Institution: London School of Economics and Political Science		
Unit of Assessment: 17 – Business and Management Studies		
Title of case study: Improving public health messaging to reduce tobacco product use in the European Union		
Period when the underpinning research was undertaken: 2012-2015		
Details of staff conducting the underpinning research from the submitting unit:		
Name(s):	**Role(s) (e.g. job title):**	**Period(s) employed by submitting HEI:**
Amitav Chakravarti	Professor of Marketing	October 2011 to present
Period when the claimed impact occurred: 2014-2020		
Is this case study continued from a case study submitted in 2014? No		

1. Summary of the impact (indicative maximum 100 words)

An estimated 700,000 premature deaths are caused each year in the European Union (EU) by smoking and the annual EU public healthcare expenditure on treating diseases caused by tobacco products is in the region of EUR25 billion. A research consortium led by LSE conducted a large-scale randomised controlled trial on tobacco product warnings. The study provided robust evidence on the efficacy of combined warnings using both text and images; it also demonstrated the ways in which emotions affect behavioural choices and intentions relating to tobacco use. The study informed a revised EU Tobacco Products Directive published in 2014 (2014/40/EU), which aimed to reduce tobacco consumption by 2% (equivalent to roughly 2.4 million smokers quitting) over the five years from its implementation in May 2016. Since that date, all tobacco products manufactured for sale throughout the EU have been required to carry specific combined warnings, the selection of which is based on the LSE Consortium study. Through its direct influence on the Directive, the research has had impacts on the producers and users of tobacco products, as well as wider effects on health services, healthcare spending, and citizens across the EU.

2. Underpinning research (indicative maximum 500 words)

Research underpinning the impacts claimed here was conducted in 2012 by Professor Amitav Chakravarti with LSE colleagues Professor George Gaskell (Department of Methodology) and Dr Caroline Rudisill (Department of Health Policy). The LSE researchers joined a multinational team including researchers from Universidad Nacional de Colombia, Bogotá; Università degli Studi di Milano; University of Leicester; Columbia University; Universitat Pompeu Fabra, Barcelona; Universitat Oberta de Catalunya, Barcelona; and the Centre for North-South Economic Research, Cagliari, Italy. The research, which was funded by the European Commission (EC), explored decision-making related to tobacco product warnings. Chakravarti contributed to both the conception and design of the experiments used in this study and to the production of the final paper **[1]** reporting its findings.

EU tobacco product warnings 2003-2011: in EU Member States, it has been mandatory since September 2003 to include text warnings on smoking tobacco packaging as a condition of the Tobacco Products Directive (2201/31/EC). That Directive required each unit packet of tobacco products to carry one of three general health warnings (e.g. “Smoking kills”) covering at least 30-35% of the front of the packet. It further required the display of one of 14 additional warnings, covering at least 40-50% of the back of the packet. Alongside these text warnings, the Directive allowed Member States to demand the inclusion of additional warnings in the form of colour photographs and other illustrations.

Since their introduction in 2003, the text warnings on tobacco products were revised and reworded in response to developing scientific, behavioural, and psychological evidence. By 2011, revised warnings included new information about the risks of smoking in relation to mouth and throat cancer, blindness, and damage to teeth and gums, as well as the increased risk of smokers’ children also becoming smokers. The EC had also developed a library of 84 draft images, from which it wanted to select 42 to sit alongside the reworded text warnings in new combined warnings to be required under a revised Directive. In a competitive tender process, the LSE and Partners Consortium was awarded the contract to test this and other

aspects of the tobacco product warnings as part of the development of the revised Directive.

Testing the relative efficacy of tobacco product warnings: the objective of the EC-funded study carried out in 2012 was to test the relative effectiveness of a number of policy measures relating to tobacco product warnings. The measures to be tested were:

- The three existing general text warnings.
- Possible new messages on tobacco constituents and emissions.
- The proposal for 84 new combined warnings bringing together new picture warnings with revised text messages.
- Possible new warning layouts, including text warnings versus combined warnings; different sized combined warnings; and warnings in different locations on the packet.
- Packet appearance, notably branded packets versus packets that increasingly standardise certain features up to a full standardisation (i.e. plain packaging).

The Executive Agency for Health and Consumers (EAHC), Consumers and Food Safety Unit, which commissioned the research, specified that the study should test the potential impact of these measures on consumer awareness, attitudes, and behaviour, by assessing:

- **Cognitions and perceptions**: noticeability, clarity/comprehensibility, credibility, and recall of warnings; impact on health knowledge and perceived risk (including awareness over time); and impact on the attractiveness of the packet.
- **Affective reactions**: personal relevance of the warnings, emotional impact, and impact on attitudes towards smoking.
- **Behavioural reactions**: impact on the demand for tobacco products, including both purchasing decisions and smoking behaviour decisions (quitting/reducing smoking among current smokers; staying quit among ex-smokers; and taking up smoking among never-smokers).

The role of emotions in decision-making: the LSE Consortium developed a comprehensive, multi-method study designed to test the large number of policy-related questions included in the study requirements. They particularly sought to address gaps in understanding of the role of emotions in decision-making related to tobacco warnings and smoking. They took as their starting point the idea that emotions experienced at the point of decision-making may have a complex and profound effect on choice for at least three reasons. First, because decisions are context-dependent, emotional state may constitute a circumstantial factor that distorts choice. Second, since consequences are often evaluated with regards to a reference point, emotions matter because they may shift this reference point. Finally, since mood can affect the ways a decision-maker perceives the future, affective states at the moment of choice may change a person's beliefs about what consequences to expect.

The literature on behavioural economics had typically examined these three dimensions of decision-making within a model postulating that agents take decisions based on rational evaluation of the consequences of a given action. In this framework, the only emotions considered are those experienced as the consequences of a particular action. This left two important issues under-explored. The first was the specific and possibly differential role of strong emotions such as fear and disgust in decision-making. The second was the consequences of variations in affective states for choice and behaviour. To address these gaps in understanding, the research team explored the impact on cognition and behaviour of a different and more granular range of emotions (including strong emotions) elicited through exposure to pictorial warnings describing the consequences of tobacco consumption.

Test methods: to achieve this, the researchers used data from a large-scale randomised control trial (RCT) conducted on a sample (representative of the 18 to 65-year-old population) of 8,000 European citizens. The study was run simultaneously across 10 EU Member States, with approximately 800 participants per country. It tested the EC's 84 draft combined warnings - that is, warnings containing a combination of text and images expected to generate different types of emotional response - together with a set of text-only warnings. It combined behavioural responses (in terms of elicited willingness to buy and pay for a tobacco product) and psychometric scales of responses to isolate the effects of different emotions. Physiological

reactions to health warnings on tobacco packets were also investigated in a laboratory in Trento Italy, and 440 respondents completed a laboratory experiment on branded and plain packaging in the LSE's Behavioural Lab.

Key findings: by exploiting the exogenous variation of images as an instrument, the team was able to identify the effect of emotional responses on decision-making relating to tobacco products. Their final report **[1]**, submitted to the EC in May 2013 and published in 2015, signalled some important findings. The most relevant to impacts described here are that:

- Removing or reducing product branding elements and increasing the size of health warnings made cigarette packets significantly less appealing. Plain packaging was shown to be very effective in reducing the appeal of tobacco products.
- The likelihood of buying a tobacco product can be reduced by 80% if the negative affect elicited by the images increases by one standard deviation. In addition, the impact of one standard deviation variation of different emotional scales on intentions to quit smoking (for smokers), avoid smoking (for non-smokers), risk perceptions, and other cognitive variables changes by between 50% and 110%.
- Crucially from a public policy perspective, not all strong emotions produce an equal effect. When images elicited emotions such as shame, anger, anxiety, and distress they were much more successful in reducing the decision-maker's likelihood of buying a tobacco product - which dropped by about 82% - than when they elicited emotions like fear and disgust - which reduced intention by about 66%.
- The researchers' estimation strategy eliminated the effect of fixed characteristics such as country, gender, and age, suggesting that the role of emotions goes beyond cultural and demographic stereotypes.

Although the research cautioned that combined warnings would not provide a quick fix for a recalcitrant addiction such as smoking, the authors concluded that they provide an economical way to reduce the effectiveness of tobacco industry marketing messages, and to contribute to changes in social norms and ensuing behaviours.

3. References to the research (indicative maximum of six references)

[1] Bogliacino, F., Codagnone, C., Veltri, G.A., Chakravarti, A., Ortoleva, P., Gaskell, G., Ivchenko, A., Lupiáñez-Villanueva, F., Mureddu, F., and Rudisill, C. (2015). Pathos & ethos: emotions and willingness to pay for tobacco products. *PLoS ONE*, 10(10). DOI: 10.1371/journal.pone.0139542.

4. Details of the impact (indicative maximum 750 words)

The LSE Consortium research constituted the largest RCT multi-country study ever conducted on tobacco pictorial warnings, and the first to be carried out at EU level. As well as making an important contribution to the literature on health warnings, the study **[1]** provided robust evidence of the efficacy of the combined warnings proposed by the EC and demonstrated the emotional mechanisms by which they affect behavioural choices and intentions. The research also provided clear evidence of which of the 84 proposed combined warnings (CWs) would deliver the best results. The CWs were categorised into four groups - top performers, very good performers, fair performers, and relatively weak performers. Four to six of these warnings were shown to support a statistically significant lower propensity to purchase tobacco products, as compared to text health warnings alone.

These findings supported important revisions to the EU Tobacco Products Directive in 2014. The new legislation, which came into effect in 2016, has direct impacts on the producers and users of tobacco products and much wider effects on health services, healthcare spending, and citizens across the 27 EU Member States.

Tobacco product use in Europe

Among the World Health Organization (WHO) regions, Europe has the highest prevalence of tobacco smoking among adults (26% - approximately 186 million people) and some of the highest prevalence of tobacco use by adolescents. In 2014, the proportion of daily smokers in

the EU ranged from 8.7% in Sweden to 27% in Greece and Bulgaria. This has significant implications for the health of European citizens: in 2016, the European Parliament estimated that 700,000 people die prematurely from tobacco-related diseases every year in the EU **[A]**. This includes deaths associated with coronary heart disease, the leading cause of death and disability globally. Across the WHO European Region, every fifth death from coronary heart disease was caused by tobacco use in 2017, accounting for some 480,000 lives lost **[B]**. Tobacco use is also believed to cause between a quarter and a third of cancer deaths in the WHO European Region **[C]**. These effects of tobacco consumption on health contribute to EU public healthcare expenditure of some EUR25 billion per year on treating diseases caused by tobacco, and EUR8.5 billion in annual productivity losses associated with tobacco **[D**, p. 3**]**.

Evidence-based changes to EU legislation on tobacco product warnings

Despite evidence showing that health warnings work, in 2014 the WHO European Region had the lowest rate for implementing large warnings and the lowest share of countries requiring pictorial health warnings, with just 20 countries within the region using them at that time. In the same year, the EC published a revised EU Tobacco Products Directive (2014/40/EU). The EC Directorate-General for Health and Food Safety (SANTE) set out the rationale for the new Directive in a presentation published in September 2015. This cites an expectation that the implementation of the new Directive would lead to a drop in tobacco consumption of 2% within five years, corresponding to 2.4 million fewer smokers in the EU **[D**, p. 6**]**. It further notes an expectation that the new Directive would support a reduction of EUR506 million annually in EU healthcare expenditure and a reduction of EUR165 million annually in productivity losses **[D**, p. 6**]**.

The revised Directive came into effect in May 2016. It requires cigarettes, rolling tobacco, and waterpipe tobacco packets to carry combined health warnings consisting of text warning about the dangers of tobacco use, a corresponding picture, and cessation information. The content of these warnings is selected from EC-approved lists of 14 text warnings and 42 pictures. The selection of those images was based on the findings of the research published in **[1]**, which identified the most effective 42 images from the 84 draft combined warnings tested in the study. The pictures selected for use on the basis of the study findings are published in Annex II of the revised Directive; these are the only images used on tobacco packaging across the EU.

The research elucidated important differences between the ways in which different *types* of emotions affect people's intention to buy tobacco products, demonstrating that emotions such as shame, anger, or distress are more effective deterrents than fear and disgust. This ran counter to expectations at the EC and particularly influenced the Commission's choice of images for inclusion in the revised Annex II. The Commission's D-G for Health and Food Safety confirms the impacts of the research on the revised 2014 Directive, stating that the study provided:

> "*a solid evidential base to inform the revision of the Tobacco Products Directive in 2014, more specifically the development of the accompanying library featuring 42 pictures, as laid down in Commission Delegate Directive 2014/109/EU. Three sets, each consisting of 14 warnings, must be placed on tobacco packs in the EU and their application is enforced by the Competent Authorities of Member States. The study's detailed review of the current literature and empirical findings also provided useful background for further actions to support interventions on the avoidance and cessation of tobacco consumption."* **[E]**

An EC-produced Q&A sheet on the use of these warnings describes the research published in **[1]** in helping readers understand the evidence base for the pictorial warnings:

> *"The pictures chosen were those that were shown to be effective through testing… Pictures were tested on 8,000 participants in 10 EU Member States (Belgium, Germany, Denmark, Spain, France, Italy, Poland, Romania, Sweden, and the UK), including 800 respondents per country. The testing was conducted in the form of an online experiment assessing various cognitive, emotional, and behavioural measures. It was complemented by a small exploratory laboratory experiment assessing physiological responses (eye tracking and skin conductance). Experts from various disciplines (e.g.*

psychology, medicine, behavioural economics, and communication) participated in the contracts and internationally renowned experts on pictorial health warnings were also consulted." **[F]**

Contributions to efforts to reduce tobacco use

Since 20 May 2016, all cigarettes manufactured for sale throughout the European Union have been required to include pictorial warnings selected from Annex II of the revised Directive. By May 2017, picture warnings were required to cover the top 65% of the front and back of all cigarette packets sold in the EU.

Given the research finding that the "right" image can reduce the likelihood of purchasing a tobacco product by some 80%, maximising the efficacy of images included in the EU library is vitally important to the attainment of public health goals around reducing tobacco use. In 2014, when the new directive was published, those goals included a WHO target of a 30% reduction in tobacco-use prevalence among the world's adult population by 2025.

It now seems unlikely that this target will be met in any WHO region other than the Americas, but the European region is currently tracking toward an 18% relative reduction in tobacco consumption between 2010 and 2025 **[G**, p. 9**]**. A 2019 WHO European Region report on European tobacco use trends identifies large pictorial warnings as one of several "*highly effective and relatively low-cost interventions*" **[H**, p. 33**]**. It cites EU Directive 2014/40/EU as an example of good practice in implementing the WHO Framework Convention on Tobacco Control (2003), which emphasises the importance of demand reduction strategies, as well as supply issues, in regulating addictive substances **[H**, p. 49**]**.

5. Sources to corroborate the impact (indicative maximum of 10 references)

[A] For 2016 estimates of the number of EU deaths associated with tobacco consumption, see European Parliament News, "700,000 deaths a year: tackling smoking in the EU", 19 May 2016.

[B] Data on deaths from coronary heart disease associated with tobacco use taken from report published by the World Health Organization (WHO), World Heart Federation, and the University of Newcastle, Australia. See WHO, "Tobacco use and exposure to second-hand smoke linked to more than 20% of deaths from coronary heart disease", 29 September 2020.

[C] For percentage of deaths from cancer associated with tobacco use, see WHO, "Tobacco use causes almost one third of cancer deaths in the WHO European Region", 18 February 2020.

[D] European Commission's Directorate General for Health and Food Safety, Unit D4. "Tobacco Products Directive 2014/40/EU" Document 1.2., September 2015.

[E] Supporting statement from Health and Food Safety DG (SANTE), European Commission. 8 February 2021.

[F] European Commission, "Q&A: Combined health warnings on tobacco products". The answer to Question 4 ("Who developed the pictures?") describes the RCT whose results are published in **[1]**.

[G] World Health Organization (2019), "WHO global report on trends in prevalence of tobacco use 2000-2025". Third edition.

[H] World Health Organization, Regional Office for Europe (2019), "European Tobacco Use: Trends Report 2019". Copenhagen.