

Color Perception: a Smoking Cessation Experiment

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Abstract— This experimental study aims to propose smoking cessation methods through experiments on the color perception of cigarette products. This study used qualitative method by measuring the desire to smoke using a 5-scale Likert scale. It provides different stimulants through 6 colors of cigarette products. Respondents stated 'desire' to smoke, based on rates ranging from those who really did not want to, for those who really wanted to smoke when interacting with cigarette products that were colored. This experimental study collected data through interviews and descriptive analysis. Further research needs to be done considering this study only involved one group of adolescents in the age range of 18 to 22 years old. The results of the experiment show that there was a real correlation between the desire to smoke and the color of cigarette products. This condition certainly also illustrates how color perception can be used as a proposal to help smokers to stop smoking, or at least reduce the desire to smoke. So, it can be a real effort to help smokers to stop smoking.

Keywords—Color, Perception, Smoking, Cessation.

I. INTRODUCTION

Everyone knows that smoking negatively affects health. Over the years, many medical studies found negative effects caused by smoking [1]. However, these findings cannot reduce the number of smokers spontaneously. In addition to the smoking cessation program initiated by non-governmental organizations, the government also organized an anti-smoking social campaign. In Indonesia, the anti-smoking campaign was so intensely carried out, from determining the day without tobacco to a more personal effort by warning the effects of smoking on cigarette packages through pictures of diseases caused by smoking. However, it seems that these efforts do not have a significant effect. Even the number of smokers in Indonesia continues to increase from year to year. Globally, the results of anti-smoking campaigns also tend to be stagnant [2]. Clayton states that visuals that display disgusting images cause negative cognitive effects [3]. Seductive and delusive cigarette advertisement visuals are considered to be in sharp contrast with images in anti-smoking campaigns. The approach taken tends to be through health threats and other psychological losses. This phenomenon is certainly interesting to study, allowing researchers to find a 'new way' to help smokers to quit through a psychological approach, especially color perception. Therefore researchers are trying to give a paradoxical perspective, how to assist in efforts to stop smoking through colored cigarette products. So that it can be a reference for tobacco smoking controlling and helping smoking cessation. Not against smokers with threatening images, but to give advice that directly involves smokers' perceptions and emotions through the cigarette product itself. The results of the experiment showed that there was a real correlation between the desire to smoke and the color of cigarette products.

Previous research used various methods to reveal what and how a person's condition related to the smoking activity. Eriksen et al mentioned that the first age of smoking in Indonesia began with adolescence [4], while Poutvaara & Siemers mentioned that many people in Indonesia tolerate smoking to form social norms [5]. WHO also reported that the family environment and the role of idol figures tended to be role models for smokers to start smoking[6], such as the results of Chung et al research [7]. Rakhmat & Tarahita also mentioned that Indonesian children are accustomed to being asked by their parents to buy cigarettes at small retailers [8]0. But the discourse about how to make people stop smoking seems to be more directed to the domain of health perspectives, government regulations, or other aspects outside the smoker themselves. Yoo said that the negative example of a celebrity character in an advertisement also triggered the desire to stop smoking [9]. But in reality, the number of cigarette advertisements starring celebrities and scenes in video clips and films more often affects the audience. Research on cigarette replacement products has also been carried out, Sheratt et al have conducted research in America about e-cigarettes which are considered as alternatives to quitting smoking still have limited health information constraints [10]. Previous research also uses a 'health and communication' perspective as a paradigm, such as Cho, Chun, & Choi, which states that graphic health warnings on cigarette packages do not get the attention of smokers who experience stress and believe that smoking can reduce their stress [11]. Graphic Health Warning, as one of the efforts of the anti-smoking campaign, apparently failed to reduce the number of smokers. Although Cheron found that Graphic Health Warning is the right step to reduce the interest in smoking [12], the application of Graphic Health Warning still requires in-depth research and requires strong public policies related to cigarette producers as Krugman reported [13]. While Macy et al check graphic health warnings must contain text about health explanations, even though the packaging area of cigarettes is very small and narrow to accommodate all of them [14]. Satomura & Nakahara argues that this effort tends not to help many smokers to quit because they do not use the smoker's point of view as a determinant of success [15]. In fact, there are also many studies that result in efforts to stop smoking, depending on the psychological factors of smokers. Rosa & Young talked about stress and psychological conditions that can increase the desire to smoke [16]. According to Wiggert who discovered smoking can eliminate anxiety [17].

Because there is no previous research that discusses the experiment on the modified cigarette as a tool to stop smoking, our research aims to create a new approach to help stop smoking by using color perception. To support this,

researchers used the color perception of cigarette products as an experiment for mapping smoking desire.

II. METHODS

In this study, the experiment used mixed methods, both quantitative and qualitative analysis, using 5 Likert scales. According to Joshi, Likert defined it as a technique for objectively making inferences and systemic identification of message characteristics [18]. According to McLeod, the Likert scale has undergone a structured development to measure attitudes by asking people to respond to a series of statements about a topic. Specifically, in terms of the extent to which they agree or disagree with the topic, to make use of the attitude component and cognitive component [19]. There is a lot of debate about the range or interval on the Likert Scale; some researchers say that a scale of 7 is better than 5. Fung & Siow has conducted research using 7 Likert-scales to see the satisfaction of a team in a work project [20]. As far as the observations and experiences of researchers, the interval range is generally only in the form of 5 levels. While the long-form 7 or 9 is intended to express something more complex and specific attitude, while still trying to contain the middle value. Joshi also said that some researchers and statisticians consider the Likert scale to be an ordinal scale, stating that responses are arranged in some ranking order [21]. Based on these two meanings, this study will consider 5 scales as parameters to map the desire to smoke. So the desire to smoke based on the color of cigarettes can be mapped. The last part of this process is to describe what color cigarettes can cause smokers not interested in smoking and why through in-depth interviews can be seen in Fig 1.

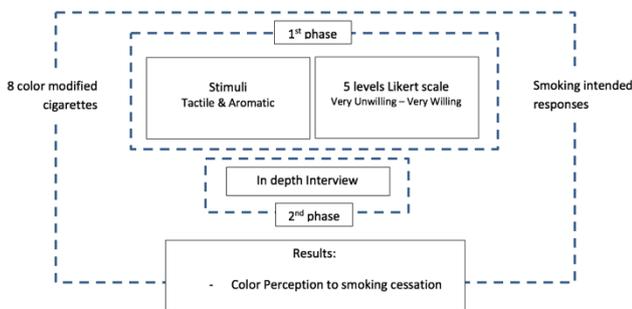


Fig. 1. Analysis Phase

A. Respondents

The first stage was defining the respondent's profile by conducting direct observations and questionnaires. Data collection used purposive sampling technique, determining the profile of respondents who are active smokers from middle to heavy levels, start smoking at a young age, and live in urban areas in West Java, Indonesia. The number of respondents involved was 60 people, consisting of 37 men and 23 women. All are aged between 18-24 years and are students. Socioeconomic status consists of the middle class. The use of purposive sampling like this has been done by Spinner & Malamuth when researching sexually explicit content in the media.

B. Research Tool

Smokers get 'psychological benefits' in the form of feelings of the calm and psychological sensation of oral

satisfaction. Therefore, a psychological approach is needed to help smokers in their efforts to reduce or stop smoking. One proposed step is the use of a psychological approach through the physical use of colored cigarettes. This is because a person's perception is influenced by the needs or biological conditions, the overall experience of the object, the properties of the object, and how to see the object [22]. Color is one of the constituent elements of perception, where perception is the process of organizing and interpreting stimuli received by an organism or a person. The colors to be used are white, black, blue, red, purple, olive, green, and orange. The color is taken from the general color of food; this is based on the characteristics of cigarette consumption, which is almost similar to food products.

C. Stimuli

Respondents were welcome to see and smell the eight cigarettes but are not allowed to consume them. After that, respondents will be asked to fill out a questionnaire by circling choices according to the questions asked. The instrument used as an assessment tool used the 'Five Level Likert Scale,' with a range of values from 1 to 5. Respondents were asked to write down their desire to smoke when interacting with cigarette products at 5 levels of the Likert scale. Point 1 represents the meaning of not wanting to smoke, 2 representing not wanting to smoke, 3 representing the middle value, 4 representing wanting to smoke, and 5 representing strongly wanting to smoke can be seen in Fig 2.

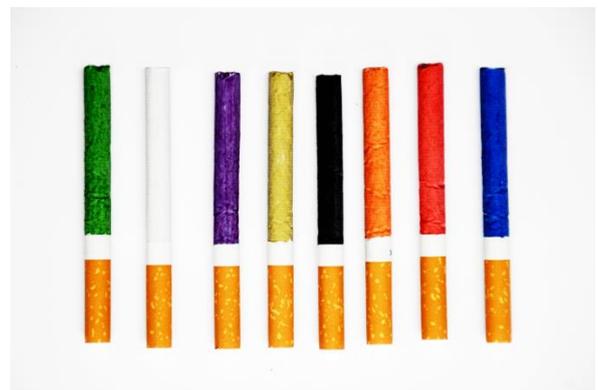


Fig. 2. Stimuli; Color Modified Cigarettes.

After the response gathered, the next procedure in the first phase is to check the validity of the data. The purpose of examining data validity is solely so that research can produce objective and scientific data so that this research can provide benefits. McLeod explained that in qualitative research using a Likert scale, mode values could be used as the easiest way to interpret results. Another case used a mean value that has a high level of complexity [23]. At least the researcher must understand the topic and be able to translate the data objectively. Alternatively, if necessary, researchers have a deep involvement in related topics. However, researchers do not necessarily ignore the mean as an element of interpretation, because of the resulting value, the tendency of fluctuations in the average value has interesting variations.

III. RESULTS AND DISCUSSION

A. Smoking Desire

After documenting all the responses obtained, the researcher continues to examine all data, copy them in the form of a series of data, to then look for the mean and mode. The details of those values are (See table I).

TABLE I. COLOR PERSPECTIVE

Color	Scale					Mean	Mode
	1	2	3	4	5		
White				12	48	4.80	5
Black	30	6	20	3	1	1.98	1
Blue	43	10	5	1	1	1.45	1
Red	33	17	8	2		1.65	1
Olive	38	8	6	6	2	1.77	1
Green	36	6	12	4	2	1.83	1
Orange	49	4	6	1		1.32	1
Purple	49	7	3		1	1.28	1

Based on the results of the mode calculation, fluctuations in the perspective of the desire to smoke look very contrasting, white cigarettes have the highest mode value and are very dominant at 5 points while the mode values in other colors are very low and tend to be the same, which is 1 point. In general, this value explains that white cigarettes have very high consumption potential. All respondents stated that visual white cigarettes made them want to smoke.

If examined further, fluctuations in the average value of non-white colored cigarettes vary greatly. Although the mode value tends to be fixed, the average fluctuation is almost 1 point. The lowest mean value is found in purple cigarette products, which is 1.28. The second-lowest value is generated from orange cigarettes with 1.32, and blue with a value of 1.45.

B. Visual Perception of Product Color

To reveal the perceptions received by respondents, in-depth interviews were conducted in the second phase. From the results of the interview, it revealed various things underlie the desire of respondents to consume cigarettes in certain colors. In general, all respondents stated they really wanted to smoke when they saw and smelled the scent of white cigarettes. Because cigarette products with these colors are prevalent in their daily lives. Even since they were first exposed to cigarettes, both when they see advertisements, films, or smoking activities carried out by those closest to them. White gives a perception of what is good, common to consume, and harmless. This opinion was also obtained by

respondents through daily experience. They argue that smokers around them do not encounter significant health complaints.

Respondents almost had the same perception when given black cigarette stimulation. The majority of respondents think that black cigarettes also commonly consumed daily. 24 respondents know that black cigarettes are available in the market. As far as researchers know, there are indeed black cigarette products in Indonesia. Even though there is only 1 product, wide distribution in the market can influence the perception of respondents. The number of respondents is 12 people adrift, 36 respondents said black cigarettes have a 'strange' perception; they feel touched something unusual about cigarette products. The most perception is the feeling of holding charcoal. They began to doubt whether cigarettes with color like that are safe for consumption.

The results of in-depth interviews also found an interesting phenomenon of red cigarettes and olives. The mean value of the two is almost in contact with the median of other non-white cigarettes, which is 1.7083. The interview revealed respondents' perceptions related to the 'taste of food' towards the two colors of cigarettes. On red cigarettes, respondents have perceptions about the taste of strawberries, while on olive-colored cigarettes, respondents have perceptions of avocados or herbal cigarettes. Both colors provide a perception of the aroma of fruit juice in colored cigarette products.

Significant differences found in orange and purple cigarette products. From in-depth interviews, interesting respondents' perceptions were generated for further exploration. Orange cigarettes apparently are not considered cigarettes with the aroma of citrus fruits but are associated with carrots. Respondents said their daily experiences with carrots were also reinforced by the nostalgic aspect when they watched the film Bugs Bunny produced by Warner Bros. Films. They expressed their dislike for the disturbing rabbit character in the film. Another thing that was expressed by respondents was the majority of them did not like to consume vegetables. As for the purple cigarette, which in the phase 1 study was the lowest cigarette, respondents revealed that they felt touched by something poisonous. Instead of getting a perception about the aroma of grapes, respondents consider the color purple in cigarette products as a deadly substance. Eliminates smoking appetite. Another thing that was expressed by respondents was the image of 'missing males'. They consider purple as a feminine color, not representing the image of men and the success that is often present in advertising discourse.

The highest mode value in white cigarettes shows that neutral and safe perception is very prominent. All respondents gave a high level of desire to smoke. This certainly also relates to the reasons for the respondents when the interview was conducted. The purity of perception and the prevalence of white in the various cigarette products available on the market have made smokers ignore the health risks that lurk them. But in the interview process, respondents also claimed to know the risk of smoking. They even understand and have access to information related to it. Male smokers tend not to want to have a female partner who smokes, on the grounds of not wanting to poison their children and the negative image of

female smokers in Indonesia. While women smokers have a target to stop smoking when they get married and will not smoke in front of their in-laws and children. But when asked why these women continue to smoke, their answers tend to be the same; smoking is a thing that is not too dangerous for the body and only has a negative social image in the older generation.

Studies on smoking behavior stated that smoking activity tends based on psychological reasons. Stress and anxiety factors that have integrated into the daily lives of urban people make smoking a self-therapy. Cause the paradigm of body health as an investment in the future is ruled out. The community prioritizes today's achievements in implementing their lifestyle. The white color also blurs the negative effects of smoking. Through its neutral entity, white can be adopted in any lifestyle activity.

Actually the effort to apply Graphic Health Warning on cigarette packages considered to have been successful, but according to researchers the number and quality of smoker interactions are still not high. Quantitatively and qualitatively, the level of interaction with cigarettes is higher than the packaging. Smokers in Indonesia tend to place cigarette packs in their pants or shirt pockets or put them on the table. Of course, this condition reduces graphic exposure for smokers. This phenomenon was observed directly by researchers at interviews. Of course, this could also be one of the answers to Kim et al research that questions why anti-smoking campaigns have results that tend to stagnate at the grassroots level. Another case with cigarette sticks held during smoking activities. Also, the effectiveness of information is still at a low level, as stated by Macy that, in addition to the graph, still requires a detailed explanation of health information.

The findings in this study also contribute to the idea that the desire to smoke arises from within smokers. Apart from the various external factors that trigger it, the decision to start or stop smoking is determined by one's life choices. Presentation of cigarettes whose color is modified in such a way results in different levels of desire to consume cigarettes. Unusual colors used in cigarette products have a significant effect on smokers. The purple and orange colors in this experiment provide a new perspective on the color perception of a cigarette product. In other words, the perception that appears can also affect the desire to smoke, even in smokers classified as heavy smokers.

As explained above, to identify the perception of cigarette color in detail, researchers used in-depth interview techniques. The interview produced the perception that cigarettes with colors other than white provided a new perspective on the image of cigarettes. Respondents feel colors based on compulsive life experiences, which means they are well attached to the minds of respondents.

From the interview results, it is known that white as a neutral color gives a general perception, prevalent, clean or non-toxic. This perception makes smokers feel 'normal' when given a stimulus. The 'has no effect' response until 'really does not want' to get an empty value. Meiselman mentions that white tablecloths in restaurants are acceptable by cross-cultural and ethnicity [24][25]. The neutrality of the white color of the cigarette makes the image of 'poison' and 'damage' biased.

In the interview process, respondents had a perception of the color of the fruit in red and olive cigarette products. This condition certainly attracts attention for further study. In everyday life, people are very familiar with the colors red and olive. Smokers in Indonesia fill their time after eating with smoking activities. The atmosphere built through color interaction is very prominent in the interview process and data analysis. The reason respondents consider these two colors to be the color of the essence of the fruit that in their surroundings, red often used as an association of strawberry flavors, and the color of olives is closely related to the association as an avocado.

But there is a slight difference when the perception of red cigarettes is asked of female smokers; they are more likely to associate 'rose' and 'sexy'. They claim that they use red very often in fashion and cosmetics, from lipstick to perfume and underwear. Olive color is also often associated with avocados, although not all of them are associated with fruit consumed while eating, but as a cosmetic ingredient. But despite all that, respondents' perceptions show how aspects of culture and lifestyle greatly influence their views on the color of cigarettes.

Cigarettes that have the most negative perceptions found in purple cigarette products. Information gathering gained the explanation that purple associated with toxic colors. This color considered strange and is a new color to put on the mouth or put into the body. From the results of the experiment, only 1 respondent stated he really wanted to try it. Respondents think that purple cigarettes are unique and interesting color to try. While 49 respondents stated straightforwardly that purple cigarettes contained poison and certainly had the potential to damage.

The perception that emerges shows the representation of self-understanding as well as their cultural values. In Indonesia, white believed to be a color that contains clean and sacred values. This even obtained through national doctrination. White images on the colors of the country's flags embedded as colors that represent nobleness and holiness. The red color also believed to be a non-toxic entity; the red color often interpreted as the color of self, majesty, and fighting power that is specific to the people of Indonesia. While purple basically not too familiar with Indonesian culture. Very rarely found cultural artifacts use this color. Purple closely related to mystery, so the community feels strange and has a negative perception compared to other colors in this experiment.

IV. CONCLUSION

The desire to smoke influenced by psychological aspects. Therefore it is necessary to have a psychological perspective in helping smokers to quit. So far, the policies adopted still have perspectives that place smokers as destructive behavior. Awareness efforts made with visual threats, even at the vulgar level, by presenting disgusting images. In other words, the effort to stop smoking still comes from outside the smoker himself. Even though there are many smokers who really want to stop smoking. Therefore, an experiment to modify the color of cigarettes needs to be done because researchers find efforts to stop smoking can also be helped by providing psychological experience through the perception of the color of cigarette products. However, this research still has weaknesses, some of which only involve a few respondents

and are local in nature. It is possible that various aspects of geographical, cultural and social value will be acquired in a wider and more diverse social area. Research outside the urban areas also needs to be done, given a variety of very significant motivations and lifestyles. The selection of respondents can also be expanded to include novice smokers or even nonsmokers. How the color of cigarettes can affect them when they start their activities to become smokers.

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