

## Pictorial Health Warning and Intention to Quit Smoking in Smokers in an Urban Campus Jakarta

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### ABSTRACT

**Background:** Research on eye-tracking among active smokers shows they avoid the health warnings on cigarette packages, which still occur even without prominent imaging information. **Aims:** To evaluate the reactions and perceptions to pictorial health warning (PHW) labels by measuring eye-tracking devices and knowing their relationship to smoking cessation intention. **Methods:** The study used a cross-sectional design with measurements of PHW on cigarette packs by eye-tracker tools of type Tobii-data collection. With a non-random sampling technique, 50 respondents were from civitas academics on Campus-A UHAMKA. Samples were selected based on inclusion criteria: men, active smokers, not colorblind, and who didn't intend to stop smoking three months before the study. **Results:** The number also shows that most respondents already have strong intentions. The majority of respondents (64%) want to improve their health. However, 20% of those surveyed have no reason to quit smoking. That might represent the respondent's low intention to quit smoking. A bivariate test showed no significant association between respondents' attitudes toward smoking cessation intention ( $p$ -value: 0.706) and subjective norms for smoking cessation intention ( $p$ -value: 0.706). The eye-tracking results found that the different gaze plots and heatmap results on cigarette packets showing smoking-related diseases were more directed to the PHW area of interest. However, on smoking behavior images, the gaze plot and heatmap showed scattered results for PHW and cigarette brands. **Conclusion:** Although it has not been proven significantly related to smoking cessation intention, PHW has been the respondents' focus. We need further research on the shape and size of PHW.

**Keywords:** Eye tracker study, Pictorial health warning (PHW), UHAMKA.

### INTRODUCTION

Tobacco kills more than five million people per year and is a project to kill 10 million by 2020, of which 70% of victims come from developing countries dominated by men, with 700 million, mainly in Asia. WHO estimates 1.1 billion world smokers aged 15 years and over, one-third of the world population. Indonesia ranks 5th in cigarette consumption worldwide after China, the United States, Japan, and Russia (Backinger *et al.*, 2011).

Cigarette packaging is an essential communication tool in advertising to create and strengthen brand image. It is a link between other cigarette advertising and the absorption of the addictive nicotine drug from a cigarette. The cigarette packaging design specifically uses striking colors, different font types, and carefully crafted material

and the cigarette packaging is designed to be very attractive, especially for young people.

The obligation to include health warnings in the form of pictorial warnings on cigarette packaging in Indonesia has been compulsory as of June 24, 2014, after granting a grace period for cigarette manufacturers for 18 months since PP No. 109 of 2012 concerning securing addictive substances containing tobacco products (President RI, 2012). However, there are still few studies on pictorial warning policies in Indonesia. One study in Jember showed that only a few smokers feared the pictorial warning (Sandra, 2016).

One way to prevent the cigarette industry from promoting dangerous products is by plain packaging, as stated in Article 11 of the Framework Convention on Tobacco Control (FCTC) document (World Health Organization, 2015). Plain packaging will require all cigarettes to be

sold in packages with standard packaging forms, colors, and opening methods. That way, all branding will be deleted, leaving only the brand name and variants in the type of letter and standard location, health warnings, and other related information, such as paid stamps and composition information.

Based on the AIDA model, advertising has to be designed to increase the attention, interest, desire, and interest of consumers, which are necessary for taking action to buy (Kotler et al., 2009). To influence smokers' behavior, such as the intent to quit smoking, pictorial health warnings (PHW) must comply to AIDA rules.

Eye-tracking is widely used to measure the target audience's attention in viewing media. This tool is also widely used to measure how effective pictorial packaging policy is on cigarette packaging. A previous study found that smokers and non-smokers have very different attention when looking at cigarette packs, whereas non-smokers will focus on smoking-related diseases. In contrast, smokers will focus on cigarette logos (Edison, Anisa and Fauzy, 2021). This study aims to evaluate the reactions and perceptions of adults to pictorial warning labels by measuring eye-tracking devices and knowing their relationship to smoking cessation.

## METHODS

We recruited 50 participants from Campus A University Muhammadiyah Prof Dr. HAMKA. The sample was selected based on the inclusion criteria: 1) male, 2) smoker, 3) can read, 4) not color blind, 5) does not have the intention to stop smoking three months before the study.

The color blindness test to detect red-green color deficiencies used several Ishihara plates. Each plate depicts a solid circle of colored dots that appear randomly in color and size. The test takes place using a computer screen before the eye tracer test.

However, some criteria, such as different physiological, neurological, and psychological conditions of the eye and a different ability to follow instructions, the use of glasses, contact lenses, or mascara, or having long eyelashes or drooping eyelids, are not used by us. Because it might interfere with the eye image, this is a limitation of this study.

After obtaining informed consent, we led them into the Center of Neuroscience laboratory equipped with eye-tracking stations using Tobii Pro X2-30 to assess visual attention. The monitor screen size is 27-inch color with a resolution level of 1280X720 pixels. Calibration was carried out at every change of participants to ensure the precision of the eye position on the object seen on the monitor screen. A laboratory assistant read all instructions aloud to participants, which were also displayed on the monitor.

Data visualizations such as heat maps and gaze plots can convey significant features of visual activity. Gaze plots indicate the location, sequence, and time spent looking at different parts of the PHW in cigarette packs. The areas of interest in cigarette packets are divided into image, brand, and message.

Participants then completed a self-report survey. For this study, we focused only on measuring their intention to quit smoking, the reason to quit smoking, smoking behavior, attitude, and subjective norms. The questions were adapted from the Global Youth Tobacco Survey (GYTS) instrument. Ethical permission for the research was obtained from the UHAMKA Research Ethics Committee with ethical approval number: 03/19.04/024.

## RESULTS AND DISCUSSION

**Table 1.** Descriptive Analysis of Smoking Behavior.

Item	n	%
<b>Intention to Quit Smoking</b>		
Low	18	36%
High	32	64%
<b>Reasons to Quit Smoking</b>		
Improved Health	32	64
Saving	4	8
My family	3	6
My friends	1	2
No reason	10	20
<b>Smoking Behavior</b>		
High	30	60%
Low	20	40%
<b>Attitude to Smoking</b>		
Negative	23	46%
Positive	27	54%
<b>Subjective Norm</b>		
Negative	26	52%
Positive	24	48%

Table 1 shows respondents' intention to quit smoking is relatively high. There were 32 (65%) respondents who had high levels of it. The number also indicates that most respondents already have a strong intention to quit smoking. The highest reason for quitting smoking is to improve their health (64%). Other reasons given by respondents were for saving (4%), family (6%), and friends (2%). However, ten respondents (20%) have no reason to quit smoking. That might represent the respondent with a low intention to quit smoking.

**Table 2.** Bivariate Analysis of Smoking Behavior.

Item	Intention to quit smoking		P-value
	Low n (%)	Strong n (%)	
<b>Smoking Behavior</b>			0.904
Daily smokers	11(36.7%)	19(63.3%)	
Non-daily smokers	7(35%)	13(65%)	
Total	18(36%)	32(64%)	
<b>Attitude</b>			0.706
Negative	7(30.4%)	16(69.6%)	
Positive	11(40.7%)	16(59.3%)	
Total	18(36%)	32(64%)	
<b>Subjective norms</b>			0.706
Negative	10 (38.5%)	16(61.5%)	
Positive	8 (33.3%)	16 (66.7%)	
Total	18(26.7%)	32(64%)	

The bivariate analysis (Table 2) showed there was no significant association between smoking rate factors and intention to quit smoking with a p-value of 0.904 (> 0.05). In other words, the respondent's smoking level is unrelated. Further results show a strong intention to quit smoking found in daily smokers respondents (19 respondents) compared to respondents with non-daily smokers (13 respondents). Bivariate test results showed no relationship between respondents' attitude factors to quit smoking with a p-value of 0.706 (> 0.05). In other words, the attitude toward smoking is unrelated to the intention to stop smoking. Further results show that the intention to quit smoking is the same as those with a positive or negative attitude (16 respondents).

Bivariate test results showed no relationship between subjective norms

factors with the desire to stop smoking, with a p-value of 0.706 (> 0.05). In other words, the subjective norm is not associated with stopping smoking. Further results show that the intention to quit smoking is the same among respondents with positive subjective norms or negative attitudes (16 respondents).

The majority of the respondent, 30 (60%), were categorized as daily smokers, and 40% as a non-daily smoker. Most respondents, 27 (54%), have positive smoking attitudes, and 26 (52%) have positive subjective norms.

The study's results using the eye tracker showed the following results below. There were four packs of cigarettes that we offered to the respondents. We chose two categories of pictures, two about diseases caused by smoking, one about cancer in the mouth, and one about cancer in the throat. The second category was about smoking behavior, firstly a picture of a father smoking while holding a child and secondly a picture of an adult man smoking.

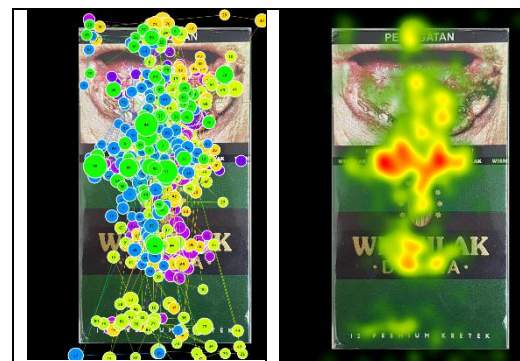


Figure 1. Gaze plot and heat map effect of smoking (disease 1)

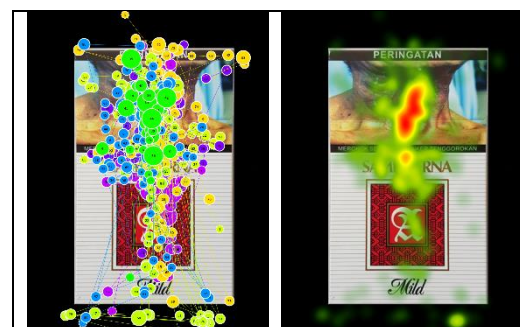


Figure 2. Gaze plot and heat map effect of smoking (disease 2)

Figure 1, a group of diseases caused by smoking, shows that the attention of the

human eye is more focused on the image area of interest than on the brand and message on the cigarette packet. However, the gaze plot results show that there is still much attention looking at the cigarette brand. Figure 2 shows almost the same effect, but in this image, the brand and message on the cigarette packet are even in their area of interest with little attention.

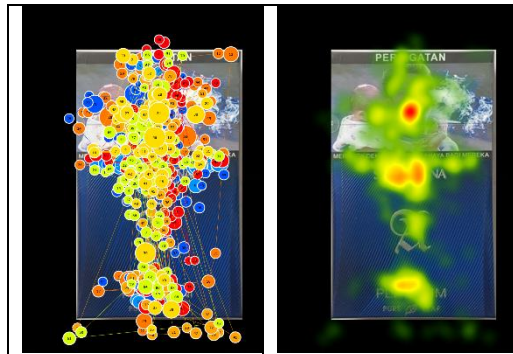


Figure 3. Gaze plot and heat map smoking in front of the baby.

Figure 3 shows almost the same results as Figure 1. Respondents' attention is more focused on the image area of interest compared to the brand and message. Figure 4 shows almost the same results as Figure 1. Respondents' attention is more focused on the area of interest of cigarette images and logos.

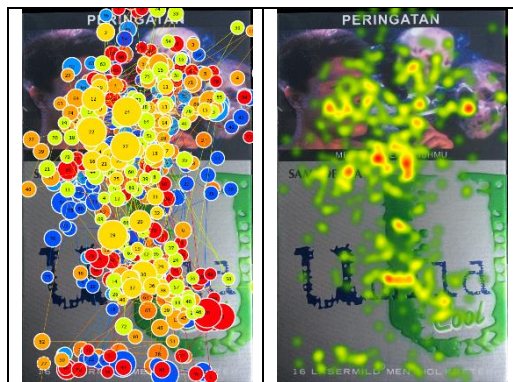


Figure 4. Gaze plot and heat map smoking.

The eye-tracking results in this study found that the different gaze plots and heat map results on cigarette packets showing smoking-related diseases were more directed to the PHW area of interest. However, on smoking behavior images, the gaze plot and heat map showed scattered results for PHW and cigarette brands.

Based on a previous study conducted by Baiquni et al. (2016), some aspects of the image influenced the overall

threat after seeing warning images on cigarette packaging. Therefore, clarity of content, the appearance of danger, and the appearance of severity due to smoking. What influences the emergence of threats and threat beliefs is the informant's experience, smoking status, cigarette price, and thoughts about the source of disease.

Warning with the highest threat from the study conducted by (Baiquni, Dewi and Widyatama, 2016) shows that the images considered the most frightening according to informants were pictures of oral and lung cancer. These images caused an uncomfortable feeling in most informants because they showed the vulnerability and severity of the effects of smoking. They were perceived as the highest hazard images showing the most severe results of tobacco. The lowest hazard warnings showed pictures that informants perceived to be the most ordinary (least scary) were images of people smoking with children nearby and images of people smoking with smoke forming a skull. Pictures of people smoking are considered the most ordinary because they are not disgusting. In addition, according to informants, cigarettes are not too dangerous for passive smokers because they are not always exposed to cigarette smoke.

The warning images of people smoking with smoke forming a skull and people smoking with children nearby were not strong enough to pose a threat, as most informants did not feel scared looking at the two images. This is because the two pictorial warnings do not show the body parts affected by the disease. These results align with what was conveyed by Russell et al. (2013), i.e., alerts that display pictures of limbs affected by the disease will be more effective in raising the threat.

Experience, images, and writing are stimuli that will influence the emergence of perceptions after seeing pictorial warnings. If experience, images, and writing provide a dangerous stimulant, individuals who see pictorial warnings will perceive that the sign indicates danger (Baiquni, Dewi and Widyatama, 2016).

Another case is when looking at the effectiveness of warning images on the intention to quit smoking among students. Although the influence can be produced by pictures of smoking-related diseases on cigarette packs, it turns out that the most significant source of the desire to quit smoking comes from within oneself in the

form of perceived behavioral control. Other exciting data state that when health warning images are shown to active smokers, almost half of the active smokers expressed no fear of the diseases that can arise from smoking (Edison, Anisa and Fauzy, 2021).

The study found that GWL (Graphic Warning Label) covering 30% of the front of a cigarette packet is better than no GWL. Increasing the size to 50% can increase visual attention to the label and its image. The study showed that a 50% GWL could promote quit intentions among adult smokers from socioeconomically disadvantaged groups but did not negatively impact risk beliefs or smoking-related intentions. The results imply that GWL may improve public health if it covers enough of the front of the cigarette packet (Skurka *et al.*, 2017).

(Pechey *et al.*, 2020) found that images of bowel cancer on alcohol bottles elicited the highest negative emotional arousal among health consequences. Labels with pictures of bowel cancer were rated as having the lowest desire to consume the product and were considered the least acceptable overall.

The study found that pictorial warnings on cigarette packets significantly impacted teenage smokers in the US. The warnings elicited adverse emotional reactions in adolescents and increased their concerns about their parents' smoking habits. The signs also encouraged conversations about smoking cessation and were perceived as effective by most teens (Brodar *et al.*, 2018).

The results showed that smoking is a common problem among US teenage smoking children. The study found a strong relationship between family SES and smoking practices or intentions, with more students from lower SES families trying to or intending to smoke shortly. In addition, it was found that more males than females had pro-smoking attitudes and perceived smoking as beneficial for social interaction, relaxing, and making them look more mature or masculine (Mao *et al.*, 2009).

A study by Romer Daniel *et al.* (2013) showed strong support for the Extended Decision Model (EDM) predictions about smoking cessation. The results suggest that the effectiveness of pictorial warnings in helping smokers quit depends on their smoking levels and their efficacy in finishing.

Alley *et al.* (2014) found video-tailored advice was more effective at gaining participants' visual attention than text-tailored advice in a web-based physical activity intervention. Presenting health advice in video form may be an effective strategy to increase participant engagement and exposure to web-based health interventions.

Experience supports that cigarettes are harmful and that clear pictures and text promote the perception that pictorial cigarette warnings are dangerous (Bond and Nolan, 2011). Witt and Riley state that perception is sensing information derived from stimuli received. Experience, images, and writing are stimuli that will affect the emergence of perceptions after seeing pictorial warnings. If experience, pictures, and writing provide a threat stimulant, individuals who know the warning show fear.

Threats for smokers and non-smokers when seeing warning pictures in cigarette packets appear in fear, disgust, pity, worry, and concern, by what is conveyed by Gore and Bracken that a threatening warning message will bring up anxiety in people who see or read it. Meanwhile, warning messages with no threat will not bring up anything in people who see or read them (Durkin *et al.*, 2013).

## CONCLUSION

In the heat maps of PHW, the fixation numbers on the images were typically high. Mostly the respondents were reading the PHW rather than the text. Although there is no significant association between attitude and subjective norm, eye-tracker analysis found that pictures and text should be deterrents for effective prevention. Although it has not been proven to be significantly related to the desire to stop smoking, PHW has been the respondents' focus. The pictures and text should be bigger and add threatening messages. Further research is needed on the shape and size of PHW.

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