

Smoking Advertisements and Its Impact on Human Behavior

*Noman Arshed¹, Muhammad Shahid Hassan & Afia Mushtaq **

* Department of Economics, University of Management and Technology

¹ Corresponding author email: noman.arshed@umt.edu.pk¹

Abstract

Advertisements facilitate households to respond to adjust behavior. This study has designed to examine the behavior of individuals about their future health behavior related choices in the light of pro- and anti-smoking advertisements respectively. Both advertisement follow the Health Belief Model which states that an advertisement must cover the cycle of exposure, recognition, receptivity and agreement respectively. This primary study which covers 222 respondents in order to judge the socioeconomic factors affecting the future decisions of the individuals about smoking using Multinomial Logit Model. This study concluded for pro-smoking advertisement, only T.V and movies are encouraging individuals to smoke. However; in anti-smoking advertisement, we have found T.V and movies & magazines and newspapers are also discouraging individuals to smoke. The study indicates that purchase of merchandise promotes individuals to smoke, whereas, the anti-smoking law is discouraging individuals to smoke.

Key words: multinomial logit model, advertisement, health belief model, smoking

JEL Classification: I1, M37

1. Introduction

Smoking is currently a serious issue for youth. Most often non-smokers are inspired from their surroundings for smoking. The decision of smoking identifies various hazards of smoking. The hazard cost the smoker is suffering with might not be quantitative but the hazard cost is observable in smoker community. And the main suppliers of this information are advertisements. Hence in this era of advertisement the respondent's decision is according to the information available, according to the context of consumer behavior. The amount of sales the product gets depends on the exposure, recognition, receptivity and agreement that the advertisement makes¹. As these smoking related advertisements are of two types the advertisements that induce people to smoke (*pro-smoking advertisements*) and the advertisements that restricts the people to smoke (*anti-smoking advertisements*) both are forcing the individual to consider its health related behavior decision.

In this case of health related decision making, model has been constructed to observe people's decision about the health related behaviors, as a result of smoking advertisements. In this respect, the

¹ All the author have equally contributed in the construction of the survey, paper write-up and the analysis.

Acknowledgement: We acknowledge the our institute University of Management and Technology for allowing us to arrange a survey from the respondents within the university premises which led us to build this study.

perceived threat and net benefits, perceived susceptibility, perceived severity, perceived benefits and perceived barriers are analyzed. This paper attempts to explain the decision making, of an individual with respect to pro and anti-smoking advertisements. It means that a person will smoke if the exposure, recognition, receptivity and agreement created by the pro smoking advertisement are greater than the anti-smoking advertisements. The models are analyzing the exposure and the frequency of delivered threats or benefits.

The recognition can be seen as when the individual knows the content of advertisement message that is being delivered. The receptivity is the attachment of the individual to the product of service and the agreement is the views of the individual about the perceived benefits or perceived threats about the product or service. The work of pro and anti smoking advertisement effect using four point Likert scales about the decision of intention to smoke ². For the evaluation of decision behavior with nominal decision scale can be done using multinomial logit model ³.

Effect of exposure and recognition is different on different individuals. There can be individuals with high exposure with low associated agreement or vice-versa. It might have different effect on future intention for different type of people ¹.

Hence not the frequency but effective frequency is expected to have any or more association with the future consumption. Similarly the source strength can be determined through source with strong agreement or source influencing future consumption. Here effective frequency is generated by the product of number of time the message is delivered and quantified scale of agreement with it. As this both parameters are giving weightage to the agreement that it is generating, hence they are expected to be independent from the individual difference.

A survey is designed to generate the frequencies of messages seen and sources used for both pro and anti smoking advertisements and this is checked its association with the future intentions to smoke.

The proceedings of the paper has following sections. Section I contains review of the work of other scholars related to this issue, section II contains description about the sampling procedure, variables and their measuring mechanism and the methodology. Section III contains the estimated results that are obtained using quantitative measures, its representation and interpretation, limitations related to the research, section IV contains conclusion of the paper with policy recommendation and the references of the related and used articles are presented hereafter.

1.1. Economics of Smoking Decision:

*Higher the cost of a behavior, the less people will do it, while the lower the cost, the more people will do if it*⁴

The decision to smoke depends upon the amount of information about the cost and benefit of this habit. Hence the positive smoking advertisers are providing information that is reducing the perceived cost of the smoking whereas the anti-smoking advertisements are providing information that is increasing the cost of this behavior.

People who smoke or ought to smoke think to reap satisfaction from the consumption of cigarettes. An anti-smoking activist Scott Ballin asserts that “*There is no positive aspect to [smoking]. The product has no potential benefits.*”⁵

Hence those who pay for to smoke are willing and paying for it due to the unreal reduced cost of the smoking habit. Whereas those who have not smoked, due to anti-smoking advertisements, had higher perceived cost of this habit i.e. smoking. This cost can be termed as the loss or damage to health that the smoking behavior causes.

Secondly this analysis of advertisements as a stepping stone of change in human health related behavior. This can be useful for the suppliers of information (advertisers) about the effectiveness and dimensions of the resources spent on these advertisements. Similarly as Government is responsible of increasing the welfare of the public, then it must have to put justifiable effort to restrict its public to indulge in health damaging activities.

The effectiveness of the sources applied by the advertisers is important to be analyzed so that if one of the source becomes ineffective the advertisers can focus on the alternate resources to make the target public to make decision in their favor (i.e. decide to smoke for the positive advertisers).

2. Literature review

Generally, individuals face some choices as the trend to smoke is very common and there is a lot of advertisement both positive and negative. The choices can be like completely deciding to smoke or not to smoke. Humans’ decision to change his habit about smoking goes through four stages i.e. exposure, recognition, receptivity and agreement⁶. In this research the dependent variable is the humans’ decision with respect to advertisements and independent variables are describes briefly above.

Both pro and anti-advertisers follow somewhat specific pattern. The empirical evidence of the health belief model which was spelled out in terms of four constructs representing the perceived threat and net benefits: perceived susceptibility, perceived severity, perceived benefits, and perceived barriers. These

concepts were proposed as accounting for people's readiness to act. Here the demand of cigarette was decreased by the increased anti-smoking exposure efforts by the government and health associations in 1964 (Surgeon General's Report), 1968 (effective years of fairness doctrine), 1971 (pro smoking broadcasting ban) and 1979 (2nd Surgeon General's Report)⁷.

The importance of the effect of exposure was again explored by treating the sample through four different methods; each having different level of exposure (using TV and local campaigns) and proved that greater the exposure more incidences of smoking⁸. An experiment done through newspapers in the region of Buffalo, New York gave significant results in making people decide not to smoke⁹.

The other avenue from where the antismoking message can be delivered is the cigarette pack itself. The difference between the message printed with graphic imagery and without graphic imagery on the cigarette pack and came through with the conclusion from the experiments in Canada and Mexico that graphic imagery decrease the demand of cigarette sold. The weakness of these all papers is that they haven't checked the effect of these sources when they are moving with others sources, which is the case of real life¹⁰.

After the importance of exposure, follows the importance of recognition, it is the quality of message that is being delivered. The anti-smoking message can be presented in two ways, First by presenting the cost of smoking and second by presenting the benefits of non-smoking. The effect of anti-smoking message is different to smokers and non-smokers according to the type of message delivered¹¹. The significance of recognition using GYTS (global youth tobacco survey) by identifying the positive association between current smoking status and the passages like direct advertisement, parents, peers, teachers and religious prohibition about smoking¹².

Receptivity and agreement are very important in decision making. There is a work on this phase by evaluating the results after delivering different type of messages to the audience. Which concluded that advertisements showing the extreme consequences of the smoking were rewarded with the greater number of agreements¹³. Increase in experience from campaigns can also affect receptivity of the individual to have a decision about the health behavior¹⁴.

In the end, aggregating all the stages the effect of both pro and anti-smoking advertisements on the non-smokers on their four liker scale intend to smoke decision and it is revealed that the exposure to advertisements and agreement with the messages delivered plays its role in changing the future decision behavior².

The limitation in this paper and all previous stated studies that they have not considered the fact that different dosage of advertisement and different sources have different effect on different individuals. Hence

this paper is designed to find the association between the determinants of future intentions that are expected to be independent of difference in the individual behavior.

It may be noted that there is hardly such study pertaining to Pakistan, particularly focused on young college graduates. It is the prime age in which individual gets addicted to smoking or equally important is that someone quits smoking. Thus, this study is a pioneering in terms of analyzing such an important behavior of youths which is concerned about their quality of life.

Given the above rationale, this study aims at achieving the following objective:

- i. Identification of significant sources that deliver pro and anti-smoking advertisements.
- ii. Point out significantly different pro and anti-tobacco messages which encourage or discourage smoking
- iii. Find out future intention to smoke which is effected by the effective frequency and source strength of the pro and anti-smoking advertisements

3. Materials and Methods

3.1. Sampling Framework

The sampling frame used for this study is random sample of 222 student respondents having variety of educational backgrounds ¹⁵.

3.2 Hypothesis and Proportion Generation

For the generation of the hypothesis of significant messages, a survey was conducted in which several pro and anti-tobacco statements were asked. From the top six pro and anti-tobacco messages were adopted for the study and the geometric mean of all their proportions is used as the proportion (calculation mechanism stated below) that will be used for sample generation formula.

$$P = \sqrt[n]{\prod_{i=1}^n p_i} = \sqrt[n]{\prod_{i=1}^n \frac{\text{total no. of } i\text{th message stated}}{\text{total statements}}}$$

Here p_i is the proportion of the occurrence of the i th message and p is the mean of all the proportions which came out to be 0.30 which means that out of 100 people on average 30 people have heard about the message (*positive or negative tobacco related*).

3.3 Anti and Positive Smoking Related Messages

This study adopted set of 6 Anti and Positive Smoking messages which were ranked highest in terms of their popularity. These will be used to evaluate how advertisements are connecting with the respondents². The list of Positive and Anti Smoking Messages is below:

Positive Smoking Messages:

- Smoking is an enjoyable experience (message 1)
- Smoking helps people relax, concentrate and is a solution to depression (message 3)
- Smoking is a symbol of courage and passion (message 5)
- Girls like smokers (message 7)
- Smoking makes men macho, attractive or good looking (message 9)
- People who smoke have more friends (message 11)

Negative Smoking Messages:

- Smoking causes heart diseases, strokes and shortens the life span (message 2).¹⁰
- Tar in cigarette causes brown staining on teeth (message 4).¹³
- Nicotine in cigarette has immediate effect of increasing blood pressure (message 6)
- Carbon dioxide decreases efficiency of breathing & increases chances of cancer (message 8)
- Smoking reduces lung growth & functionality (message 10)
- Smoking or exposure to smoke is extremely dangerous during pregnancy (message 12)

3.4. Sources of Advertisements

This paper adopted following common sources of advertisements, the relative reach of smoking messages from these sources are checked¹². The sources which are mentioned in the questionnaire are:

- Movies and TV.⁸
- Internet
- Shopping stores
- Newspapers and magazine.¹⁶
- Billboards

3.5. Questionnaire

A questionnaire was developed to generate data to be used for analysis. For convenience the questionnaire was prepared amended and revised in the light of comments by the experts and cleared for any non-ethical and racial statements. An optimal size of the questionnaire was adopted for the study.

3.6. Variables / Indicators

The variables in the model are;

- Intentions to smoke
- Recognition with the source of the pro tobacco message
- Frequency of pro-tobacco message delivered
- Agreement with the message; pro-smoking advertisements
- Receptivity of pro-tobacco advertisements
- Recognition with the source of the anti-tobacco message
- Frequency of anti-tobacco message delivered
- Agreement with the message; Anti-smoking advertisements
- Receptivity of anti-smoking advertisements
- Awareness of laws and rules (social and organizational restrictions)

3.7. Calculation mechanism of variables

- Recognition with the source of the pro tobacco message

In real life the advertisements had spillover effect that it increases awareness and deliver any particular type of message. Exposure (number of times which individual have seen the message) of anti-smoking advertisements measurement scale is previously used by GYTS (Global Youth Tobacco Survey) ¹². In this calculation five different types of sources are discussed like TV & movies, internet, shopping stores, newspapers & magazines and billboards.

- Frequency of the pro tobacco message delivered

A frequency of the message seen in a year is asked just to see the recognition of the times message seen ^{2, 17}. Higher the frequency represents the ease of recognition of that message. This information is used to form an indicator named Effective Frequency, which is expected to have positive relationship with future intention to smoke and greater association with it, as compared to the original variable. This quantitative variable can be used in the form of qualitative variable.

- Receptivity of pro-smoking advertisements

The measurement scale shows the response of the viewer is return of advertisements. There are two questions asked first one asking two scale responses about having bought any product with tobacco product logo on it and second one five scale question asking future chances of buying one product. The second question is expanded to five scale from four scale to give respondent a wider scope of answers for their future related action. The questions like “what is your favorite brand? And what brand of cigarette will you prefer to buy?” are dropped out of the model. The results are placed into the model in the form of individual variables. The sign of this variable is expected to have positive sign as present product buying can tempt the individual to buy tobacco product in future. Both questions are dummy variables ¹⁷.

- Agreement with the message; pro-smoking advertisements

The acceptance of the delivered messages is tested on the five scale statements. The agreement with every statement is entered into the model as separate variable. This concept is adopted as agreement is asked in the case of anti-smoking advertisements also, discussed later. Instead of measuring stress and depression the statement like “*Smoking decreases stress and is a solution for depression*” is asked for agreement. Hence if the individual has a perception that stress and depression can be relieved by smoking then he will go for smoking whenever an individual feels stress or depression. The higher the agreement means value more the chances that the individual will opt to smoke; hence a positive sign are expected. It ranges from 1 to 5 ².

- Recognition with the source of the anti-tobacco message

Similar to the pro tobacco recognition variable this variable is also calculated against the anti-tobacco messages. It is expected to have negative relation with the future intention to smoke.

- Frequency of the pro tobacco message delivered.

The frequency of the anti-tobacco message delivered is calculated and converted into the effective frequency of anti-tobacco message and it is expected to have negative relation with the future intention to smoke and higher negative correlation as compared to the original variable.

- Receptivity of anti-smoking advertisements

Just like pro-smoking case, the receptivity of anti-smoking is also tested with the question like” have you ever attempted any kind of anti-smoking seminar, activity or campaign?” for a two scale answer. The answers are placed in the model as it is. This variable will probably have negative sign. It is a dummy variable.

- Agreement with the message; Anti-smoking advertisements

Agreement variable adopted from past studies which checks the extent of agreement with the issues that are delivered by the anti-smoking advertisement. There are six statements having five scale options instead of four scale question for the sake of wider scope. The results are placed in the model. It will be expected have negative sign and range from 1 to 5².

- Awareness of laws and rules (social and organizational restrictions)

The awareness with the social and organizational restrictions can also make the individual to stop to commit to smoke. That's why there are two questions like "there is a fine when you are caught smoking in public places? And the institution where you belong is smoking free?" thus two scale answer is demanded. This variable imposes a negative expected effect on the intention to smoke. It ranges from 0 to 1.

- Intentions to smoke,

According to prior studies, intention to smoke is a valid predictor of smoking initiation. The adapted question is further expanded to a five scale questions are asked. This variable is considered as the dependent variable. It ranges from 1 to 5².

3.8. Data analysis mechanism

- Advertisement Sources

In the survey respondents are asked to identify which is the most prominent source for the anti and positive smoking messages, as there was option for "no source" it means if respondent marks some source, the message gets recognized by the respondent, also within the survey the frequency of the message received per source is observable.

In the following positive smoking messages related spider graph in table 1, it can be seen that only Movies & TV are the only the source which delivers highest frequency of positive smoking messages. While analyzing the anti-smoking messages in spider graph, here TV & Movies and Newspapers & Magazines are prominent source of anti-smoking related messages.

Within the anti-smoking messages "Smoking causes heart diseases, strokes and shortens the life span" and "Smoking or exposure to smoke is extremely dangerous during pregnancy" were well noticed by the respondents and within Positive smoking messages "Smoking is a symbol of courage and passion" was well noticed.

- Effective Frequency

As only non-smokers' future decision to smoke is focused, hence the normalized effective frequency is used; here we can see those positive messages in figure 2, the message 7, message 9 and message 11 more than average effectiveness i.e. higher frequency matched with higher agreement. For the case of anti-smoking messages, the higher frequency message 2 and message 12 are backed by higher agreement.

- Effects of Characteristics on Intention to smoke

Curve estimation on the scatter plots in figure 3 reveal that effect of being Female (Gender), attending Seminar and knowledge of antismoking law reduces the intentions to smoke in future, the results are as expected. Whereas within the survey sample, education level does not play any role in effecting the future intention to smoke.

- ANOVA results

Following are the results of the separate ANOVA analysis on both Anti and Positive smoking advertisements against the sources of messages.

Form the table 1, where the degrees of freedom are the number of sources, messages and error respectively, it is seen that the positive smoking messages are not significant statistically and the sources of the positive smoking messages are statistically significant. Here to find the most different source of message the mean variation of each message is arranged in the ascending order in mean variation of sources in the table 1. For this, if the difference between the immediate two values of mean variation is greater than the value generated from the Least Significance Difference Test then the particular source is reason that all the sources are become statistically significant. Here Least Significant Difference is calculated¹⁸

$$LSD = t_{\alpha/2 (v)} \sqrt{\frac{2(MSE)}{r}}$$

Hence it can be seen that the source named Movies and TV is statistically significant hence only this will be used in the regression analysis so that the limited sample size does not create any problem.

From the ANOVA analysis of the anti-smoking messages results are represented in the table 1. It can be seen that for this, the anti-smoking messages are not statistically significant and the sources are statistically significant and using the difference in the mean variation in table 1, Movies & TV, and newspapers & magazines are different from all, hence will be used in the regression analysis.

- Regression analysis

A multinomial regression analysis will be done having change in future behavior, as a dependent variable. Its coefficients will represent the likeliness of change in the behavior. All the variables which passed through the ANOVA as significant are used in the regression analysis. For the judgment of behavioral type decision having limited and discrete outcomes a multinomial logit model as used by some studies^{2,3}.

The model is given below;

$Y = f$ (frequency of anti and positive smoking advertisements on TV & movies, frequency of anti smoking advertisements from newspapers & magazines)

Where, Y = future intention to smoke

The dependent variable is the individual's future intention to smoke, and it is defined as following cases:

| | | |
|------------------------|------------------------|--------------------|
| Definitely not (y = 0) | Probably not (y = 1) | Don't know (y = 2) |
| Probably yes (y = 3) | Definitely yes (y = 4) | |

These OLS results in table 2 are used as benchmark for the appropriate combination of variables which is sought to be used in the Multinomial Logit Model. According to these results the Anti-Smoking Advertisements from TV & Movies and Newspaper & Magazines have significant impact in reducing the probability to smoke, other smoking intervention variables are Education and Anti-smoking law awareness which are also significant in controlling the future intentions to smoke, here only merchandise purchase comes out as indicator which is promoting the future smoking decision, whereas the Positive smoking advertisements from TV & Movies is not significant in increasing the chances to smoke in future. This regression is free of Multicollinearity but there is Heteroskedasticity which is expected when the dependent variable is discrete and qualitative dummy.

3.9. Interpretation

The interpretation of multinomial Logit model is very difficult hence it is only interpreted by converting it into its marginal effects (this study has used Elasticities). The estimated regression is decomposed in to 5 regressions each are estimated against the probability of particular behavior outcome to happen. Here it should be noticed that the pro smoking related variable is expected to become irrelevant or in other words irritating of the respondent if he / she has already decided to smoke in future, similarly for the case of anti-smoking related messages.

The R^2 is 0.492 showing that only 49% of the variation in the dependent variable of future decision to smoke is explained by the independent variables. For a Multinomial model the overall significance is represented by the Chi-squared value this is also significant at 1%.

The model results are in terms of Elasticities of 5 outcomes of behavior tested against Positive TV & Movies, Anti TV & Movies, Anti Newspaper & Mag., Education, Law awareness and History of Merchandise Purchase.

These results shows that only history of merchandize purchase has partial positive impact in increase the chances to smoke in future. But still this merchandise purchase, anti-smoking law awareness and positive smoking messages on TV & movies does not have linear impact on future behavior.

On the other hand, the anti-smoking messages like messages on TV & Movies and Newspaper & Magazines also increase in education have significant linear impact on the future intensions such that it increases the probability to not to smoke and decreases the probability to smoke in future.

The results of Positive smoking advertisements, merchandise purchase and anti-smoking law awareness is not similar as other variables because of following reasons, the first one is that the target sample is non-smokers and according to this characteristic the pro smoking advertisement will generally have minimal effect on them. Secondly the pro smoking advertisement in the significant source of advertisement i.e. TV and movies is already very rare, most of the countries had banned it.

4. Conclusion and Results

This study proceeded with its objective to use health belief model and evaluate the potency of pro and anti-smoking advertisement sources and their influence on human decision to smoke. Since the dependent variable of decision to smoke is ordinal and discrete with 5 stages hence Ordinary least square procedure is only used as a comparison tool to evaluate the significance of the independent variable used. For this particular type of dependent variable, this study has used Multinomial Logit Model which estimated 5 equations with dependent variable of probability of individual to decide a particular option.

After constructing a survey and questionnaire according to the health belief model (i.e. prediction of future health related behavior by evaluating degree of significance exposure, recognition, agreement and receptivity of the pro- and anti- tobacco advertisements) it is concluded that for health related behavior change only anti-smoking messages and education have consistent effect of discouraging future intentions to smoke. This consistency indicates throughout the 5 decision stages from definitely smoke to definitely not smoke the effect of anti-smoking messages on television & movies and newspapers & magazines have negatively effect on probability to smoke and positively affected the probability of not to smoke.

Hence to stop non-smoking youth to indulge in smoking, advertisements on television and newspaper and education for harmful effects of smoking should be used as primary tool. The role of these indicators is to increase the perceived cost of the smoking behavior in the youth. Future intention to smoke means for the individual the perceived benefits outweigh the health related costs of smoking.

From the results it can be seen that positive advertisements and messages are not an important factor that determines the future decision to smoke among all the sources of advertisements, the firms (advertisers) which use only TV & Movies are marginally significant this is only because the smoking messages in movies are not been strictly regularized. Thus in order to completely stop pro smoking advertisements to influence young ones then this source should be banned too.

Conflict of interests: For this paper no funding source has been used, and there is no conflict of interest in the study
Authors Contributions: There are three authors in the study which have equally contributed in the construction of this study from construction of the idea and its questionnaire to the collection of data and its analysis

References

1. Schiffman, Kanuk. *Consumer Behavior*, 9th edition, Pearson Education, 2007.
2. Straub D.M, Hills N.K, Thompson P.J, Moscicki A.B. Effects of pro-and anti-tobacco advertising on nonsmoking adolescents' intentions to smoke. *Journal of Adolescent Health*, 2003; 32(1): 36-43.
3. Nguyen A.N, Taylor J. Post-high school choices: New evidence from a multinomial logit model. *Journal of Population Economics*, 2003; 16(2): 287-306.
4. Economics and Smoking. A Minority View. <http://www.gmu.edu/departments/economics/wew/articles/07/smoking.html>. Published March 14, 2007.
5. The Economics of Smoking. Econlib. <http://www.econlib.org/library/Features/feature5.html>. Published June 28, 2000.
6. Hochbaum, Rosenstock, Kegels. *Health Belief Model*. U.S. Public Health Services, 1950s.
7. Doroodian Khosrow, Seldon Berry J. Advertising and cigarettes consumption. *Eastern Economics Journal*, 1991; 17 (3): 359-366.
8. McVey D, Stapleton J. Can anti-smoking television advertising affect smoking behaviour? Controlled trial of the Health Education Authority for England's anti-smoking TV campaign. *Tobacco Control*, 2000; 9(3): 273-282.
9. Cummings M.K, Sciandra R, Markello S. Impact of a Newspaper Mediated Quit Smoking program. *American Journal of Public Health*, 1987; 77(11): 1452-1453.
10. Thrasher J.F, Hammond D, Fong G.T, Arillo-Santillán E. Smokers' reactions to cigarette package warnings with graphic imagery and with only text: a comparison between Mexico and Canada. *Salud publica de Mexico*, 2007; 49: 233-240.

11. Bajde D, Vida I. The Impact of Ad Characteristics on Adolescents' Attitudes towards Antismoking Ads. *Managing Global Transitions*. 2008; 6(1): 75-93.
12. Siziya S, Rudatsikira E, Muula A.S. Antismoking messages and current cigarette smoking status in Somaliland: results from the Global Youth Tobacco Survey 2004. *Conflict and health*, 2008; 2(1): 6.
13. Pechmann C, Reibling E.T. Antismoking advertisements for youths: an independent evaluation of health, counter-industry, and industry approaches. *American Journal of Public Health*, 2006; 96(5): 906 - 913.
14. Popham W.J, Potter L.D, Bal D.G, Johnson M.D, Duerr J.M, Quinn V. Do anti-smoking media campaigns help smokers quit? *Public Health Reports*, 1993; 108(4): 510 -513.
15. Parel C.P, Caldito G.C, Ferrer P.L. Sampling design and procedures, 1973.
16. King III C, Siegel M, Celebucki C, Connolly G.N. Adolescent exposure to cigarette advertising in magazines: an evaluation of brand-specific advertising in relation to youth readership. *Jama*, 1998; 279(7): 516-520.
17. Pierce J.P, Gilpin E, Burns D.M, Whalen E, Rosbrook B, Shopland D, Johnson M. Does tobacco advertising target young people to start smoking?: evidence from California. *Jama*, 1991; 266(22): 3154-3158.
18. Chaudhry Sher M, Shahid K. *Introduction to Statistical Theory Part II*. Lahore: Ilmi Kutab Khana, 2009.

Figures

Figure 1. Frequency of Advertisements.

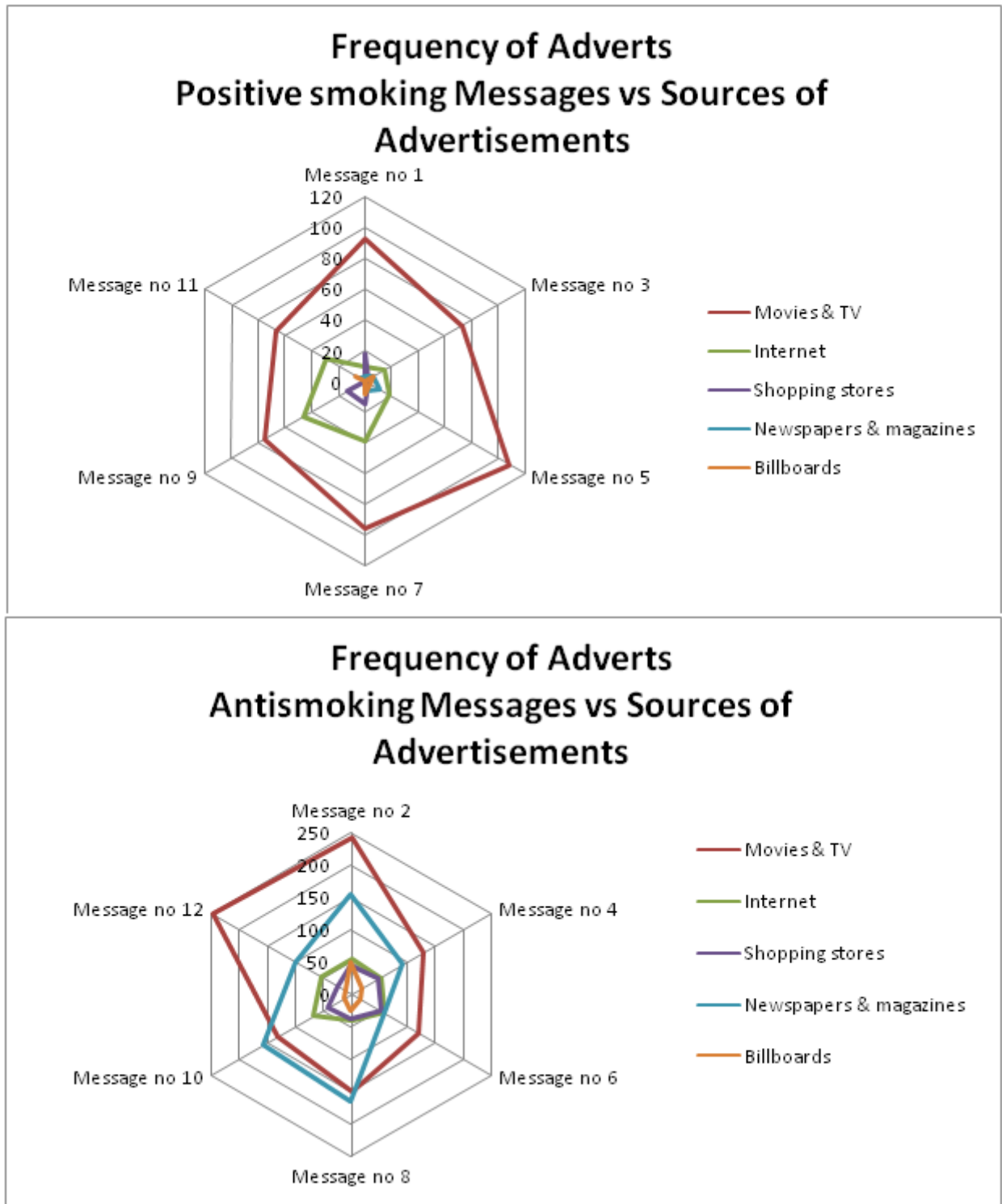


Figure 2. Effective Frequency

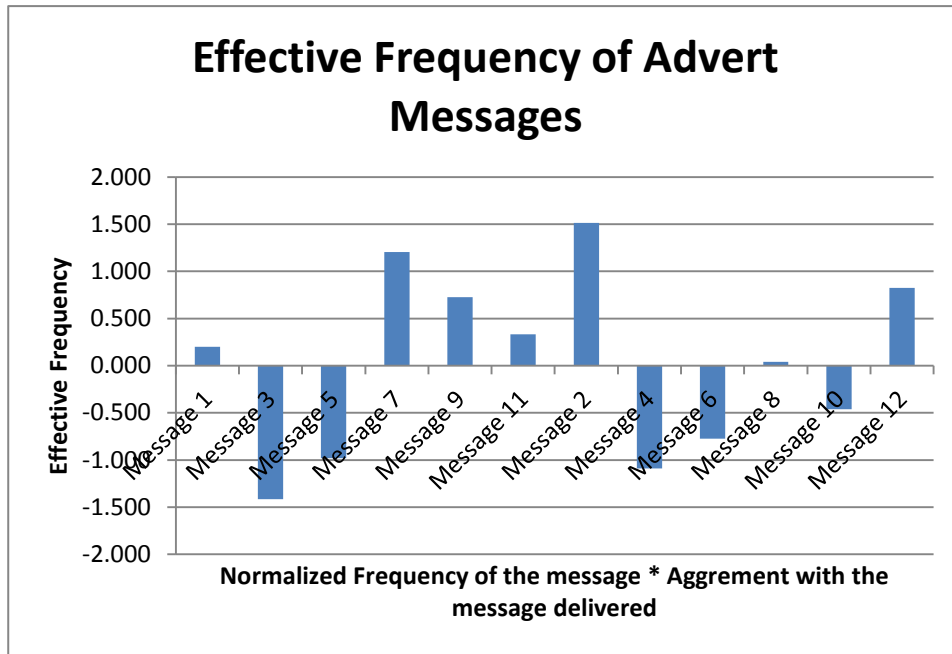
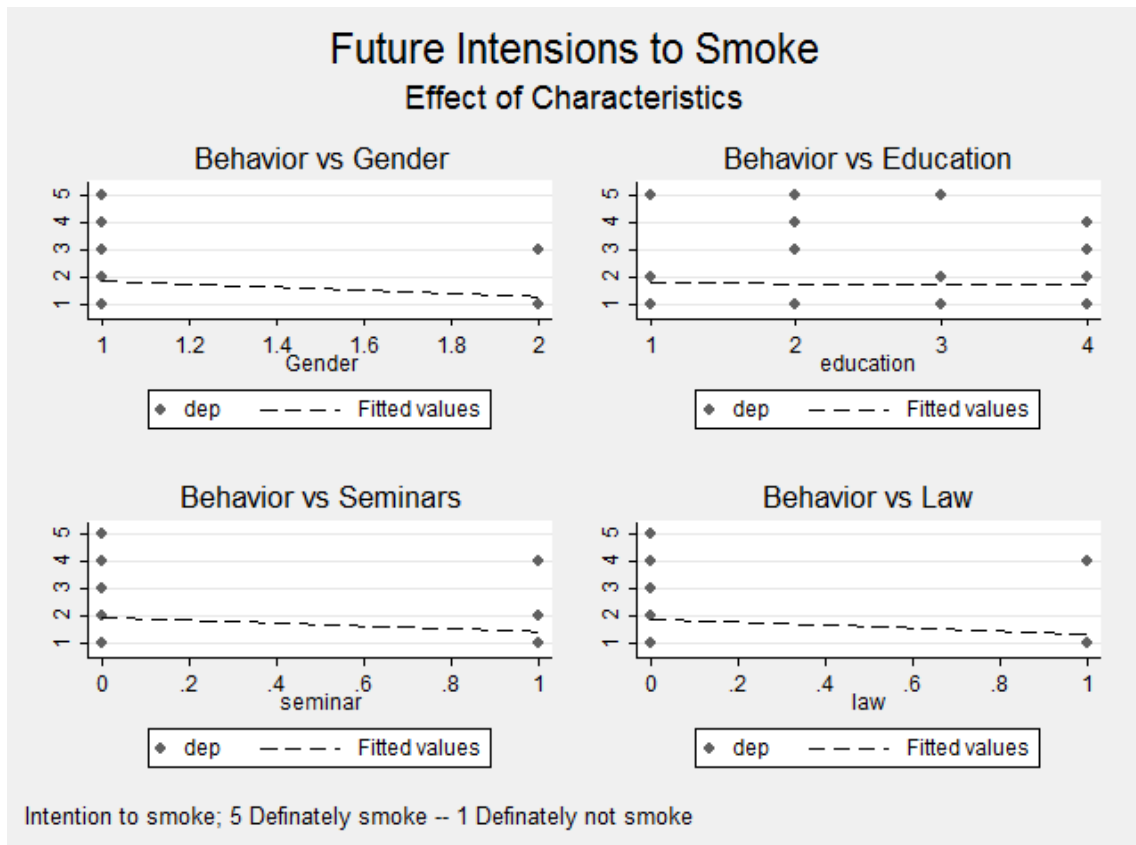


Figure 3. Effect of Characteristics on Smoking



Tables:

Table 1. ANOVA calculation for Positive and Anti-Smoking messages

| ANOVA of Positive Smoking Messages | | | | |
|---|-------------------|---------------|--------|---------------------|
| Source of variation | Degree of freedom | Sum of Square | F | F _(5,25) |
| Sources | 5 | 38617.3 | 39.43* | 3.13 |
| Messages | 5 | 550 | 0.56 | 3.13 |
| Error | 25 | 4896.6 | | |
| Total | 35 | 44064 | | |
| Mean variation in the sources | | | | |
| Sources | Mean Variation | Difference | | |
| Billboards | 4.167 | | | |
| Newspapers and magazines | 5 | 0.832 | | |
| Shopping stores | 8.67 | 3.67 | | |
| Internet | 25.83 | 17.16 | | |
| Non media* | 71.17 | 45.34 | | |
| Movies and TV* | 85.17 | 14 | | |
| LSD = 19.8 at $\alpha = 5\%$ | | | | |
| ANOVA of Anti Smoking Messages | | | | |
| Source of variation | Degree of freedom | Sum of Square | F | F _(5,25) |
| Sources | 5 | 101671.47 | 17.29* | 3.13 |
| Messages | 5 | 3508.47 | 0.59 | 3.13 |
| Error | 25 | 29400.36 | | |
| Total | 35 | 134580.30 | | |
| Mean variation in the sources | | | | |
| Source | Mean variation | Difference | | |
| Billboards | 21.67 | | | |
| Non media | 35.17 | 13.5 | | |
| Shopping stores | 40.83 | 5.86 | | |
| Internet | 54.5 | 13.67 | | |
| Newspapers and magazines* | 120.5 | 66* | | |
| Movies and TV* | 169.17 | 48.67* | | |
| LSD = 48.45 at $\alpha = 5\%$ | | | | |
| *Sources are statistically different | | | | |

Table 2. OLS and MNL Estimates

| OLS Estimates (Dependent variable Future Intentions to smoke) | | | | | |
|--|---|---------------------------|-------------------------|---------------------------|-----------------------------|
| Variable | Coef. (Std Error) | | T value | VIF | |
| | | | (Prob.) | | |
| Constant | 3.08 (0.29) | | 10.45 (0.00) | | |
| Pro TV & Movies | 0.05 (0.07) | | 0.82 (0.42) | 1.12 | |
| Anti TV & Movies | -0.37 (0.07) | | -5.08 (0.00) | 1.18 | |
| Anti Newspaper & Mag. | -0.32 (0.06) | | -5.23 (0.00) | 1.23 | |
| Education | -0.15 (0.08) | | -1.81 (0.07) | 1.38 | |
| Law awareness | -0.56 (0.18) | | -3.05 (0.00) | 1.12 | |
| Merchandise Purchase | 0.46 (0.17) | | 2.82 (0.00) | 1.20 | |
| Post Regression Diagnostics | | | | | |
| R ² = 0.25 | | RMSE = 1.11 | | White test Prob. = 0.00 | |
| Health Behavior Elasticities Multinomial Logit Model | | | | | |
| | Elasticity (Prob.) of P(Intention to smoke = i) | | | | |
| P(Intention to smoke) | Definitely not (i=1) | Probably not (i=2) | Don't know (i=3) | Probably yes (i=4) | Definitely Yes (i=5) |
| Pro TV & Movies | -2.00 (0.05)* | -2.93 (0.00)* | 19.90 (0.00)* | -5.51 (0.00)* | -2.16 (0.00)* |
| Anti TV & Movies | 0.002 (0.99) | 0.25 (0.37) | 0.26 (0.71) | -106.4 (0.00)* | -1.45 (0.00)* |
| Anti Newspaper & Mag. | 0.91 (0.00)* | -0.32 (0.30) | -23.77 (0.00)* | -34.21 (0.00)* | -0.50 (0.11) |
| Education | 2.04 (0.00)* | 0.11 (0.88) | -1.05 (0.44) | -18.71 (0.00)* | -0.58 (0.43) |
| Law awareness | -0.12 (0.00)* | -5.36 (0.00)* | -5.50 (0.00)* | 0.93 (0.00)* | -5.35 (0.00)* |
| Merchandise Purchase | 0.19 (0.50) | 0.95 (0.00)* | -7.03 (0.00)* | -19.23 (0.00)* | 0.86 (0.00)* |
| Average Marginal Elasticities calculated after robust Multinomial Logit Model | | | | | |