancer then conveyed the message, “When you start regretting, it’s already too late” and “If you want a healthy life, quit smoking now.”

4. Statistical analysis

A chi-square analysis was conducted to understand the sociodemographic characteristics of each message framing group. The positive change in knowledge, beliefs, and attitude based on the message framing type and group characteristics were then tracked with a chi-square analysis. Factors affecting positive change in attitude toward smoking were subsequently analyzed using a multiple logistic regression analysis. Finally, the differences in positive change to attitude and beliefs based on the smoking status and message framing type were analyzed using a chi-square analysis. All *p*-values were two tailed, with a *p* < 0.05 considered statistically significant. All statistical analyses were conducted using IBM SPSS Statistics ver 22.0 (IBM Co., Armonk, NY, USA).

RESULTS

1. Characteristics by message framing group

All participants were exposed to either positive or negative anti-smoking PSAs. Table 1 presented the differences in the general characteristics of the target groups exposed to different types of message framing. Men made up 69.0% of the group exposed to negative message framing, making the proportion larger than that of the group exposed to positive message framing (49.2%) (*p* < 0.001). More first and second year students were exposed to positive message framing, whereas more third and fourth year students were exposed to negative message framing (*p* < 0.001).

2. Rate of positive change in knowledge, beliefs, and attitude

Table 2 showed the differences between the rates of positive change in knowledge, beliefs, and attitude toward smoking after exposure to PSAs based on the type of message framing and audience characteristics. Although positive message framing result-

Table 1. General characteristics of respondents by message appeal types in public anti-smoking advertisement

Characteristic	Message appeal type		<i>p</i> -value
	Positive	Negative	
Sex			< 0.001
Male	97 (49.2)	156 (69.0)	
Female	100 (50.8)	70 (31.0)	
Grade			< 0.001
First	61 (31.0)	42 (18.6)	
Second	86 (43.7)	35 (15.5)	
Third	35 (17.8)	126 (55.8)	
Fourth	15 (7.6)	23 (10.2)	
Religion			0.190
Protestantism	46 (23.4)	70 (31.0)	
Buddhism	31 (15.7)	25 (11.1)	
Catholicism	10 (5.1)	18 (8.0)	
No	105 (53.3)	109 (48.2)	
Others	5 (2.5)	4 (1.8)	
Monthly spending money (Korean Won)			0.002
< 100,000	19 (9.7)	13 (5.8)	
100,000–199,999	24 (12.2)	28 (12.4)	
200,000–299,999	63 (32.1)	48 (21.2)	
300,000–399,999	57 (29.1)	64 (28.3)	
≥ 400,000	33 (16.8)	73 (32.3)	
Smoking status			0.151
Never-smoker	141 (71.6)	147 (65.0)	
Ever-smoker ^a	56 (28.4)	79 (35.0)	

^aPast or current smoker.

ed in a higher rate of positive changes in knowledge than negative message framing, this change was not significant. In contrast, negative message framing resulted in a higher rate of positive change in beliefs and attitude compared with positive message framing at a statistically significant level. In terms of smoking status, a greater rate of positive change in attitude was observed both in past and current smokers compared with those who had never smoked (*p* < 0.001). Although a positive change in attitude measured only 18.2% among women, the positive change in men was 39.1%, showing a statistically significant difference between sexes (*p* < 0.001). There was no difference in the rate of positive change in knowledge, beliefs, and attitude based on religion and amount of monthly allowance.

Table 2. Positive changes in knowledge, belief, and attitude according to message appeal types in public anti-smoking advertisement and general characteristics

Variable		Positive change rate					
		Knowledge	<i>p</i> -value	Belief	<i>p</i> -value	Attitude	<i>p</i> -value
Message appeal types	Positive	33.0	0.147	39.1	< 0.001	19.8	< 0.001
	Negative	26.5		59.7		40.3	
Smoking status	Never-smoker	28.5	0.478	48.6	0.365	17.4	< 0.001
	Ever-smoker ^a	31.9		53.3		59.3	
Sex	Male	29.6	0.959	51.4	0.526	39.1	< 0.001
	Female	29.4		48.2		18.2	
Grade	First	29.1	0.839	47.6	0.009	31.1	0.095
	Second	31.4		42.1		22.3	
	Third	29.8		60.2		36.0	
	Fourth	23.7		39.5		34.2	
Religion	Protestantism	26.7	0.44	51.7	0.736	31.0	0.652
	Buddhism	23.2		44.6		26.8	
	Catholicism	25.0		53.6		21.4	
	No	33.6		50.9		33.2	
	Others	22.2		33.3		22.2	
Monthly spending money (Korean Won)							0.086
	< 100,000	43.8	0.292	56.3	0.201	18.8	
	100,000–199,999	28.8		59.6		28.8	
	200,000–299,999	27.0		47.7		26.1	
	300,000–399,999	25.6		43		30.6	
	≥ 400,000	33.0		54.7		40.6	

^aPast or current smoker.

3. Effects of message framing, audience characteristics, and beliefs on attitudes

A multiple logistic regression analysis was conducted to evaluate the effects of message framing in anti-smoking PSAs, audience characteristics, and beliefs toward smoking (Table 3). In model 1, message framing was selected as a significant variable; this resulted in a 2.7 times greater change in attitude for negative message framing compared with positive message framing. In model 2, message framing and smoking status were selected as independent variables. This showed a higher rate of attitude change among past and current smokers (odds ratio [OR], 7.162; 95% confidence interval [CI], 4.449–11.531) and negative message framing (OR, 2.895; 95% CI, 1.779–4.710). Model 3 included message framing, smoking status, change in beliefs, and sex. Change in beliefs and sex had no statistical significance, while message framing and smoking status remained as factors related

to attitude change.

Figure 1 illustrated the categorization of targets by smoking status (never-smokers and ever-smokers) and the attitudinal change according to groups exposed to positive and negative message framing. The attitude change in non-smokers exposed to positive message framing was only 10.65, while past or current smokers exposed to negative message framing showed a higher rate of attitude change (70.9%).

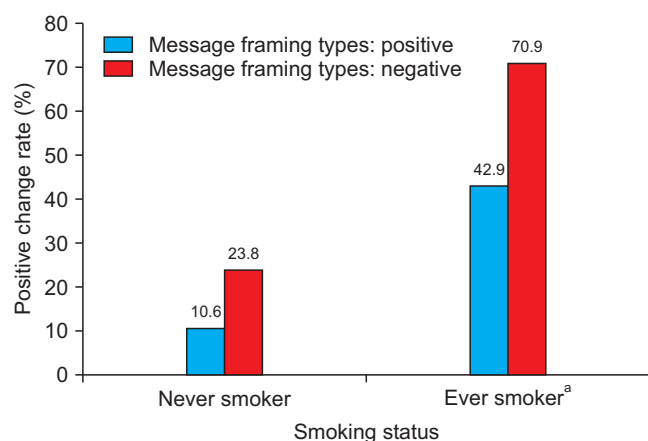
DISCUSSION

Although advertisements on popular media are the most expensive, they are the most effective means to promote anti-smoking programs [2]. Therefore, the most effective message should be chosen before allocating resources to produce and air PSAs. Thus, this study used four anti-smoking PSAs aired in Korea and

Table 3. Factors influencing the positive change in attitude toward smoking

Variable	Model 1		Model 2		Model 3	
	OR	95% CI	OR	95% CI	OR	95% CI
Message framing	Positive	1.00	1.00		1.00	
	Negative	2.73	1.76–4.24	2.90	1.78–4.71	3.05
Smoking status	Never-smoker		1.00		1.00	
	Ever-smoker ^a		7.16	4.45–11.53	6.97	4.11–11.81
Change of belief	None or negative				1.00	
	Positive				0.72	0.45–1.17
Sex	Women				1.00	
	Men				1.13	0.65–1.96

OR, odds ratio; CI, confidence interval.

^aPast or current smoker.**Figure 1.** Rates of positive attitudinal changes based on the participants' smoking status and the appeal of message framing types in the public anti-smoking advertisement.^aPast or current smoker.

tested among students from different universities to assess their change in knowledge, beliefs, and attitude based on message framing type and audience characteristics. The obtained data were used to identify factors affecting attitude changes toward smoking. This study aimed to verify the effects of anti-smoking PSAs as part of the government program to decrease smoking rates.

Earlier studies reported that individual characteristics such as smoking status and plans to quit smoking influenced the effectiveness of anti-smoking PSAs [6,7,14,15]. In a different study examining the effectiveness of message framing based on the participant's smoking status, positive message framing was more effective on smokers, while negative message framing was more effective on non-smokers [6]. Both smokers and non-smokers had a positive attitude toward PSAs with positive message fram-

ing, while the negative message framing was far more effective in smokers, increasing their intention to quit [7].

A previous study revealed that smokers who have not yet planned of quitting responded more positively to other-oriented messages than self-oriented messages, while those who were planning to quit responded more positively to self-oriented messages [14]. In a recent study, the level of involvement was used to determine the attitude toward quitting. The group with a higher level of involvement showed a more positive attitude toward smoking compared with the group with a lower level of involvement [15]. Considering the change in knowledge, beliefs, and attitude toward smoking after exposure to PSAs based on message framing and general audience characteristics, a high level of positive change in beliefs among third year students was observed when negative message framing was used, while a high level of change in attitude was observed among never-smokers and men when negative message framing was utilized. This study reported that anti-smoking PSAs have the greatest effect on attitude change among past or current smokers when a negative message framing is utilized. Based on the additional analysis conducted to evaluate the association between smoking status and general audience characteristics, a sex difference was observed between never-smokers and ever-smokers ($p < 0.001$). After adjusting for sex, smoking status remained a strong factor influencing the positive change in attitude toward smoking (Table 3).

A comprehensive and lasting intervention in schools and local communities combined with PSAs is the most effective way to reduce smoking among youths. However, media campaigns have long been utilized as the most effective means of promoting anti-smoking programs and will continue to be the most important part of any effective anti-smoking program. This study showed that the message framing in anti-smoking PSAs and the partici-

pants' smoking status had a strong impact on attitude change toward smoking. Smokers exposed to negative message framing showed a high rate of attitude change than non-smokers. In other words, smokers exposed to a negative message frame tend to change their attitude toward smoking more unfavorably than non-smokers. This finding contrasts with the results of a previous study, which suggested the use of positive message framing for smokers and negative message framing for non-smokers [16]. However, the study was conducted 10 years ago, using only visual and textual messages, while this study utilized audiovisual media, which is a dynamic tool rather than a static one [16]. Future studies should consider real-world conditions and examine changes in knowledge and attitude from messages transmitted through a variety of media channels including textual, visual, and audiovisual, which should be used in health education programs targeting university students.

As this study was limited to currently enrolled university students in Pusan, South Gyeongsang and Gangwon provinces, the results might not be generalized to all university students. Although the participants were selected considering that university students were at a crucial period of quitting smoking and showed high rates of smoking, PSAs were aired in the entire country. The recent study found that positive messages were more effective

in college students with low nicotine addiction, while negative messages were more effective among those with high nicotine addiction [17]. The lack of consideration of nicotine dependence as an effect modifier was among the limitations of this study. Thus, further studies should be conducted to determine the effectiveness of PSAs based on the age group. In this study, the rate of the change in attitude toward smoking was considered as the dependent variable that can be used for examining the effects of PSAs. However, further research is needed to evaluate the effects of attitude on the intention to quit smoking, leading to an actual behavioral change.

CONFLICTS OF INTEREST

No potential conflict of interest relevant to this article was reported.

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