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## **Do disgusting and fearful anti-smoking ads increase or decrease support for tobacco control policies?**

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Do disgusting and fearful anti-smoking ads increase or decrease support for tobacco control policies?

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## **ABSTRACT**

### **Background**

Frightening messages and disgusting pictures are commonly used in anti-smoking media campaigns. How does watching these campaigns affect people's attitudes towards tobacco control policies?

### **Method**

Non-smokers (n = 464) and smokers (n=139) recruited through the online labour market Amazon Mechanical Turk watched anti-smoking videos with one of three types of emotional content (random allocation): fear plus disgust, fear only (i.e., only moderate levels of disgust), or a control condition. Differences between the three conditions on a Tobacco Policy Support Index were tested after ad exposure. Potential mediation through ratings of negative emotions was determined with bootstrap tests of indirect effects.

### **Results**

For non-smokers, videos that induced fear or fear in combination with disgust were associated with higher support for tobacco control policies than the control condition. The effect seemed to be mediated through ratings of fearfulness. Those who perceived the videos as fearful reported higher levels of support. For smokers, there was no overall effect of the videos.

### **Conclusion**

The data suggest that anti-smoking advertisements with strong negative emotional content can produce more support for tobacco control policies among non-smokers.

## **INTRODUCTION**

Many of today's anti-smoking campaigns across the globe aim to elicit quitting behaviour by inducing fear in smokers (see World Lung Foundation, 2013). Several of these contemporary campaigns include disgusting graphical contents, such as images of deformed lungs, cancerous tumours and surgeries (e.g., Wakefield et al., 2013). The strong images also reach non-smokers, and viewing a carotid surgery or a testimonial of a dying smoker may be undesirable for some viewers. The present research explores whether such strong viewing experiences can have an impact on people's degree of support for tobacco control policies. On one hand, anti-smoking advertisements with high levels of negative emotional content underlines the dangers of smoking, and may increase the understanding that efforts of the governments are needed. On the other hand, it might be unpleasant to view such images, which in turn may produce a negative perception of the anti-tobacco work. Since the elected government is dependent on support from the public when implementing policies (see e.g. Burstein, 2003), it is important to gain knowledge about determinants of support for tobacco control.

### **Predictors of attitudes towards tobacco control**

Former smokers and non-smokers have been found to be more supportive towards tobacco control efforts than current smokers, and lighter smokers are more supportive than heavy smokers (Schumann et al., 2006; Velicer, Laforge, Levesque, & Fava, 1994). Of demographic variables, gender, race, age, and education have been found to be significant predictors of support for tobacco control policies (Doucet, Velicer, & Laforge, 2007; Hamilton, Biener, & Rodger, 2005). Knowledge about negative effects of smoking and attitudes towards smoking also seems to be of importance (Blake, Viswanath, Blendon, & Vallone, 2010b; Macy, Chassin, & Presson, 2012, 2013).

More relevant for the present context, there have been a few studies on the impact of media on attitudes towards control measures. In one study, there was no effect of the type of news coverage (in favour or not) on public support for smoking bans but a tendency towards *lower* support with higher news coverage in general (Smith et al., 2008). However, this could be due to higher news coverage in states where bans were controversial. In contrast, two other studies have investigated the impact of tobacco-related media exposure and found that self-reported exposure to anti-tobacco advertising and news coverage was associated with increased support of certain types of control policies (Blake, Viswanath, Blendon, & Vallone, 2010a; Blake, et al., 2010b). Exposure to pro-tobacco advertising was associated with decreased support of policies related to restrictions in portraying smoking in movies (Blake, et al., 2010a).

The above studies on the role of media exposure in predicting attitudes towards policy measures were correlational and did not specifically address anti-smoking messages with strong negative content. Thus, there is no prior research on how the experience of watching fearful and disgusting anti-smoking messages affects the level of support for tobacco control measures. Theoretically, fear appeal messages should be able to change behaviour and attitudes when people perceive that they have the means to change (Peters, Ruiters, & Kok, 2012), and data on real life smoking behaviour suggest that highly emotional content can produce higher rates of quitting (Farrelly et al., 2012; Wakefield, Spittal, Yong, Durkin, & Borland, 2011). However, little is known about how such message influence an audience and an attitude object that is not directly targeted. The main goal was therefore to investigate the effect of the fearful and disgusting anti-smoking videos on support for tobacco policy among non-smokers. Non-smokers constitute the largest group of voters in most democracies (e.g., World Health Organization, 2011), and their opinions are therefore important. In addition, we

investigated the impact of fearful and disgusting anti-smoking videos on smokers' support for tobacco control policies.

## **METHOD**

### **Participants**

Participants located in the USA were recruited from the online labour marketplace Amazon Mechanical Turk (See e.g. Goodman, Cryder, & Cheema, 2013). Of 650 participants who provided proper descriptions of a test video, 17 were excluded because they failed to follow instructions or because they had participated in a similar study before. Thirty participants dropped out during the study. The mean age of the remaining 603 participants was 33 (range = 18 to 75), 51% were women. Twenty-three percent defined themselves as smokers on the question "Do you smoke tobacco?" by choosing the pre-defined response "Yes, daily" or "Yes, but not daily". Those who responded with one of the following alternatives were defined as non-smokers: "On rare occasions.", "Former smoker. I have quit.", "No, but I have tried.", "No, and I have never tried."

### **Procedure and materials**

Participants were randomly allocated to one of three conditions and watched anti-smoking videos with one of three types of emotional content: a) Fear plus Disgust, b) Fear Only (i.e., lower levels of disgust), or c) Control (mildly positive). The fearful videos were taken from anti-smoking campaigns, and the control videos were commercials related to smoking. Each video set comprised three videos presented in random order. The videos were chosen based on a pre-test of 24 ads with a sample of 40 participants recruited through Amazon Mechanical Turk.

The Fear plus Disgust videos included pictures of deformed lungs, a carotid surgery, tar, white fatty substance squeezed out of an artery, and several other disgust-provoking elements. The Fear Only videos illustrated the dangers of smoking through visual effects,

testimonials and other dramaturgical means. The control videos were commercials related to smoking (ad for nicotine replacement product, passive-smoking ad, and an anti-smoking ad that marketed a mock product that could simulate effects of indoor smoking). See Supplementary Materials A for further details.

After watching the videos and describing the content of the videos, participants responded to series of questions, and among these, six items regarding tobacco control policies, partly based on the scale by Velicer, et al. (1994): a) ban on advertisement from tobacco companies, b) funding of media campaigns by federal government, c) increased taxes on cigarettes, d) ban on smoking in restaurants and cafeterias, e) warning messages on packages, f) ban on visible display of cigarettes in shops. Participants' mean level of agreement with the above policies, rated from 1 ('Strongly disagree') to 7 ('Strongly agree'), formed a Policy Support Index ( $\alpha = .85$ ). Last, participants indicated the extent to which they experienced the video sets as 'fearful' and 'frightening' on a scale from 1 ('Not fearful/frightening at all') to 7 ('Very fearful/frightening'), which provided a measure of Fearfulness,  $\alpha = .97$ , along with items regarding disgust ('disgusting', 'repulsive',  $\alpha = .96$ ) and sadness ('sad', 'sorrowful',  $\alpha = .97$ ). Ratings of emotionality for each experimental condition can be found in Supplementary Materials B

## **RESULTS**

For non-smokers, the results of an ANOVA revealed a main effect of condition,  $F(2, 461) = 5.253, p = .006, \eta^2 = .022$  (See Table 1). A planned contrast between the two negative emotion conditions and the control condition was statistically significant, Difference = 0.39,  $S.E. = 0.125, p = .002$ . Pairwise comparisons showed no difference between the two negative emotion conditions,  $p = .359$ , a significant difference between Fear plus Disgust vs. the Control condition,  $t(307) = 3.035, p = .003$ , Cohen's  $d = 0.35$ , and a significant difference between Fear Only and Control,  $t(313) = 2.317, p = .021$ , Cohen's  $d = 0.26$ .

[Table1]

A bootstrap test of indirect effects (cf. Hayes, 2013) with 10 000 samples assessed whether the effect of the videos was mediated by fearfulness. A dummy-coded variable representing emotional tone of videos (1 = negative emotion conditions, 0 = Control) was used as a predictor of scores on the Policy Support Index, with ratings of fearfulness as the potential mediator. The direct effect of video condition was not significant,  $B = -0.22$ ,  $S.E. = 0.17$ ,  $p = .195$ , but the indirect effect through ratings of fearfulness,  $B = 0.62$ ,  $S.E. = 0.13$ , was statistically significant, as indicated by the 95% confidence intervals (Percentile method) which did not overlap zero,  $CI^{95\%} [0.3795, 0.8662]$ . This means that the effect seemed to be fully mediated by negative emotional reactions to the videos. The ratings of video sadness and disgust behaved virtually identical to the fearfulness scale when entered as mediators in separate analyses. The three negative emotion emotions correlated strongly ( $r$ s between .60 and .83), and it would not be meaningful to enter all three ratings into the same model. The precedence of fearfulness over the other measures is simply based on the focus on the emotion fear in the persuasion literature (e.g. Peters, et al., 2012).

The above analyses were performed on non-smokers only. For smokers, the level of agreement with tobacco control policies was generally lower than for non-smokers (See Table 1). Smokers in the Fear plus Disgust condition scored slightly higher than smokers in the Fear Only and the Control condition, but there were no statistically significant differences, all  $p$ s > .36. This seemed to indicate that the videos did not affect the smokers' willingness to embrace tobacco control policies, or that the study was not sufficiently powered to reveal any difference. A power of .80 for Cohen's  $d = .30$  (the effect for non-smokers) would require 175 smokers in each condition. However, a test of indirect effects revealed a pattern wherein two



effects cancelled each other out. The analysis suggested an indirect positive effect through ratings of fearfulness,  $B = .95$ ,  $S.E. = .24$ ,  $CI^{95\%}[0.53, 1.47]$ , and a direct negative effect of conditions,  $B = -.93$ ,  $S.E. = .34$ ,  $p = .007$ .

An ANOVA performed on data including both smokers and non-smokers revealed a main effect of smoking status,  $F(1, 599) = 87.675$ ,  $p < .001$ ,  $\eta^2 = .128$ , and an effect of the experimental conditions,  $F(2, 599) = 4.379$ ,  $p = .013$ ,  $\eta^2 = .014$ . However, when adding the interaction term between smoking status and experimental conditions, only the effect of smoking status remained statistically significant, and there was no interaction between smoking status and experimental conditions,  $F(2, 597) = 0.989$ ,  $p = .372$ ,  $\eta^2 = .003$ . In other words, the data was not able to establish any differential impact of the commercials on smokers vs. non-smokers despite the different conclusions of the separate analyses above.

## **DISCUSSION**

In accordance with recent studies showing a positive impact of anti-smoking videos on support for tobacco control (Blake, et al., 2010a, 2010b) our data indicate that strong negative anti-smoking videos, even those with disgusting graphical content, may create a more supportive environment for tobacco control policies among non-smokers.

As indicated in the introduction, few have studied dynamic determinants of support for tobacco control. Predictors such as gender and age (e.g., Doucet, et al., 2007) does not allow for any influence, but the association between media exposure and support for control policies (Blake, et al., 2010a, 2010b) corroborates the present conclusion that people's opinions about tobacco control policies can be changed through anti-smoking messages. A recent review of public acceptability of government interventions concluded with a request for more experimental research on how to present health problems and policies to the public (Diepeveen, Ling, Suhrcke, Roland, & Marteau, 2013). The present study is a contribution in

this direction, as the use of hard-hitting media campaigns is one way to present and frame health problems.

There are several methodological issues that need to be highlighted in the present study. The control condition consisted of videos with a positive emotional tone, which might pose a problem with interpreting the results. In theory, the results can be interpreted as an indication that positive anti-smoking videos decrease the level of support for tobacco control. The present control condition was chosen after assessing the strengths and weaknesses of several other alternatives. Control conditions with no videos or completely unrelated videos might produce artificial effects due to the tobacco-related topics of the experimental videos, and anti-alcohol or other anti-drug videos might induce a comparative mindset that affects the perception of potential harm. The optimal would be to include several types of control conditions, but this would require more resources and would lower the statistical power of the study.

The most simple and rational interpretation is that the negative emotion videos increased support for tobacco policies. It is difficult to find reasons why the control videos would decrease support for policy measures like a ban on advertisements from tobacco companies and increased taxes on cigarettes. In addition, the test of indirect effects suggested that fearfulness may have played a role.

The use of ratings of fearfulness (or other negative emotions) as a mediator may however be problematic. Persons with a more positive attitude toward the commercials may give higher fearfulness ratings. That is, instead of video fearfulness having an impact on the Policy Support Index, both measures may reflect an attitude towards the videos. This could mean that properties of the videos other than the emotional tone might be necessary for a persuasive impact. In this sense, the current approach is a pragmatic one, where strict control

over all persuasive elements is traded for real-life relevance by employing anti-smoking videos used in actual media campaigns in recent years.

In any case, it might be a valuable observation that fearful stories and disgusting content as currently used in many campaigns did not have a negative effect on people's perceptions of tobacco control efforts in the present context. In other words, ads aimed at smoking cessation did not produce collateral damage in terms of reduced support for tobacco control among non-smokers.

The analyses on current smokers revealed no overall impact of the videos. However, the tests of indirect effects suggested two opposing effects. The direct effect of the conditions on the Policy Support Index suggested a negative impact of the fear appeal videos (less support) when the level of fearfulness was controlled for. However, this effect was cancelled out by a simultaneous positive indirect impact of the videos through the fearfulness ratings (higher fearfulness ratings associated with higher support). One interpretation of this effect is that those who are not persuaded by the videos become more negative and those who perceive the messages as fearful become more positive towards tobacco control. Alternatively, the measure of fearfulness might be able to differentiate between those who initially support and those who does not support tobacco policies in the two fear conditions, but not in the control condition (for which the rating of fearfulness makes less sense). If this is the case, the two opposing effects may have arisen as statistical artefacts. Adding a pre-test could be helpful in future studies but will introduce other problems, such as a more obvious purpose of the study ('Do they think these videos can change my opinions?'), and it will not exclude the possibility that perceived video fearfulness is non-causally related to persuasion.

It is difficult to know whether the results would be different in other populations. A US sample was used because it was easier to obtain anti-smoking videos in the English language, and because Mechanical Turk provides an inexpensive way of collecting data.

Several reports document the validity and reliability of data collected on this online population (e.g., Casler, Bickel, & Hackett, 2013; Goodman, Cryder, & Cheema, 2013; Holden, Dennie, & Hicks, 2013.). Since tobacco control policies differ by country and states, the particular strategies included in the Policy Support Index might have played a role. However, the high Cronbach's Alpha that was achieved, despite the range of different types of strategies, suggests that a more general support for control policies was tapped.

In conclusion, the results indicate that fearful and disgusting anti-smoking commercials aimed at smoking cessation may have the unintentional but desirable effect of stronger support for tobacco control policies among non-smokers. To the very least, the current research suggests that different types of anti-smoking messages may have a different impact on support for control policies—which is also a novel finding.

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*Table 1. Means and Standard Deviations of Tobacco Control Policy Index according to emotional tone of anti-smoking videos.*

	Non-smokers			Smokers		
	n	M	SD	n	M	SD
Fear + Disgust	149	5.48	1.23	37	4.24	1.58
Fear Only	155	5.37	1.25	59	3.94	1.56
Control (positive)	160	5.02	1.42	43	4.03	1.52
Total	464	5.29	1.31	139	4.05	1.54

## SUPPLEMENTARY MATERIAL A

### List of videos

Emotion	Video set	Videos
Fear +		
Disgust*	A	Carotid, Sponge, Fatty Deposits
	B	Brain, Cigarettes are Eating you Alive, Artery
Fear Only*	A	Krystell, Emphysema, Ronaldo
	B	Anthony, Voice Within, The Wait
Control		
		Shark: <a href="http://www.youtube.com/watch?v=8DjLZP8Q3IY">http://www.youtube.com/watch?v=8DjLZP8Q3IY</a>
		Nico Breeze: <a href="http://www.youtube.com/watch?v=Zken-PWviQ">http://www.youtube.com/watch?v=Zken-PWviQ</a>
		Smoke Farts: <a href="http://www.youtube.com/watch?v=Ock1w7BtCP4">http://www.youtube.com/watch?v=Ock1w7BtCP4</a>

*Note.* Participants in the two first conditions received one of the two video sets (random assignment).

Last online retrieved date was June 26 2013. \* Videos available at [www.worldlungfoundation.org/mmr](http://www.worldlungfoundation.org/mmr)

## SUPPLEMENTARY MATERIAL B

### Mean ratings (and standard deviations) of negative emotions for the videos in each condition.

	n	Emotional Rating		
		Fear	Disgust	Sadness
Fear + Disgust	186	5.62(1.58)	5.83(1.41)	5.46(1.52)
Fear Only	214	5.47(1.55)	4.32(1.67)	6.21(1.08)
Control (positive)	203	2.48(1.73)	2.88(1.77)	2.72(1.93)