

The Effect of Cigarette Plain Packaging on Individuals' Health Warning Recall

Effet de l'emballage neutre des paquets de cigarettes sur la capacité de retenir les avertissements de santé



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Abstract

Purpose: To examine the extent to which increasingly plainer packaging might increase recall of health warnings.

Design: A 4 (pack ID levels) x 2 (smoking status: smokers and non-smokers) between-subjects design in which participants were randomly assigned to view one package.

Sample: Two hundred and twenty students from three universities in Nova Scotia, Canada, participated in the survey.

Measures: Participants were asked to recall the health warning on their package.

Analysis: A sequential binary logistic regression test to examine whether plain packaging and/or smoking status affects health warning recall.

Results: The odds of recalling the correct health warnings were significantly higher for the two plainest packages relative to the original package. The odds of recalling the correct health warning were also higher for non-smokers relative to smokers.

Conclusions: The results provide compelling evidence that health warnings on plain packages can be more easily recalled.

Résumé

Objet : Examiner à quel point l'utilisation d'emballages plus neutres peut augmenter la capacité de se souvenir des avertissements de santé.

Conception : Un test d'effets inter-sujets 4 (niveaux d'identification des paquets) x 2 (usage du tabac : fumeurs et non-fumeurs) dans le cadre duquel les participants ont vu un paquet choisi aléatoirement.

Échantillon : Deux cent vingt étudiants provenant de trois universités néo-écossaises (au Canada) ont participé à l'étude.

Mesures : On a demandé aux participants de se souvenir du message d'avertissement de santé inscrit sur le paquet.

Analyse : Une analyse de régression logistique séquentielle binaire a été employée pour voir si l'emballage neutre et/ou l'usage du tabac affecte le souvenir des avertissements de santé.

Résultats : La probabilité de se souvenir d'un avertissement de santé donné était beaucoup plus élevée pour les deux types d'emballages les plus neutres comparativement au paquet original. La probabilité de se souvenir du bon message de santé était aussi plus élevée chez les non-fumeurs, par rapport aux fumeurs.

Conclusions : Les résultats prouvent que les avertissements de santé sur des emballages neutres peuvent être plus faciles à retenir.

THE GERMAN TOBACCO CONTROL CENTRE OF THE WORLD HEALTH ORGANIZATION (WHO) stresses the importance of combining strong images with written warnings on cigarette packs in order to motivate smokers to quit and to deter non-smokers from smoking. According to the Tobacco Control Centre's report, warnings should cover 50% or more of cigarette packages (Tuffs 2009). The WHO's Framework Convention on Tobacco Control (FCTC) requires that written warnings, pictorial warnings or a combination of both cover 30% or more of the front and back of a cigarette package (Kees et al. 2006). The inclusion of both visual warnings like those in Canada and written warnings like those in the United States can decrease the attractiveness of the package to consumers and create a high level of anxiety or fear in them (Kees et al. 2006).

In 1989, the Toxic Substances Board of the New Zealand Department of Health recommended selling cigarettes in white packages with no logos or colours and a standardized text to strip the packages of all design elements (Freeman et al. 2008). Those packages that are stripped of brand imagery are known as "plain packages." A number of Canadian public health officials argue that plain packaging, with just the name of the brand and no logos or colours, can focus consumers' attention on the health warnings on packs, and subsequently assist in reducing smoking rates (Feinleib 2001).

Several studies have demonstrated the usefulness of plain packaging in increasing consumers' attention to health warnings. A study by Goldberg and colleagues (1999) concluded

that plain packaging increases health warning recall for direct and brief messages but decreases recall for indirect and long messages. Similarly, Beede and Lawson's (1992) study concluded that adolescents demonstrated significantly higher accuracy in recalling health warnings on plain packs compared to branded counterparts for US brands but not NZ brands. A possible explanation for this result is that the health warnings on US brands (non-domestic because the study took place in NZ) were recalled because the participants were not familiar with the packs. As a consequence, they were not desensitized to the health warnings on these non-domestic packs and were more likely to pay attention to them. Further, the two studies were conducted in the 1990s, when health warnings were drastically smaller than current health warnings, and hence more studies have been conducted recently to generate temporally relevant results. Nevertheless, Goldberg and colleagues' (1999) and Beede and Lawson's (1992) work set the foundation for plain packaging studies.

Germain and colleagues (2009) conducted a study on the impact of plain packs on health warning recall. Their study concluded that increasing the size of pictorial health warnings on plain packs from 30% to 80% can reduce its pack appeal among smokers, non-smokers and experimenters. These three groups rated the cigarette package with bigger pictorial warnings – 80% warning size on the face of the pack – as having less positive package appeal compared to the package with a smaller (30%) pictorial warning size. Because Germain and colleagues' (2009) study compared a plain package to relatively plainer packaging with respect to health warning visibility, this team's results do not provide evidence comparing plain packages to original packages. Munafò and colleagues (2011) assessed the effect of plain packaging on the visual attention of smokers and non-smokers to health warnings on cigarette packages using eye-tracking methods. They concluded that plain packaging increases the visual attention of non-smokers and non-daily smokers to health warnings. Maynard and her team (2012) replicated Munafò and colleagues (2011) study with adolescents, and found that plain packaging increases visual attention of experimenters and weekly smokers but not daily smokers. Hoek and colleagues (2011) used online best–worst experimental methods to compare different levels of pack branding and health warning size. The authors found that participants were significantly less likely to choose packages that featured larger health warnings or fewer pack-branding elements. Hammond (2011) provided an extensive review of the evidence on the impact of health warnings, with a section on plain packaging. The plain packaging evidence in his review provided support for using it to increase health warning recall.

This study represents continuing efforts to test whether plain packaging increases health warning recall. It compares three levels of plain packaging to an original package with respect to health warning recall to add to the literature of plain packaging studies. It also examines how being a non-smoker could increase the odds of recalling health warnings. Given this body of knowledge and the aforementioned expectations, two hypotheses were formulated:

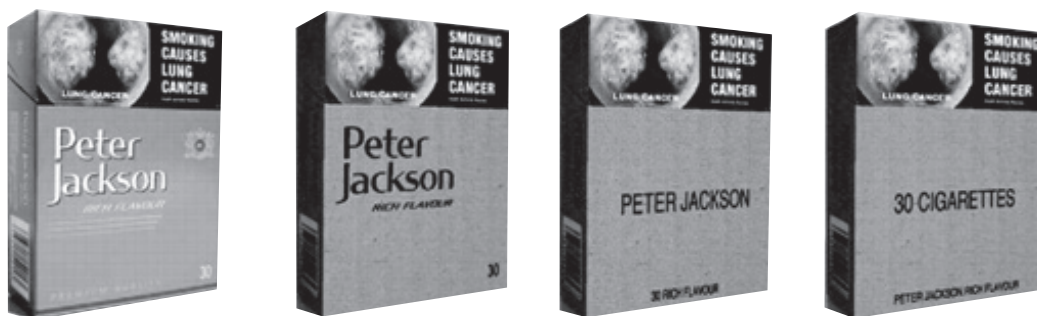
- Hypothesis 1: Participants will be more likely to recall health warnings on any of the plain packages compared to the original package.
- Hypothesis 2: Non-smokers will be more likely to recall health warnings compared to smokers.

Methods

Design

This study used a 2 (smoking status: smokers and non-smokers) x 4 (pack levels) between-subject design in which smoking status was a non-manipulated variable. The participants were randomly assigned to one of four packages (Figure 1). The first is the reference, which represents a regular package. The second is plain package 1, which preserved the orientation and font of the brand and its text but removed the logo and a red line on the bottom of the package. The third package is plain package 2, which standardized the orientation and font of the brand, and standardized and moved the brand text to the bottom of the package. The fourth package is plain package 3, which standardized the brand name and text, and placed them at the bottom of the package. The packages become progressively plainer from the first package to the fourth package.

FIGURE 1. Packs that were randomly assigned to study participants



Source: Wakefield, Germain and Durkin 2008; modified by permission from Dr. Wakefield.

Once the participants were randomly assigned their pack, they completed a brief seven-minute survey on their perceptions of the pack as a time-delay strategy. Then they were asked to answer a multiple-choice question to test their recall of the health warning.

Sample

The study population consisted of adult university students (19 or older) who attended three universities in Halifax Rural Municipality (HRM): Dalhousie University, Saint Mary's University and Mount Saint Vincent University. The three universities from which the popu-

lation was recruited included adults from different socio-economic statuses, cultural backgrounds and geographical locations. The sample was recruited through information sheets posted around the university campuses. Interested students were asked to read the online information letter that served as the informed consent and preceded the image of the package and the health warning question. The participants had the option to enter a draw for one of 30 pre-paid credit cards valued at \$25 each as an incentive to participate. The \$750 for the pre-paid cards was funded through Dalhousie University. Ethics approval for recruiting the participants in this study was sought through the ethics review boards of the three universities. A sample size of 120 was estimated for the perception questions based on a sample size estimations manual (small- to medium-size effects; $p=0.05$; power=0.90) (Cohen 1988).

Measures

The participants answered a single multiple-choice question to test their recall of the health warning on the package that was displayed to them. Each participant was asked to pick one of four health warning choices: "Smoking causes lung cancer," "Smoking kills," "Smoking causes impotence" and "Get help to stop smoking: Consult your doctor or pharmacist." All the packs displayed the same health warning, "Smoking causes lung cancer," because that was the text that appeared on the packs in the study by Wakefield and colleagues (2008), on which this study was based (with e-mail permission from Dr. Wakefield). To facilitate the analysis, participants' responses for the correct health warning were grouped together into group A; responses for the three false warnings were grouped into group B. The responses for the two groups of health warnings were compared across the four packages.

Analysis

Analysis was conducted using SPSS version 18.0. A preliminary analysis showed that the demographic variables as well as smoking status did not vary significantly across the four pack conditions. Therefore, none of these variables were controlled for in the logistic regression analysis. A sequential binary logistic regression test was used to compare the odds of choosing the correct health warning on the original pack as compared to plain pack 1, plain pack 2 and plain pack 3, and the odds of choosing the correct health warning for smokers and non-smokers. The main effects of smoking status and pack ID were entered in the first block, and the interaction between smoking status and pack ID were entered in the second block.

Results

Demographic characteristics

Table 1 lists the demographic characteristics of the sample. Two hundred and twenty students participated in the study. Of the total participants, 54.5% were female and 45.5% were male. About 77.7% of the participants were between the ages of 19 and 24, while the rest were 25 years or older. Over 73% of the participants were enrolled in a baccalaureate program; the rest

were enrolled in other programs (see Table 1). About 24.1% of the participants were smokers, and most of them, 54.8% of total smokers, smoked between one to 10 cigarettes per day.

TABLE 1. Characteristics of the study sample

Predictor		Pack ID				p-Values
		Original pack	Plain pack 1	Plain pack 2	Plain pack 3	
		n=55	n=55	n=48	n=62	
Sex	Female	49.1%	50.9%	60.4%	58.1%	0.587
	Male	50.9%	49.1%	39.6%	41.9%	
Age	19–24	76.4%	76.4%	81.3%	77.4%	0.926
	25+	23.6%	23.6%	18.8%	22.6%	
Educational status	Bachelors	78.2%	74.1%	68.8%	71.0%	0.296
	Diploma	14.5%	5.6%	8.3%	9.7%	
	Graduate	7.3%	20.4%	22.9%	19.4%	
Are you a smoker?	No	78.2%	69.1%	77.1%	79.0%	0.598
	Yes	21.8%	30.9%	22.9%	21.0%	
Daily cigarette consumption (no. cigs)	1–10	41.6%	64.7%	54.5%	58.3%	
	11–15	25.0%	17.6%	27.3%	16.7%	
	16–19	25.0%	17.6%	18.2%	16.7%	
	20+	8.3%	0%	0%	8.3%	

Health warnings

Overall, 76.8% of participants recalled the correct health warning. With respect to pack ID, 67.3%, 58.2%, 89.6% and 91.9% of respondents identified the correct health warning for the regular package, plain package 1, plain package 2 and plain package 3, respectively. As for recall by smoking status, 82.0% of non-smokers recalled the correct health warning, while 60.4% of smokers recalled the correct health warning. As shown in Table 2, the first-block smoking status and pack ID significantly predicted health warning recall ($\Delta\chi^2 [4, n=220] = 35.935, p<0.001$). This finding suggests that the set of the two predictors, smoking status and pack ID, discriminates between correct and incorrect health warning recall. Prediction success for the cases included in the development of the first model was high, with an overall prediction rate of 78.2%, 92.3% correct prediction rate for those who correctly recalled the health warning and 31.4% correct prediction rate for those who incorrectly recalled the health warning. The seemingly low latter rate is a function of the low number of those who incorrectly recalled the health warning. After controlling for the demographic variables and main effects, the interaction between smoking status and pack ID did not provide additional improvement beyond the main effects model ($\Delta\chi^2 [3, n=220] = 1.75, ns$). Table 2 shows the Wald statistics, significance level and odds ratios for each predictor. The Wald test reports that both smoking status and pack ID significantly predict health warning recall.

TABLE 2. Logistic regression results for predicting health warning recall using smoking status and pack ID as predictors after controlling for gender, age and education

Predictors	Wald	df	p-Value	Odds Ratios	95% Confidence Intervals	
					Lower	Upper
Pack ID*	21.517	3	0.000			
Pack ID (Plain pack 1)	0.550	1	0.458	0.738	0.331	1.647
Pack ID (Plain pack 2)	7.129	1	0.008	4.531	1.495	13.738
Pack ID (Plain pack 3)	10.063	1	0.002	5.890	1.969	17.617
Smoking status (non-smokers)*	8.899	1	0.003	3.071	1.469	6.418
Constant	0.100	1	0.752	0.880		

*Reference groups: smoking status (smokers) and pack ID (original pack)

The influence of smoking status on health warning recall was strong; non-smokers were 3.1 times more likely to recall the correct health warning compared to smokers (CI 95% = 1.47, 6.42). The influence of pack ID was also strong; participants who received plain package 2 were 4.53 times more likely to recall the correct health warning compared to those who received the original pack (CI 95% = 1.50, 13.74). Similarly, participants who received plain package 3 were 5.89 times more likely to recall the correct health warning compared to those who received the original pack (CI 95% = 1.97, 17.6).

As a post hoc analysis, two separate logistic regressions were run for males and females. Female non-smokers were 4.4 times more likely to recall the correct health warning compared to female smokers (CI 95% = 1.52–12.67). Females who received plain package 2 were 6.55 times more likely to recall the correct health warning compared to females who received the original pack (CI 95% = 1.40–30.66). Similarly, females who received plain package 3 were 5.45 times more likely to recall the correct health warning compared to females who received the original pack (CI 95% = 1.35–21.96). In contrast to the findings on the influence of smoking status on female health warning recall, male non-smokers were not significantly more likely to recall the correct health warning compared to male smokers. As for pack ID, males who received plain package 3 were more likely to recall the correct health warning compared to males who received the original pack. However, there were no significant differences for males in recalling the correct health warning between either plain package 1 versus the original pack or plain package 2 versus the original pack.

Discussion

Results of the health warning test

The study suggests that people are more likely to recognize health warnings on plainer packs relative to regular packs, a finding that demonstrates a benefit of plain packaging. Previous studies have suggested that plain packages increase both the visibility of health warnings and the seriousness with which individuals regard them and hence, the likelihood of recalling them (Germain et al. 2009; Goldberg et al. 1999; Northup and Pollard 1995; Rootman and Flay 1995). This study is the first with an online design demonstrating that the odds of recalling the correct health warning are higher for two levels of plain packages as compared to the original pack. The odds

for recalling the correct health warning on plain pack 1 were not significantly higher compared to the original pack. This finding was not expected; a possible explanation for it is that the Peter Jackson brand displayed to the participants was an Australian version of the brand and does not resemble the design of the Canadian Peter Jackson package. The novelty of the regular package to Canadians could have enhanced their recall for the correct health warning, rendering the difference between the regular package and plain package 1 statistically non-significant. An alternative interpretation could be the similarity in font, size and position of the brand on both the regular package and plain package 1. It could mean that brand font, size and position are the most crucial brand design elements to dissolve in the process of plain packaging. For both plain pack 2 and plain pack 3, the odds of recalling the correct health warning were progressively higher in pairwise comparisons with the original pack.

Two important observations flow from these results. First, as the font for the brand name became smaller and less attractive (original pack vs. plain pack 2), the odds of recalling the correct health warning significantly increased. Second, when the brand name's orientation was pushed from the centre of the package to the bottom of the package (original pack vs. plain pack 3), participants were even more likely to recall the health warnings. These observations suggest the importance of reducing the size of the font of the brand, changing the font on original packs to less attractive ones and placing the brand name on the bottom of the face of the pack.

The results of this study show that non-smokers have higher odds of choosing the correct health warning compared to smokers. This finding is not surprising, given that smokers are more likely to be exposed to cigarette packages compared to non-smokers. Such exposure causes desensitization and inattentiveness to the pack and its health warnings. This finding aligns with those of Munafò and colleagues (2011) and Maynard and colleagues (2012), both of whom used an eye-tracking measure. Therefore, the findings from this study, which used an online display and recall method, corroborate findings from studies that used eye-tracking methods. Future studies, however, should further examine the differences between smokers and non-smokers in recalling health warnings while providing sound theoretical explanations for the expected differences.

The results of the post hoc analysis, in which males and females were separately compared for health warning recall by smoking status, reveal interesting sex differences. The results show no differences between male smokers and non-smokers in terms of health warning recall. Contrarily, female non-smokers were more likely to recall the correct health warning compared to female smokers. This means that female non-smokers have a greater tendency to pay attention to health warnings. The results of these sex differences were not expected and warrant further research. Males were also more likely to recall the correct health warning for only plain package 3 compared to the original pack, while females were more likely to recall the correct health warning for both plain package 2 and the original pack, as well as for plain pack 3 and the original pack pairwise comparisons. This finding indicates that females resonate with greater levels of plain packaging, a second unexpected finding that warrants further investigation.

Strengths and limitations

This study has two main strengths. First, it presents an important conclusion in terms of the tendency of progressively plainer packs to increase health warning recall. Most previous studies did not examine the tendency of progressively plainer packs to increase the chance for health warning recall, thus limiting the determination of an optimal level of plain packaging that can be recommended for policy purposes. Second, this study reveals differences between smokers and non-smokers in recalling health warnings. Future studies could examine these differences and determine whether they are related to the multiple previous exposures of smokers to a similar package in the study. This approach could provide further evidence of the importance of changing images and health warnings on cigarette packages.

This study has four major limitations. First, the packs were displayed on computer screens, and the results might possibly have been different if the participants had physically handled the pack. Second, the knowledge gained from this study provides support for the relative differences among packages. However, in order to estimate population responses to different plain pack configurations, a study with a more representative sample is needed to provide concrete support for plain packaging policies in Canada. This study did not necessarily generate concrete results that can be used to recommend or not recommend cigarette plain packaging in Canada because the results were taken from university students, who might not necessarily represent the Canadian population. The study highlights the issue of plain packaging and encourages future studies that are more representative of the Canadian population. The results of such a future study could then recommend or not recommend a plain packaging policy for Canada. Third, this study does not provide a theoretical framework for explaining the relationship between plain packaging and health warning recall. A theoretical framework that explains this relationship could provide insight into the cognitive and behavioural processes that underlie the influence of plain packaging on recall and smoking habits. Fourth, the differences among the three universities were not explored because the home university of the participants was not identified, limiting the creation of dummy variables. This in turn limits the examination of any university-specific differences that could have influenced health warning recall.

Conclusion

This study presents an effort to examine the effect of plain packaging on the ability of individuals to accurately recall health warnings on progressively plainer packages. Although it presents findings in support of plain packaging, it has some limitations that need to be addressed in future plain packaging studies. A future study is needed that uses actual packages instead of packages displayed on a screen and examines a wider segment of the Canadian population in order to generate concrete results that either support or do not support plain packaging. The examination of the relationship between plain packaging and health warning recall based on a theoretical model is also an important future direction to consider in order to understand the underlying cognitive and behavioural processes that govern this relationship. Finally, the unexpected sex differences emphasize the importance of this variable in health warning recall and signal the need for more research to determine the underlying reasons for these differences.

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