Abstract
According to the theory of Psychological Reactance, anti-tobacco warning messages are perceived as a threat to individual's freedom to choose among behavioral alternatives which may elicit resistance to desirable behavioral change. Similar to the previous studies, we have investigated the psychological effects of text-only; graphic and text together warning messages; and to take a step further we also examined anti-smoking public service announcements which are official government interventions that combine information with fear appeals. The findings show that smokers who were exposed to those public service announcements experienced significantly more reactance than the other participants.

Keywords: Smoking Behavior, Psychological Reactance Theory, Public Health, Warning Messages

Smoking Behavior
Tobacco use has been identified by the World Health Organization as the leading cause of death and disability (Murray & Lopez, 1997). The Center for Disease Control and Prevention reports that cigarette smoking is responsible for approximately 443,000 premature deaths annually. In all its parts, smoking is one of the biggest public health problems. Since the discovery of the hazardous effects of smoking on health, several methods have been tried to struggle with this addiction. Restrictive measures, smoking cessation programs, health education for the community and other methods are all conducted almost all over the world. The common point of all these efforts is ‘the right to know’. The WHO Framework Convention on Tobacco Control’s guiding principle is that “every person should be informed of the health consequences, addictive nature and mortal threat posed by tobacco consumption and exposure to tobacco smoke” (WHO, 2003). Indeed previous studies revealed that smokers who are more aware of these risks are more motivated to quit (Romer & Jamieson, 2001). Therefore, to reduce the smoking rate, in many countries it is required that cigarette packs must contain text-only or graphic health warnings that inform consumers about the dangers of smoking. Warning labels are good for communicating with smokers directly, and in addition, when compared to the other smoking control policies, warning labels can be an extremely cost-effective educational intervention (Thrasher, Hammond, Fong & Santillan, 2007). Text-only warnings are more informative than the graphics, but, compared to text-only warnings, graphic warnings are more likely to be noticed by smokers, are rated as more effective, elicit greater negative thoughts and feelings about smoking, and are more likely to be cited as a source of motivation to quit (Hammond, Fong, McDonald, Brown, & Cameron, 2004a, 2004b; Hammond, Fong, McDonald, Cameron, & Brown, 2003; Kees, Burton, Andrews, & Kozup, 2006; White, Webster, & Wakefield, 2008). Besides giving information to the target audience about the main
Psychological Reactance Theory & Tobacco Control Policies

Psychological reactance theory explains human behavior in response to the perceived loss of freedom in an environment. A freedom is defined, briefly, as a belief that one can engage in a particular behavior. Freedoms include what one does, how one does it, or when one does it (Brehm & Brehm, 1981). Psychological reactance, as a motivational state, is aroused by a threat to a particular freedom. It is not just any freedom, but particularly the freedom which is threatened in an environment or a situation. Examples may be to buy House A rather than House B from real estate agents or to read Magazine A rather than Magazine B. In other words, reactance theory deals with specific, discrete behavioral and attitudinal freedoms that people act upon in everyday life. Threats can be defined as any kind of attempted social influence, any kind of impersonal event, and any behavior on the part of the individual holding the freedom (including his or her preferences) that work against exercising the freedom (Brehm & Brehm, 1981). Threats to freedom may be social influence attempts such as various sales pressures from real estate agents or impersonal barriers such as the high probability of the sale of a particular house among alternatives to another party. There are two mediators of the reactance process, which are presence or absence of freedom, and importance of freedom (Clee & Wicklund, 1980). For reactance to be aroused either by social influence attempts or barriers there must first be an expectation of free choice; presence or absence of freedom in other words. Besides the presence of freedom, the more important the freedom, the more reactance is generated due to personal or impersonal threats. The theory advocates that if an individual’s freedom is threatened, he or she will become motivationally aroused to restore it. (Brehm & Cole, 1966; Brehm, 1989; Clee & Wicklund, 1980). Reactance theory is applicable to any situation as long as one expects a measure of freedom to act in a given situation and some threat arises that infringes upon that freedom. Primarily, psychological reactance theory is a social psychological approach and at the beginning applications of the theory were in this area. Since, the theory has become a reference point for many other disciplines which aim to shed light on human behavior. Particularly some studies on public health, such as smoking (Grandpre, Alvaro, Burguno, Miller & Hall 2003), family sun safety (Buller, Borland & Burgoon 1998) and drunken driving (Dillard & Shen 2005), have come to take the theory to be applicable to make the results of their practices closer to the expected. Public health experts had focused on attitudinal and behavioral change for years before they understood that these theoretical approaches are restricted, consequently reactance mechanism became an appropriate way out. Due to the failure of health campaigns which aim to make behavioral change, significance of understanding the reactance at individual level becomes apparent. And recently for many researchers, exposure to cigarette health warnings may elicit a defensive, maladaptive psychological response in some smokers, known as reactance. This reactance may negatively impact smoking attitudes and behavior (Wiium, Aaro, Hetland 2009; Erceg-Hurn & Steed 2011).

Reactance as a psychological tendency may differ in individuals’ characteristic potential for reactance. Hong & Page’s (1989) reactance scale is developed for this kind of trait (dispositional) reactance. Reactance is also generated by situational factors so that Shen and Dillard (2005) have developed a scale for ‘state reactance’ which is the combination of anger and negative cognitions. According to the theoretical framework of reactance studies the degree of nicotine dependence is effective on state reactance (Miller, Burguno, Grandpre, & Alvaro, 2006). Obviously both dimensions of reactance can negatively affect tobacco control policies’ efficiency.
Reviewing the literature, despite the fact that researchers have a general agreement on the helpfulness of graphic warning messages and public service announcements, the expected consequence of decreasing rate of tobacco addiction does not occur. There are merely a few studies which argue that the psychological reactance may be the reason between the expected and the actual situation. Our aim is to determine whether the aforementioned gap could be explained by psychological reactance. Accordingly, we have prepared five research questions.

**R1:** Is there a relationship between trait reactance and state reactance? If yes, how does trait reactance affect state reactance?

**R2:** Is there a relationship between the individual’s nicotine dependence degree and state reactance? If yes, how does the individual’s nicotine dependence degree affect state reactance?

**R3:** Is there a difference among the degree of state reactance elicited by public service announcement video, graphic and text together warning label, and text-only warning label?

**R4:** Is there a relationship between the individual’s state reactance and thinking of quitting smoking after seeing the warning messages?

**R5:** Is there a difference between the effect of warning messages on the first person’s (self) intention to quit smoking and the believed effect on the third person’s (others) intentions to quit smoking?

**Method**

This study is exploratory and descriptive in nature as not much has been done previously in the topic especially in Turkey.

**Participants**

Data collected from three state universities in Turkey (Anadolu University, Osmangazi University and Trakya University). The sample on which analyses were performed consisted of 520 students. Similar numbers of men ($N = 301; 57.9\%$) and women ($N = 219; 42.1\%$) participated in the study, ranging in age from 16 to 38 years ($M = 23$ years; 17.3\%).

<table>
<thead>
<tr>
<th>Age Groups</th>
<th>Frequency</th>
<th>(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Below 20</td>
<td>58</td>
<td>11.2</td>
</tr>
<tr>
<td>20-25</td>
<td>394</td>
<td>75.8</td>
</tr>
<tr>
<td>26 and above</td>
<td>68</td>
<td>13.1</td>
</tr>
</tbody>
</table>

**Table 1. Age of Participants**

<table>
<thead>
<tr>
<th>Duration of Smoking</th>
<th>Frequency</th>
<th>(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 year or below</td>
<td>35</td>
<td>6.7</td>
</tr>
<tr>
<td>2 - 5 years</td>
<td>278</td>
<td>53.5</td>
</tr>
<tr>
<td>6 – 10 years</td>
<td>178</td>
<td>34.2</td>
</tr>
<tr>
<td>Above 10 years</td>
<td>29</td>
<td>5.6</td>
</tr>
</tbody>
</table>

**Table 2. Smoking Duration of Participants**

All participants are smokers. As the sample is taken from university students, duration of smoking in years is gathered between 2 and 10 years.

**Apparatus and Measures**

Three kinds of warning messages (public service announcement, graphic warning labels, text-only warning labels) are used randomly in the surveys. All warning messages were selected with the same content. The message was "smoking cessation reduces the risk of fatal heart and lung diseases". The message was only designed to inform participants and did not include emotional components.
Trait reactance: Trait reactance was measured using the 14-item version of the Hong Psychological Reactance Scale (HPRS; Hong, 1992; Hong & Faedda, 1996; Hong & Page, 1989), which includes items such as “I resist the attempts of others to influence me,” and “When someone forces me to do something, I feel like doing the opposite.” The scale was internally consistent (Cronbach’s Alpha = 0.78). All questions related to trait reactance were measured by a scale 1 =totally disagree to 5 =totally agree.

State reactance: State reactance was assessed by adapting Dillard and Shen’s (2005) self-report anger scale. Participants were asked to rate how irritated, angry, annoyed, and aggravated the warnings made them on 5-point Likert-type scales. The scale was internally consistent (Cronbach’s Alpha = 0.77). All questions related to state were measured by a scale 1 =totally disagree to 5 =totally agree.

Nicotine dependence: Nicotine dependence was measured by a slightly revised version of Fagerström’s nicotine dependence scale (1990). (0-4 points=Low nicotine dependence, 5-8 points=Medium nicotine dependence, 9-12 points=High nicotine dependence). The scale was internally consistent (Cronbach’s Alpha = 0.70).

Results
As can be seen in Table 4, participants have mostly emphasized the importance of freedom which lets them act of their own will and how they feel when the freedom of choice is restricted by others. Accordingly, out of fourteen statements, “I become angry when my freedom of choice is restricted” has received the highest mean score of 4.32 out of a five point Likert scale. Nevertheless, resistance against the rules and advices are slightly low when they are compared with the other expressions. Though, ‘I consider advice from others to be an intrusion’ has the lowest rate with 2.34. These results show that our sample is sensitive about the phenomenon of freedom but it is more about the characteristics they have, not so much about the other people or other social forces. It seems like deciding and acting on their own choices are important and desirable for them but the resistance degree against the rules, advice or any other interventions is weaker than expected. Especially, their aim to break the rules is relatively weak in the statement ‘When something is prohibited, I usually think “that’s exactly what I’m going to do” as shown by the mean score of 2.99. Due to the given data, it is acceptable that the participants have moderate levels of reactance.

The scale was subjected to exploratory factor analysis. Results indicated two factor structure, namely independent decision making (variance exp. 31.74) and rules and restrictions (variance exp. 14.34), explaining just over 46 per cent of the variance in the construct.

State reactance phenomenon, which is known as a complement of the reactance theory, is hard to measure. Brehm, who is the founder of the psychological reactance theory (1981), claimed that the theory cannot be measured at all. In our study, state reactance degree was measured by anger aspect only. Based on the psychological reactance theory; statements had been listed from bottom to top to represent the intensity of anger. Table 5 shows that warning messages elicit a noticeable reactance on our sample.

<table>
<thead>
<tr>
<th>Warning Message Type</th>
<th>Frequency</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Text-only</td>
<td>160</td>
<td>30.8</td>
</tr>
<tr>
<td>Graphic</td>
<td>188</td>
<td>36.2</td>
</tr>
<tr>
<td>Public Service Announcement Video</td>
<td>172</td>
<td>33.1</td>
</tr>
<tr>
<td>Total</td>
<td>520</td>
<td>100.0</td>
</tr>
</tbody>
</table>
Table 4. Hong Psychological Reactance Scale (Hong, S. M., & Faedda, S. 1996).

<table>
<thead>
<tr>
<th>Statements</th>
<th>Mean</th>
<th>Std. Dev.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regulations trigger a sense of resistance in me.</td>
<td>3.37</td>
<td>1.38</td>
</tr>
<tr>
<td>I find contradicting others stimulating.</td>
<td>3.20</td>
<td>1.29</td>
</tr>
<tr>
<td>When something is prohibited, I usually think “that’s exactly what I’m going to do”.</td>
<td>2.99</td>
<td>2.68</td>
</tr>
<tr>
<td>The thought of being dependent on others aggravates me.</td>
<td>4.02</td>
<td>1.19</td>
</tr>
<tr>
<td>I consider advice from others to be an intrusion.</td>
<td>2.34</td>
<td>1.36</td>
</tr>
<tr>
<td>I become frustrated when I am unable to make free and independent decisions.</td>
<td>4.02</td>
<td>1.17</td>
</tr>
<tr>
<td>It irritates me when someone points out things which are obvious to me.</td>
<td>4.24</td>
<td>1.05</td>
</tr>
<tr>
<td>I become angry when my freedom of choice is restricted</td>
<td>4.32</td>
<td>1.01</td>
</tr>
<tr>
<td>Advices and recommendations induce me to do just the opposite.</td>
<td>3.00</td>
<td>1.35</td>
</tr>
<tr>
<td>I am content only when I am acting of my own free will.</td>
<td>4.29</td>
<td>1.01</td>
</tr>
<tr>
<td>I resist the attempts of others to influence me.</td>
<td>3.98</td>
<td>1.11</td>
</tr>
<tr>
<td>It makes me angry when another person is held up as a model for me to follow.</td>
<td>3.95</td>
<td>1.19</td>
</tr>
<tr>
<td>When someone forces me to do something, I feel like doing the opposite.</td>
<td>3.62</td>
<td>1.82</td>
</tr>
<tr>
<td>It disappoints me to see others submitting to society’s standards and rules</td>
<td>3.51</td>
<td>1.38</td>
</tr>
</tbody>
</table>

*Scale: 1 = totally disagree to 5 = totally agree.

Table 5. State Reactance - Measurement of Anger (Dillard & Shen, 2005)

<table>
<thead>
<tr>
<th>Statements</th>
<th>Mean</th>
<th>Std. Dev.</th>
</tr>
</thead>
<tbody>
<tr>
<td>While viewing/reading this message, I felt irritated.</td>
<td>3.20</td>
<td>1.38</td>
</tr>
<tr>
<td>While viewing/reading this message, I felt angry.</td>
<td>3.57</td>
<td>2.64</td>
</tr>
<tr>
<td>While viewing/reading this message, I felt annoyed.</td>
<td>3.85</td>
<td>1.25</td>
</tr>
<tr>
<td>While viewing/reading this message, I felt aggravated.</td>
<td>3.34</td>
<td>1.39</td>
</tr>
</tbody>
</table>

*Scale: 1 = totally disagree to 5 = totally agree.

Table 6. Respondents Level of Nicotine Dependence (Heatherton, Todd F. et al. 1991)

<table>
<thead>
<tr>
<th>Level of nicotine dependence</th>
<th>Frequency</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low</td>
<td>240</td>
<td>46.0</td>
</tr>
<tr>
<td>Medium</td>
<td>197</td>
<td>38.0</td>
</tr>
<tr>
<td>High</td>
<td>83</td>
<td>16.0</td>
</tr>
<tr>
<td>Total</td>
<td>520</td>
<td>100.0</td>
</tr>
</tbody>
</table>

*Details of calculation of nicotine dependence level can be found in Appendix
The scale was also subjected to the exploratory factor analysis. Reliability analysis indicated that “I felt irritated” item was distorting the factor structure. It was eliminated from the structure and reliability score Cronbach’s Alpha jumped from 0.77 to 0.88. Results showed one factor structure that explained over 80 per cent of the variance in the construct.

Good news from the results is that only 16 per cent of the respondent’s level of nicotine dependence is calculated to be high (Table 6). However, results also indicate that 70 per cent of the respondents smoke more than a half of pack a day.

**Exploring Research Questions**

The first research question explored the relationship between trait reactance and state reactance. Correlation analysis indicated that there is a statistically strong positive relationship between the *rules and restrictions* component of the trait reactance ($r=0.475$, $p<0.001$) and a statistically weak positive relationship between the *independent decision making* component of the trait reactance ($r=0.083$, $p<0.05$) and state reactance. In order to delve further into the relationship, a multiple linear regression analysis was calculated to predict state reactance based on *rules and restrictions* and *independent decision making* components of trait reactance. Results showed a significant regression equation ($F=78.3$, $p<0.001$ with a $R^2=0.232$). The analysis showed that both components of trait reactance significantly predicted state reactance (*rules and restrictions*: $\beta=0.48$, $t=12.3$, $p<0.001$), (*independent decision making*: $\beta=0.083$, $t=2.16$, $p<0.05$). According to these results it is safe to argue that the *rules and restrictions* component explains more variations in the level of state reactance than the *independent decision making* component.

The second research question investigated the relationship between the individual’s nicotine dependence degree and state reactance. Correlation analysis indicated a statistically significant, but weak positive relationship ($r=0.174$, $p<0.001$). In order to explore this relationship further, a linear regression analysis was calculated to predict state reactance based on the individual’s nicotine dependence degree. Results indicated a significant regression equation ($F=16.1$, $p<0.001$ with a $R^2=0.03$), but the effect is very small.

The third research question compared the degree of state reactance elicited by public service announcement video; graphic and text together warning label; and text-only warning label. The results of a one way ANOVA test reveal that there are statistically significant differences among elicited state reactance by different mediums (Table 7).

The fourth research question investigated the relationship between the individual’s state reactance and thinking of quitting smoking after seeing the warning messages. Correlation analysis indicated that a statistically significant and moderate negative relationship ($r=-0.314$, $p<0.001$). This results indicates that at the stages of choosing message content and medium, managers and authorities need to beware of not eliciting reactance among audience.

<table>
<thead>
<tr>
<th>Medium</th>
<th>N</th>
<th>Mean</th>
<th>Std.Dev.</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Text only</td>
<td>160</td>
<td>3.46</td>
<td>1.18</td>
<td>12.34</td>
<td>0.001</td>
</tr>
<tr>
<td>Graphic and Text</td>
<td>188</td>
<td>3.32</td>
<td>1.19</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PSA-Video</td>
<td>172</td>
<td>3.92*</td>
<td>1.16</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Public service announcement video elicited more state reactance ($p<0.001$).

The last research question was aimed to see whether the effect of warning messages differs on the first person (self) and the third person (others). As can be seen in Table 8, the mean score of warning messages’ effect on the participant’s intention to quit smoking is substantially weak (1.78). However, respondents indicated that warning messages’ effect on third person is high. These scores are compared by repeated measures t-test. Test result is statistically significant ($t=23.12$, $p<0.001$).
This result can be explained by the argument which claims that ‘individuals may find the warning messages useful, moreover they may strongly support the use of these kind of messages in tobacco control policies or prevention studies, but when it gets to the point to quit smoking (especially the effect on themselves) they will describe them almost non-effective’ (Önsüz, 2009).

**Discussion**

Previous studies are inconclusive as to whether cigarette warnings elicit psychological reactance in smokers or not. Our study shows that it is possible for cigarette warnings to elicit state reactance. Furthermore, we have found that public service announcements elicit far greater state reactance than the other warning messages. It is important to consider what impact this reactance has on smoking behavior and beliefs about smoking.

The theory of psychological reactance predicts that if smokers believe their freedom to smoke is being impinged by warnings and reactance is elicited, they will be motivated to restore their freedom (Brehm & Brehm, 1981). We realized that our participants did not experience state reactance in extreme levels, but only that they have qualified them as ‘annoying’ (3.50/5.00). We believe that this is due to the sample’s low-nicotine dependence level. (Most of our participants’ level of nicotine dependence was low (46%), only 16% of them were qualified as highly addicted).

There are numerous ways in which reactant smokers could restore their freedom. One can be “digging in their heels” and becoming less motivated to quit smoking (Erceg- Hurn, Steed, 2011). Another would be to smoke more than they did previously. However, our sample did not act in this way. That result may be caused by the limitations of our study. Reactance has been conceptualized in the literature as a composite of negative cognitions and anger (Dillard & Shen, 2005), but only anger was measured in the current study. Another limitation is that participants in our study viewed warnings via survey and PC, rather than on actual cigarette packs or TV. This may have influenced the results.

Consistent with recent studies indicating that graphic anti-smoking warnings can elicit maladaptive psychological responses (Leshner, Bolls & Thomas, 2009), results confirmed that ‘Warning messages are non-effective’ on the first person. However, the effect on the third person is much more. We believe that utilizing a third person perception framework to assess effectiveness of anti-smoking warnings can be a fruitful further research avenue.

These findings highlight the importance of rigorously testing and improving public health interventions using experimental methods prior to disseminating the interventions to the public. Cigarette health warnings may yield substantial public-health benefits, but the reactance elicited by the warnings may jeopardize their effectiveness among some smokers.

**References**


APPENDIX Fagerström Nicotine Dependence Scale*

INSTRUCTIONS: For each question, circle your answer. Keep track of your points as you go.

1. How soon after you wake up do you smoke your first cigarette?
   a. Within 5 minutes (3 points)
   b. Within 6-30 minutes (2 points)
   c. Within 31-60 minutes (1 point)
   d. After 60 minutes (0 points)

2. Do you find it difficult to refrain from smoking in places where it is forbidden (e.g., in church, at the library, in cinema, etc)?
   a. No at all difficult (0 Points)
   b. Not difficult (1 Points)
   c. Difficult (2 Points)
   d. Very Difficult (3 Points)

   Revised (Used)                                      Original
   a. Not at all difficult (0 Points)                  a. Yes (1 point)
   b. Not difficult (1 Points)                        b. No (0 points)
   c. Difficult (2 Points)                            
   d. Very Difficult (3 Points)                       

3. Which cigarette would you hate most to give up?
   a. The first one in the morning (1 point)
   b. Any other (0 points)

4. How many cigarettes per day do you smoke?
   a. 10 or less (0 points)
   b. 11-20 (1 point)
   c. 21-30 (2 points)
   d. 31 or more (3 points)

5. Do you smoke more during the first hours after waking than during the rest of the day?
   a. Yes (1 point)
   b. No (0 points)

6. Do you smoke even when you are ill enough to be in bed most of the day?
   a. Yes (1 point)
   b. No (0 points)

Now add up your points. How did you score? ______


Original Scoring Key: A score of 5 or more indicates a significant dependence, while a score of 4 or less shows a low to moderate dependence.

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Our Revised Scoring Key:
  0-4= Low dependence
  5-8= Moderate dependence
  9-12=High dependence