



Publicly Accessible Penn Dissertations

---

1-1-2016

# Viewer-Generated Comments to Online Health Policy News: Content, Dynamics, and Influence

Rui Shi

*University of Pennsylvania*, [rshi@asc.upenn.edu](mailto:rshi@asc.upenn.edu)

Follow this and additional works at: <http://repository.upenn.edu/edissertations>

 Part of the [Communication Commons](#), [Public Health Education and Promotion Commons](#), and the [Public Policy Commons](#)

---

## Recommended Citation

Shi, Rui, "Viewer-Generated Comments to Online Health Policy News: Content, Dynamics, and Influence" (2016). *Publicly Accessible Penn Dissertations*. 2012.

<http://repository.upenn.edu/edissertations/2012>

This paper is posted at ScholarlyCommons. <http://repository.upenn.edu/edissertations/2012>

For more information, please contact [libraryrepository@pobox.upenn.edu](mailto:libraryrepository@pobox.upenn.edu).

---

# Viewer-Generated Comments to Online Health Policy News: Content, Dynamics, and Influence

## **Abstract**

New media has changed people's experience with news. News readers nowadays encounter both selective opinions from elite sources and comments from anonymous strangers. The question is: how do people simultaneously process these two types of information? This dissertation selects a health policy, namely the cigarette graphic warning label (GWL) policy, locates online news reports on the major developments of the GWL policy, examines the content and dynamics of the public deliberation on the comment boards for these news articles, and explores the social consequences of such deliberation on news readers. A computerized content analysis was first conducted on user-generated comments following GWL news articles and results showed the majority of the comments were relevant to the issue under debate and argumentative and thus qualified as public deliberation. Comments were predominantly against GWL, and the most prevalent argument was the danger of government infringing on personal life. Three thematic frames emerged from the coding of arguments in comments: the legitimacy of the policy, the effectiveness of the GWL, and the presentational features of the labels. An experiment was then conducted to test the effect of news and comments on readers' attitude and behavior. Readers of oppositional comments showed significantly lower level of policy support than those who read no comment or supportive comments. News story elicited the highest level of policy support when only the basic facts of the policy but none of the argumentative themes was covered. Comments outperformed news in shaping readers' thought diversity such that comments could stimulate people to think more when news is narrow, and limit people to think less when news is thorough. Political ideology interacted with comment valence to influence participation such that conservatives tend to post comments if the opinion climate is overly positive, but liberals did not show interest in posting when the opinion climate is overly negative. Comments are a distorted reflection of public opinion. Content analysis found only 10% of the comments expressed any form of support for the GWL policy while 61% of the experiment participants indicated they were in favor of the policy.

## **Degree Type**

Dissertation

## **Degree Name**

Doctor of Philosophy (PhD)

## **Graduate Group**

Communication

## **First Advisor**

Joseph N. Cappella

## **Keywords**

computerized content analysis, framing effect, online deliberation, social influence, viewer-generated comment

---

**Subject Categories**

Communication | Public Health Education and Promotion | Public Policy

VIEWER-GENERATED COMMENTS TO ONLINE HEALTH POLICY NEWS:  
CONTENT, DYNAMICS, AND INFLUENCE

Rui Shi

A DISSERTATION

in

Communication

Presented to the Faculties of the University of Pennsylvania

in

Partial Fulfillment of the Requirements for the

Degree of Doctor of Philosophy

2016

Supervisor of Dissertation

---

Joseph N. Cappella  
Gerald R. Miller Professor of Communication

Graduate Group Chairperson

---

Joseph Turow  
Robert Lewis Shayon Professor of Communication

Dissertation Committee

Michael X. Delli Carpini, Professor of Communication and Walter H. Annenberg Dean

Robert Hornik, Wilbur Schramm Professor of Communication

John B. Jemmott III, Kenneth B. Clark Professor of Communication and Psychiatry

## DEDICATION

To my dear son, Jinyan

Without him I would have finished this dissertation two years ago

## ACKNOWLEDGMENT

As much as I would like to claim it all mine, my dissertation is a product of collective intelligence. My deepest gratitude goes to my advisor Dr. Joseph Cappella, for his academic guidance, emotional and financial support, and continuous encouragement. His sharp insights in research, practical advice on parenting, and his patience, generosity and sense of humor helped me survive the darkest moments of my dissertating years. I would also like to thank my dissertation committee, Dean Michael Delli Carpini, Dr. Robert Hornik, and Dr. John Jemmott for their feedback. They are the reason my experiment had a gazillion conditions and my analysis plan included five-way interactions. Their comments and suggestions made this project much stronger and theoretically more interesting. I have taken classes with all of them and have learned so much in research methods, in health communication, and in what makes a great scholar and teacher.

Besides my committee, I would like to thank Dr. Sherry Emery at the University of Illinois at Chicago for offering enormous support and thoughtful comments to my work. My sincere thanks also goes to the late Dr. Martin Fishbein. I was extremely fortunate to have worked for him in my first semester at Annenberg. Our weekly one-on-one meetings had eased a rookie's nerve and established my outlook on social science.

I am very grateful for working and living under the great support system of Annenberg School for Communication with outstanding faculty, students, staff, and free food. I would like to thank Tejash Patel and John Garber on the IT team for survey programming and eighty rounds of pretesting and debugging, undergraduate research

assistants Sofia Duque and Gracie Chang for data collection and comment coding, and my dear friends and colleagues, Dina Shapiro, Felicity Duncan, Minji Kim, Jiaying Liu, Sijia Yang, Rosie Bae, Hyun Suk Kim, Yotam Ophir, Stella Lee, Laura Gibson, Erin Maloney, and Sungkyoung Lee for all the inspirational conversations we had inside or outside the lab, with or without food.

My research was facilitated by funding from National Cancer Institute at the National Institutes of Health (5P20CA095856, P50CA095856, R01CA160226, and 1U01CA154254) and the UPenn Annenberg School (Dissertation Research Fellowship).

Last but not least, I want to thank my family for their love and support throughout my PhD life. I'm exceedingly grateful to my husband, Mingxuan, for the encouraging reassurance that it would be OK if I decided to ditch my dissertation and quit school to be a stay-home mom, and to my son, Jinyan, for the sleepy days and the sleepless nights that almost made me ditch my dissertation and quit school to be a stay-home mom. I also want to thank my father, Jiaming, for being a chain smoker with perseverance and therefore reminding me how much the world still needs my research. Special thanks to my mother, Xixin, for her sacrifice, her unconditional love, and her faith in me.

## ABSTRACT

### VIEWER-GENERATED COMMENTS TO ONLINE HEALTH POLICY NEWS: CONTENT, DYNAMICS, AND INFLUENCE

Rui Shi

Joseph N. Cappella

New media has changed people's experience with news. News readers nowadays encounter both selective opinions from elite sources and comments from anonymous strangers. The question is: how do people simultaneously process these two types of information? This dissertation selects a health policy, namely the cigarette graphic warning label (GWL) policy, locates online news reports on the major developments of the GWL policy, examines the content and dynamics of the public deliberation on the comment boards for these news articles, and explores the social consequences of such deliberation on news readers. A computerized content analysis was first conducted on user-generated comments following GWL news articles and results showed the majority of the comments were relevant to the issue under debate and argumentative and thus qualified as public deliberation. Comments were predominantly against GWL, and the most prevalent argument was the danger of government infringing on personal life. Three thematic frames emerged from the coding of arguments in comments: the legitimacy of the policy, the effectiveness of the GWL, and the presentational features of the labels. An experiment was then conducted to test the effect of news and comments on readers' attitude and behavior. Readers of oppositional comments showed significantly lower level of policy support than those who read no comment or supportive comments. News



story elicited the highest level of policy support when only the basic facts of the policy but none of the argumentative themes was covered. Comments outperformed news in shaping readers' thought diversity such that comments could stimulate people to think more when news is narrow, and limit people to think less when news is thorough. Political ideology interacted with comment valence to influence participation such that conservatives tend to post comments if the opinion climate is overly positive, but liberals did not show interest in posting when the opinion climate is overly negative. Comments are a distorted reflection of public opinion. Content analysis found only 10% of the comments expressed any form of support for the GWL policy while 61% of the experiment participants indicated they were in favor of the policy.

TABLE OF CONTENTS

**ACKNOWLEDGMENT.....III**  
**ABSTRACT.....V**  
**LIST OF TABLES.....IX**  
**LIST OF FIGURES.....X**  
**Chapter 1 Introduction.....1**  
    Background.....2  
    Dissertation Overview.....5  
**Chapter 2 Online Deliberation: Characteristics and Dynamics.....9**  
    Public Deliberation in the New Media Environment.....9  
    Theoretical Foundation of Social Influence.....14  
    Dynamics of Online Deliberation.....16  
**Chapter 3 Content Analysis of Online Comments to News Stories on Graphic**  
    **Warning Label Policy ..... 20**  
    Computer Assisted Content Analysis.....20  
    Method.....22  
        Sample.....22  
        Coding Schema.....26  
        Procedure.....27  
    Results .....37  
    Discussion.....48  
**Chapter 4 Social Influence of User-Generated Comments ..... 52**  
    Persuasive Effect of Comment Valence.....52  
    Framing and Frame Diversity.....55  
    Message Sidedness and Refutation.....61  
    Participation in Deliberation.....66  
**Chapter 5 Impact of Comment Climate, Comment Themes and News Frames .....68**  
    Method.....68  
        Sample.....68

Study Design and Procedure.....	69
Stimulus Materials.....	70
Measurement.....	75
Results.....	78
Manipulation Check.....	79
Policy Support.....	73
Opinion Quality .....	87
Thought Diversity.....	90
Participation.....	92
Discussion.....	96
Negativity Bias of Comments and News.....	96
Suppression Effect of News and Comment Framing.....	98
Participation and Political Ideology.....	99
User-Generated Comment as Indicator of Public Opinion.....	101
<b>Appendix A: Codebook for the Content Analysis of GWL News Comments.....</b>	<b>103</b>
<b>Appendix B: News Articles Used in Study 2 .....</b>	<b>107</b>
<b>Appendix C: Sample Stimuli Page .....</b>	<b>111</b>
<b>Appendix D: News and Comments Selection Algorithm Programming.....</b>	<b>113</b>
<b>Appendix E: Questionnaire for Study 2.....</b>	<b>114</b>
<b>References.....</b>	<b>125</b>

## LIST OF TABLES

Table 1. Major Events Concerning the Graphic Warning Label (GWL) Policy.....	4
Table 2. Number of Comments Collected From Nine News Outlets on Six GWL Related Events.....	25
Table 3. Inter-Coder Reliability Coefficients for Categories and Subcategories.....	31
Table 4. Performance of Optimal Models Selected from Ten-Fold and Leave-One-Out Validation.....	36
Table 5. The Percentage of Comments.....	38
Table 6. Percentage of messages supporting or opposing GWL and smoking.....	39
Table 7. The Percentage of GWL Related Arguments and Themes.....	42
Table 8. Summary of Hierarchical Regression Analysis for Variables Predicting Number of Replies.....	44
Table 9. Summary of Additive ANOVA model for Variables Predicting Argument and Theme Prevalence.....	48
Table 10. Demographics of the Study Sample.....	69
Table 11. Mean (SD) of Policy Support by Comment Valence, Comment Themes, and News Frames.....	76
Table 12. Three-way ANCOVA of Policy Support by Comment Valence, News Frame, and Smoking Status Controlling for Political Ideology (PI).....	80
Table 13. Three-way MANOVA of Argument Repertoire by Comment Valence, Comment Theme, and News Frame.....	88
Table 14. Binary Logistic Regression Models for Variables Predicting Clicking on the “Leave a Comment” Button.....	93

## LIST OF FIGURES

Figure 1. Content analysis procedure and sample allocation in each step.....	28
Figure 2. Prevalence of the 14 arguments and 3 themes.....	40
Figure 3. Experiment conditions and a sample stimuli composition for each condition...74	
Figure 4. Mean policy support for those who read no comment, supportive comments, and oppositional comments. ....	82
Figure 5. Mean policy support received by five versions of news articles. ....	83
Figure 6. Summary of results for all the hypotheses and research questions on policy support.....	84
Figure 7. Mean policy support received by five versions of news articles.....	85
Figure 8. Policy support for none, supportive and, oppositional comments across five versions of news articles.....	86
Figure 9. Number of anti-GWL reasons listed by people reading four types of comments or no comment .....	89
Figure 10. Summary of results for all the hypotheses and research questions on opinion quality.....	90
Figure 11. People’s thought diversity after reading three types of news accompanied by three types of comments .....	91
Figure 12. Summary of results for all the hypotheses and research questions on thought diversity.....	92
Figure 13. People’s probability to click the “leave a comment” button as a function of comment valence and their political ideology on social issues .....	95
Figure 14. Summary of results for all the hypotheses and research questions on participation.....	96

## CHAPTER ONE

### INTRODUCTION

The rise of the new media has changed the landscape of mass communication. When ordinary internet users blog about their life experience, tweet their opinions to their followers, “like” a video on Facebook, or review a product on Amazon, they climb away from the passive receiver end of the mass communication chain and become a sender.

Although news production remains largely in the hands of editors and journalists, media-audience interaction is celebrated by many news websites that allow viewers to leave comments in response to news stories. By leaving comments the audience members not only interact with the media, but they interact with each other as well. Some commenters focus on the news directly while others comment on a previous comment to support, oppose, elaborate on, or make fun of its position. In a real sense news websites are becoming public forums, where following the prompt—a piece of news or an op-ed—opinions are expressed and social issues debated.

Unlike editors or journalists, commenters on this forum do not practice under professional or ethical systems. Some argue that new media are developing their own ethical codes based on notions of distributed intelligence and the wisdom of crowds, but we know so little about the mechanism of such wisdom or its consequences that the new ethical system seems to be a myth.

Just like audience on the public forums, the majority of the website visitors do not participate in the discussion directly. Most of them read, watch, listen, and then leave the page without a word. It is important to understand the content, dynamics, and influence of online user-generated contents because readers see them as a proxy of what other

society members think despite the fact that they consist of a very small and non-representative sample of opinions.

The content and dynamics of the deliberation happening on news commentary boards is not completely up to commenters. By changing the structure in which comments are displayed, level of interactivity allowed, and the moderating rules adopted, websites may be able to manipulate to some degree what aspects of the issue get discussed more often and more profoundly. For example some news websites display comments in chronological order and thus early comments are given advantage in exposure rate and potentially become more influential. Some sites encourage interactivity among users by including a “reply” button for each comment posted, and thus debate and refutation become more prominent and confusion across lines of argument less pronounced. Some other websites require all the comments to be submitted to a moderator for review and only the selected ones get posted at a later time, and thus may potentially discourage participation as well as user-to-user interaction.

This dissertation selects a health policy that has been under continuous debate for the past few years, locates online news reports on the major developments of this policy, examines the content and dynamics of the public deliberation on the comment boards for these news articles, and explores the social consequences of such deliberation on news readers.

## Background

The Family Smoking Prevention and Tobacco Control Act passed in 2009 gave the Food and Drug Administration (FDA) the authority to mandate tobacco manufacturers place graphic warning labels (GWL) over 50% of the front and back of

cigarette packages. FDA selected and released nine labels in June 2011 and they were scheduled to go on cigarette packs in September 2012.

Two legal challenges to the GWL policy were posed by the tobacco industry. The first lawsuit was filed in 2009 in Kentucky shortly after the Tobacco Control Act was passed. Major tobacco companies (Discount Tobacco City & Lottery, Lorillard, Reynolds, Commonwealth Brands, etc.) sued the United States and the FDA questioning the constitutionality of several provisions of the Tobacco Control Act including the GWL requirement. The district court Judge McKinley ruled in favor of the provision concerning GWL in 2010, and the decision was supported by the Cincinnati-based U.S. Court of Appeals for the Sixth Circuit in March 2012.

The second lawsuit was filed in Washington D.C. in 2011 right after the FDA released nine GWLs. Five large tobacco companies (including R.J. Reynolds, Commonwealth Brands, and Lorillard) sued the FDA claiming that the GWLs violated cigarette makers' First Amendment rights. A preliminary injunction was issued in November 2011 by Judge Leon of the district court and in February 2012 he formally ruled the GWLs unconstitutional as he found they conveyed more than purely factual and non-controversial information and advanced government's "obvious anti-smoking agenda". The FDA appealed the decision and in August 2012 U.S. Court of Appeals for the DC Circuit upheld the lower court ruling in favor of the tobacco companies. Table 1 summarizes the major events concerning the policy about cigarette labeling change in chronological order.



Table 1

*Major Events Concerning the Graphic Warning Label (GWL) Policy*

No.	Date	Event
0	2009-06-22	Family Smoking Prevention and Tobacco Control Act signed into law
1 <sub>a</sub>	2010-01-05	Kentucky District Court upheld the GWL provision
2	2011-06-21	FDA chose and released nine labels
3 <sub>b</sub>	2011-11-07	DC District Court ruled against GWL in a preliminary injunction
4 <sub>b</sub>	2012-02-29	DC District Court ruled GWL violated the First Amendment rights
5 <sub>a</sub>	2012-03-19	Court of Appeals for the 6th Circuit ruled GWL constitutional
6 <sub>b</sub>	2012-08-24	Court of Appeals for the DC Circuit ruled against GWL

*Note.* Events with the same subscript are court rulings on the same lawsuit.

FDA’s recent cigarette warning label policy was selected as the topic of interest because it has been under continuous debate for the past four years and has attracted sufficient media coverage. In the legal fight the tobacco companies claimed that the policy unconstitutionally compelled government advocacy and thus violated the First Amendment, the GWLs presented non-factual and controversial information, and that there was a lack of evidence of the effectiveness of the GWLS (Brief for Appellees in R.J. Reynolds Tobacco Company et al. V Food and Drug Administration et al., 2012). The government and the public health organizations on the other hand argued the GWLs could effectively inform consumers of the risks of smoking, the information presented in

the nine labels selected was truthful, and that the policy required disclosure of information rather than restricting commercial speech and thus should be justified because it is related to government interest in promoting public health (Brief for Appellants; Brief of Amici Curiae, in R.J. Reynolds Tobacco Company et al. V Food and Drug Administration et al., 2012).

The GWL requirement did not attract much attention from the media until the FDA released the nine labels (Event 2 in Table 1) which were extensively covered, and since then each court ruling received attention by the major news media outlets. When published online, many of these news reports received comments left by their readers.

#### Dissertation Overview

By studying user-generated comments to news articles on the graphic warning label policy, this dissertation addresses several questions with broad theoretical and policy implications. To what extent can online commentary be considered a form of public deliberation where people listen to, learn from, and interact with each other? How much of the online commentary is on topic and what arguments are made? How does the online commentary influence news readers' knowledge, opinion, and participation.

Study 1 of the dissertation is a computerized content analysis that uses the machine learning approach to examine the content and dynamics of the public deliberation on the comment boards for these news articles. The content analysis judges comments' deliberation quality by coding their relevance and argumentativeness. It reveals the overall level of policy support and the prominent arguments made by both sides of the debate. It further identifies factors that could help a comment solicit more replies or help an argument gain popularity.

Although most deliberative undertakings occur in an environment very different than the online commentary, the ubiquity of online commentary nowadays underlines the issue whether this new format of deliberation is helpful or deleterious to the public good. Deliberation is without efficacy if people do not get informed of their own and other's opinions. Based on thematic frames emerged in Study 1 an experiment is then designed to investigate how user-generated commentary together with editorial decisions like news framing could affect viewers' knowledge gain, cognitive elaboration, quality of opinion, and policy support.

Chapter 2 begins with a discussion of the definition and operationalization of public deliberation in both new and traditional media environment. Features that distinguished online deliberation from face-to-face interactions are summarized and the consequences of these distinctions to deliberation are reviewed. Three research questions are raised concerning whether online commentary meets the minimum requirements of deliberation. Comments are assessed on whether they are on topic (RQ1a), whether they include any form of reasoning (RQ1b) and what arguments they make (RQ3).

I then turn to studies related to the consensus decision-making process in the traditional setting and the dynamics of deliberation in cyberspace. Message features are examined to determine why some comments get multiple replies while others sit on the board unanswered (RQ5), and whether the popularity of arguments is consistent across comment boards (RQ6).

Chapter 3 first introduces some general approaches to computerized content analysis, and then describes the method used in this study for the content analysis of online comments to news articles on the GWL policy. Specifically, human coding

procedures and the machine learning techniques are explained in detail. Two cross validation methods for supervised machine learning, namely ten-fold and leave-one-out, are adopted and coding results from the two methods are compared. The results section of the content analysis identifies the overall opinion climate on the comment board and ranks 13 arguments by their popularity. It also identifies features that lead a comment to gain more replies, and features that make an argument more or less prominent. Three thematic frames emerged from the coding of arguments in comments. The three frames become the foundation of stimuli manipulation in Study 2.

Chapters 4 and 5 extend what is learned in the content analysis and explores the consequences of reading user-generated commentary. Chapter 4 reviews previous studies that investigated the influence of online comments on readers. The effects of four features of online commentary are discussed: opinion climate in the form of aggregated valence of existing comments tend to sway readers' evaluation of the issue through normative pressure (H1, H2, RQ1); topical focus of arguments are argued to serve as frames and interact with the frame of the news to center readers' attention to certain aspects of the issue (H3, H4, H5, RQ2); disagreement expressed as refutation is hypothesized to be more persuasive than non-refutational statement of disagreement (H6); opinions expressed by commenters are expected to interact with readers' own stance on the policy to suppress or motivate online participation (RQ3 & RQ4).

Chapter 5 presents the methods and results of an online experiment that aims at testing the hypotheses and research questions above. The experiment manipulates the opinion climate on the comment board, the topical focus of the comment discussion, and the frame adopted in the news article. Smokers and non-smokers' policy support, thought

diversity, opinion quality, and interest in participation are reported to be influenced by the news and comments they read. Theoretical and practical implications are then discussed.

## CHAPTER TWO

### ONLINE DELIBERATION: CHARACTERISTICS AND DYNAMICS

Comments are almost ubiquitous in the new media world today. They are not only everywhere, they are in large quantity. Huffington Post, for example, accumulated 54 million comments in 2011 and about 80 million in 2012. When questioned whether the exchange of ideas was still feasible when 100,000 people commented on one single article, Huffington Post's director of community Justin Isaf said there was meaningful community building even with 100,000 comments, as 70% of the comments on their site were user-to-user replies (Sonderman, 2012). Interaction of course is key to deliberation, but does online commentary meet the minimum requirements of deliberative process beyond interactivity?

#### Public Deliberation in the New Media Environment

The conceptualization of civic and political participation has expanded in the recent years from traditional activities like voting, attending rallies, working for a political party or candidate, donating money (e.g. Brady, Verba, & Schlozman, 1995; Leal, 2002) to include online expressive activities such as emailing a politician, emailing a newspaper editor, and signing online petition (De Zúñiga, Veenstra, Vraga, & Shah, 2010). Although rarely incorporated in the measurement, some argue that public deliberation is a form of participation, as it “provides the opportunity for individuals to develop and express their views, learn the positions of others, identify shared concerns and preferences, and come to understand and reach judgments about matters of public concern” (Delli Carpini, Cook, & Jacobs, 2004, p. 319). Theorists have defined

deliberation from various perspectives but they generally agree that deliberation involves 1) communicative process of opinion or exchange of ideas and 2) the use of logic and rational arguments (Chambers, 2003; Delli Carpini et al., 2004; Gastil, 2002; Habermas, 1989; Halpern & Gibbs, 2013).

In a comprehensive review of the empirical evidence on the impact of public deliberation Delli Carpini and associates summarized various democratic benefits and drawbacks coming out of discursive participation (Delli Carpini et al., 2004). On the one hand research ranging from case studies of face-to-face real-world town hall meetings to controlled online experiments with invited discussion groups showed deliberative participants enjoyed positive outcomes like knowledge gain (Delli Carpini, 1997), strengthened social bonds (Gastil, 2000), opinion convergence and cooperative decision making (Gaetner et al., 1999; Price, Nir, & Cappella, 2006), increased social trust (Price & Cappella, 2002), higher interest in public affairs civic engagement like community activities and voting (Gastil, Dees, & Weiser, 2002; Wuthnow, 1994). On the other hand political discussion under certain circumstances could make participants feel frustrated and dissatisfied with the process or institution (Mendelberg & Oleske, 2000; Morrell, 1999), reinforce preexisting views and thus widen the already present gulf (Morrell, 1999; Price, Nir, & Cappella, 2005), and generate group decisions that are of worse quality than the independent decisions (Stasser & Titus (1985).

Public deliberation can take many forms. In an offline setting the measure of public deliberation mainly involves interpersonal and small group conversation on political or public affairs such as discussing current events on the news with family friends, trying to persuade someone how to vote, attending meeting to talk about political

issues (Brady, 1999; Delli Carpini, Cook, & Jacobs, 2003; Keeter, Zukin, Andolina, & Jenkins, 2002). The internet offers great opportunities for individuals to not only replicate such interpersonal or small group conversation in the virtual space but also share their thoughts with a much larger audience. Thus online deliberation activities can be divided into two categories: 1) online political talk, activities that have a counterpart in the real world, for example sending political emails or Instant Messages to friends, participating in online chat rooms or Facebook groups to discuss issues of public concerns (e.g. de Zúñiga et al., 2010; Marichal, 2012) and 2) online political broadcasting, activities that are in some sense unique to the internet community and are in nature on the mass communication level, such as posting blog articles, posting messages on forums, commenting on news websites or video sharing sites. They are labeled as broadcasting because these activities put out truly public messages visible and accessible to an audience of unknown identity and undefined size.

The distinction between online talk and online broadcasting was not made clear in most of the online deliberation studies but broadcasting activities were usually given more attention when comparison was made between face-to-face and computer-mediated deliberations. Such comparisons identified mainly four unique characteristics of online deliberation: 1) the communication is in written form; 2) the interaction is asynchronous; 3) the participants are anonymous; 4) there is a lack of observable social cues in the process (Coleman & Gotze, 2001; Connolly, Jessup, & Valacich, 1990; Papacharissi, 2004; Stromer-Galley & Wichowski, 2010). As a result the online environment has the potential to generate arguments that are rational, interesting and diverse (Dahlberg, 2001; Gallupe, DeSanctis, & Dickson, 1988; Siegel, Dubrovsky, Kiesler, & McGuire, 1986).



Not only are online discussions less rigid, they can be less polite. Incivility, sometimes referred to as “flaming”, has been a problem common to online discussions (Halpern & Gibbs, 2013). The use of uncivil language has been found to be more prevalent and obvious in computer mediated communication than in face to face situations (Orenga, Zornoza, Prieto, & Peiro, 2000). Cautions have been raised on the uncivil atmosphere surrounding political discussion on social network sites (Kushin & Kitchener, 2009) as well as on the prevalence of profanity among online health service sites and forums from which women seek help (Finn & Banach, 2000).

Empirical evidence for superiority or the inferiority of deliberations in the cyberspace over its face-to-face counterparts is still sparse, and in the meanwhile theorists like Dahlberg (2011) doubted online deliberation can serve as an extension of the traditional public sphere (Habermas, 1989) as it may be limited by factors like:

...the increasing colonization of cyberspace by state and corporate interests, a deficit of reflexivity, a lack of respectful listening to others, the difficulty of verifying identity claims and information put forward, the exclusion of many from online political fora, and the domination of discourse by certain individuals and groups. (p. 0)

It may still be too early to see how these factors would influence the dynamics of online deliberation apart from an increased level of flaming, but they are not problems unique to the cyberspace and may function under the same social normative mechanism that dominates group discussions.

The first half of this dissertation focuses on the content and dynamics of online deliberation concerning a health policy, namely the Graphic Warning Label policy.

Comments to news stories on the releasing and the court rulings of the policy were collected from major online news outlets. This study first asks:

RQ1: Do online comments to news stories qualify as public deliberation?

Since the use of logic and rational arguments is fundamental to the definition of deliberation, RQ1 is broken down to the following two questions in operationalization:

RQ1a. To what extent are comments relevant to the issue under debate?

RQ1b. To what extent do comments contain arguments or give reasons for the position taken.

FDA's recent cigarette warning label policy is selected as the topic of interest for this study. In the interest of policy making concerning tobacco control it is further asked:

RQ2. What is the opinion climate on the comment board regarding policy support?

RQ3. What are the most salient arguments supporting or opposing the GWL policy?

A total of five events about the GWL policy have earned substantial media coverage. Among the five events, one is about a court ruling in favor of the policy, three are about court rulings against the policy, and one is about the releasing of the labels, which is considered valence-neutral. On the one hand the overall opinion climate set by the media were traditionally argued to have an silencing effect on those holding opposite opinions (Noelle-Neumann, 1984), and on the other hand studies conducted in online settings found people are more likely to engage in discussion on topics contrary to their group identity (Price et al., 2005). Thus the current study asks:

RQ4. Whether the aggregated valence of the comments fluctuates with the nature of the ruling such that stories on the ruling supporting GWL get more pro-GWL comments and stories on the ruling against GWL get more anti-GWL comments.

### Theoretical Foundation of Social Influence

The “Spiral of silence” (Noelle-Neumann, 1984) is arguably the most prominent theory that speaks to the formation of consensus. It posits the overall opinion climate can have a silencing effect on individuals who perceive their viewpoints are losing ground. The reluctance of expression is caused by minority members’ fear of social isolation. Meta-analysis has found the silencing effect of the dominant opinion on the dissenters to be small if any (Glynn, Hayes, & Shanahan, 1997). Although people’s fear of isolation, when measured as a personal trait, can significantly predict their willingness to express minority opinion in the face-to-face discussion, its’ impact is significantly attenuated if the discussion occurs in a virtual chat room (Ho & McLeod, 2008).

Instead of claiming the minority members’ opinions are suppressed, some theorists argued those in the minority group conform to the norm and thus changed their opinion either genuinely or orally to fit in., Deutsch and Gerard (1955) theorized two distinct types of social influences based on people’s motivations to conform: informational social influence and normative social influence. The former refers to people’s tendency to obtain other’s responses as accurate evidence about reality that can guide them to behave correctly. The latter refers to people’s desire to follow other’s positive expectation in order to get social approval. Some have argued that informational

and normative social influences are difficult to disentangle conceptually as well as empirically (David & Turner, 2001), particularly in deliberation processes where dominant arguments and the overall climate of opinion tend to go hand in hand (Price et al., 2006). Apart from external pressure people may be subject to referent informational influence, that is group influence due to self-stereotyping (Turner, 1982, 1985). People identify with others who are similar to themselves in some way, and such identification creates a feeling of belongingness to a group or social category that intrinsically motivates them to adopt the beliefs and behaviors that can best exemplify their in-group identity. Group is broadly defined in the conceptualization of referent informational influence, and it can be social category based on a variety of things, like race, gender, political ideology, and for the interest of the current study, smoking status.

Extensive research had been conducted long before the internet on conformity to demonstrate the power of social influence (e.g, Asch, 1956; Sherif, 1935, 1936). The formation of group norm in computer-mediated social interactions is less studied as it's a relatively new phenomenon, but current evidence seems to suggest despite features like anonymity and the lack of social cues online deliberation is subject to social influence as much as, if not more than, its face-to-face counterpart. Drawn from Turner's social identity approach, Lea and Spears argued (Lea & Spears 1991; Spears & Lee, 1994) in their social identity model of deindividuation effects (SIDE) that the fact that people are depersonalized in the anonymous interactions on the internet can enhance group identification, make it more salient and more influential. The claim was supported by a series of studies comparing online versus face-to-face interactions (See review of empirical evidence by Spears, Postmes, Lea, & Wolbert, 2002).

Since social influence is an indispensable player in the computer-mediated interaction it is necessary to understand its consequences on the dynamics of online deliberation.

### Dynamics of Online Deliberation

Face-to-face deliberation must tolerate some incompleteness. Incompleteness described by Fishkin (1995), exists in the situation where participants are not on the same page and some lack the background information necessary to understand the force of others' claims. Incompleteness is also prominent when people cherry pick only those arguments raised by others that they are willing to answer and thus leave certain voiced opinions ignored. Online deliberation sees even higher levels of incompleteness, particularly on commentary boards or public forums where the interaction is asynchronous because the asynchronous and written conversation format makes the cherry picking of preferable arguments easy. When new participants enter the discussion, they are in a marketplace of ideas (Kennedy, 2012). They are able to view all the existing posts and the arguments made by previous discussants and then decide what topics they want to address and which arguments they are willing to answer, but how? Apart from personal preferences, how do people decide in this marketplace of ideas which idea they want to pursue?

In an online discussion board the most direct measure of a thread's popularity is the number of replies it receives. A frequent thread does not necessarily represent the most supported argument, but it clearly identifies the topic eliciting the highest interest. Research has shown people are more likely to respond to threads on the Facebook and YouTube channels of the White House if the threads are on sensitive topics (Halpern &

Gibbs, 2013). Sensitivity in the study, however, was arbitrarily defined with examples of gay marriage and Iraq War. Some evidence further suggested people in the online discussion groups tend to respond more when the moderator gave them a prompt against the shared group ideology (Price et al., 2005).

Research on online thread popularity is still inconclusive and thus the following question is raised:

RQ5. What content or language features in the comments tend to solicit replies from other commenters?

In their analysis of an online discussion event consisted of 60 groups, Price, Nir, and Cappella (2006) found both the overall argumentative climate and the number of arguments made by other group members on each side of the debate affected participants' pattern of expression and their post-discussion opinions. They also observed social influence operated via an argument elicitation process and proposed the explanation that "arguments expressed in the group may direct attention to certain aspects of an issue, heightening the likelihood that other members will render those salient beliefs and considerations applicable to the issue at hand ... and thus indirectly shaping subsequent expressions" (Price et al., 2006, p. 63). Such elicitation process adds some randomness to the deliberation outcome as it partially depends on arguments or themes dominating the early stage of discussion (Devine, Clayton, Dunford, Seying, & Pryce, 2001), or in the setting of online news comment board, comments made by the first few viewers.

The randomness of outcome caused by social influence was confirmed in a study that tried to explain why experts usually failed to predict the market performance of cultural products (Salganik, Dodds & Watts, 2006). In this online experiment subjects

were given the chance to download unknown songs from unknown bands for free. Those in the control condition were only given a list of the song names while those in social influence condition were given the name of each song as well as how many times each song had been downloaded by previous listeners. The most interesting manipulation in the experiment was that instead of presetting the download record for each song researchers randomly assigned participants into eight “worlds” and allowed the download record to accumulate naturally within each world from its participants’ downloading behavior. Record of downloads showed the best songs always ranked high and the worst songs always ranked low in all worlds but the rest of the songs fluctuated randomly from the top to the bottom. Thus unless a song is of superb quality, its success would depend on the market environment at its time of release. A second experiment kept the same design but tried to strengthen people’s perception of the social approval by arranging songs in rank order in addition to presenting the number of previous downloads. The effect of social information was found to be even larger than in the first experiment and thus predicting a song’s success became even less possible. The importance of expression sequence is further stressed by the theory of information cascades. As Bikhchandani, Hirshleifer, and Welch (1998) stated “individuals often converge on the same wrong action... (because) the error-prone choices of a few early individuals determine the choices of all successors” (p. 154).

To further explore the randomness of online deliberation the following questions are raised:

RQ6. Whether the prevalence of arguments is consistent across comment boards?

RQ6a. Does the best argument always get more attention no matter where it first appears?

RQ6b. Are arguments appearing in early comments more likely to become prominent overall?

To summarize, previous studies on the dynamics of online deliberation suggest discussants tend to be influenced by the overall climate of the deliberation and respond to arguments that are sensitive or controversial. Ideas presented early in the conversation may be more influential as they could set the climate and have the advantage of getting more attention. These findings seem to be at odds with the ideal of public sphere (Habermas, 1989) and coincide with Dahlberg's (2011) distrust in the potential of the internet as a vehicle to deliberative democracy.

To address the questions above comments to online news articles on the five events related to the GWL policy were collected, and a computerized content analysis is performed to determine the relevance and valence of the comments. Prominent arguments raised by both sides of the debate are also identified. Computerized content coding is inevitable when studying user-generated content on the internet. The next chapter briefly reviews some popular approaches for computer assisted content analysis, and then moves to detailed description of procedures used in this particular study.



## CHAPTER THREE

### CONTENT ANALYSIS OF ONLINE COMMENTS TO NEWS STORIES

#### ON GRAPHIC WARNING LABEL POLICY

##### Computer Assisted Content Analysis

The increasing amount of user-generated texts on the internet in the form of blogs, comments, reviews, tweets provided communication scholars with great opportunities to unobtrusively observe people's attitudes and beliefs. In order to make sense of these texts quantitatively content analysis needs to be performed. When analyzing online comments, reviews, blogs, or tweets, some researchers chose to use human coders (e.g. Forkosh-Baruch & Hershkovitz, 2012), which is no doubt a conservative solution, but it can be very expensive and time consuming for large quantities of data. Data reported by Twitter in March 2013, for example, showed that its users sent 400 million tweets per day (Tsukayama, 2013), and if the researcher is interested in tracking the fluctuation of public opinion on a certain topic expressed in the form of tweets, hand coding is impossible given the magnitude of the data set except perhaps using some form of sampling. Computer assisted content analysis is a solution of great potential.

Depending on the research question and programming skill level, social scientists can chose from a range of computer programs to help them understand user-generated texts on the internet. Dictionary based strategy was adopted by those who want to determine the prevalence of certain concepts expressed by the texts. Such method usually starts with a dictionary that organizes words under predefined concepts, for example word "love" "happy" "proud" under concept "positive emotion", and the prevalence of a concept can be determined by counting the frequency of words that fall into this concept.

LIWC (Pennebaker, Booth, & Francis, 2007) for example is one of the popular tools in this area. Its internal dictionary assigns words into different categories and sub-categories of psychological processes (for application example see Berger & Milkman, in press).

Apart from its basic word counting function, dictionary can be combined with layers of precise coding rules to address the syntactical complexities of natural language so that more concrete and contextual concepts can be extracted. For example a program called InfoTrend was applied to the analysis of online support group discussions (Han et al., 2011). It allowed researchers to go beyond counting the mentioning of certain words and helped identify expressions of empathy, requests for help, offers of prayer, etc. Coding rules take into consideration not only the appearance or absence of words or word categories but also the relationship between these words in the form of their relative positions and distances. For instance a rule may specify a sentence to be labeled as “showing empathy” if it contains emotion words like “sorry” “glad” “happy” that appear closely before notice words like “hear” “find” “see”. This rule will effectively distinguish statement “*I’m sorry to hear about your condition*” from “*Sorry it’s a typo*”, as only the former sentence shows empathy.

Dictionary based content analysis is restricted in the sense that the content and structure of the dictionary dictates what research question can be asked. The researcher can build up a customized dictionary with precise coding rules that are pertinent to the research question, but it is time consuming and may not worth the effort if it’s too specific to fit any other topics or text sets.

The main task of the traditional quantitative content analysis is to code content into categories, i.e. classification. Computer scientists in recent years have demonstrated

computer programs could classify formal textual documents with some level of success, and past research has also shown software can predict the valence of short open-ended responses that are grammatically imperfect (Baek, Cappella, & Bindman, 2011). User generated texts on the internet have the same, if not worse, language quality as survey participants' responses to open-ended questions. Supervised machine learning methods were developed with the intent to classify text into mutually exclusive categories. The idea is to first have human coders hand code a subset of the sample, and then use the coded subset as markers to guide the computer to code the rest of the sample automatically. Depending on resources and skill level, researchers can choose to conduct machine learning based on statistical estimation (e.g. multinomial logistic regression), similarity rules (e.g. K-nearest neighbor), or even latent semantic indexing (Landauer, 2007).

#### Method

##### *Sample*

Three ranking lists of news sites summarized by Pew Research Center's Project for Excellence in Journalism (Olmstead, Mitchell, & Rosenstiel, 2011) were consulted to determine the most popular online news outlets in the United States. The three rankings were generated by Nielsen, comScore, and Hitwise. Although these measuring companies adopted different methods and metrics and thus produced varying raw figures, the overall rank of top sites is consistent across the three lists. Nine sites that are common across the top 20 lists offered by the three companies were selected after excluding pure news aggregators (e.g. Google News) and sites that do not allow commentary (e.g. Fox News).

Google Advanced Search was used to search for news stories on each of the major events about the GWL policy listed in Table 1. A search was conducted per news site per event, and therefore a total of 54 (9 news sites x 6 events) searches were performed. To locate the exact article every search had the domain specified as the news website's domain, search time specified as 15 days before and after the date of the event, and search keywords as any combination of "graphic warning label" "cigarette package / pack" "FDA" "Judge Leon" "Judge McKinley" etc. For example in order to locate CNN's report on Event 3 *Judge blocks law on cigarette pack warnings* (Watkins, 2011) Google was set to search for "graphic warning label | cigarette pack | Judge Leon site:cnn.com" with a custom date range of "10/24/2011 – 11/22/2011". When a search returned more than one result, all the links were opened and read and only the relevant report was selected. News sites usually publish no more than one article per event, but when two or more articles in the search results were judged as relevant the editorials and blog posts were excluded. A site was marked as not having any article on a particular event if a) all the links returned by the search were irrelevant, or b) a search with even the broadest keywords generated no result. The search procedure used in this study prioritized specificity over sensitivity, meaning all the articles included were relevant but despite the effort made in locating all the relevant stories it is likely some articles were missed due to the selection of search keywords. A total of 37 unique news reports were identified across nine news websites and six GWL events.

Reader generated comments for these news stories were then collected. The number of comments varied greatly from site to site and from event to event. The most commented on story was CNN's report about FDA's releasing of nine labels, which

received 3279 comments within 40 hours of its publication online, yet six news reports received no comment at all. Such variation can be attributed to not only intrinsic factors like the sensational level of the story and the comment policy of the site (e.g. comment prescreening or moderating) but also random factors like the competing news events of the day and story placement (e.g. picture on homepage vs. textual title on secondary page). In order to keep a relatively balanced pool only the earliest 400 comments were obtained when a story generated too many comments.

Some websites allow commenters to reply to an earlier comment. When a comment was collected its following replies entered the sample as well, so that the integrity of the discussion and the natural dynamics on the comment board could be kept. Of the nine websites studied, [nytimes.com](http://nytimes.com) and [abcnews.com](http://abcnews.com) does not have a built-in reply function. All the messages collected from these two sites were treated as independent comments though people could technically reply to a comment by quoting it or calling out the commenter's username. The final sample consists of 5102 messages. About half of the messages are replies under independent comments ( $n_{replies} = 2454$ ). Table 2 summarizes the selected online news sources and the number of messages (both comments and replies) collected from each of the site on the major GWL policy events. Event 1 (i.e. Kentucky District Court upheld the GWL provision) was excluded from further analysis since it was not extensively covered and generated zero comments.

Table 2

*Number of Comments Collected From Nine News Outlets on Six GWL Related Events*

Source	Domain	Event No.						Total
		1	2	3	4	5	6	
ABC	abcnews.com	-	75	8	-	-	-	83
CNN	cnn.com	-	400 <sup>a</sup>	0	0	-	400 <sup>a</sup>	800
Huffington Post	huffingtonpost.com	-	400	402 <sup>a</sup>	400	40	28	1270
MSNBC	msnbc.com	-	401	-	393	13	0	807
New York Times	nytimes.com	0	372	0	0	-	0	372
USA Today	usatoday.com	-	396	172	59	22	70	719
Washington Post	washingtonpost.com	-	151	80	22	-	-	253
Wall Street Journal	wsj.com	-	247	0	26	24	46	343
Yahoo! News	news.yahoo.com	-	0	408 <sup>a</sup>	2	42	3	455
	Total	0	2442	1070	902	141	547	5102

*Note.* Dashes indicate no news report was found for the event from the corresponding source. Zero means the event was reported on but no comment was posted for the story.

<sup>a</sup> Only a subset of comments were collected for the purpose of balance.

### *Coding Schema*

Messages were first coded for their relevance and valence. Coders were instructed to decide whether each comment or reply contained any content about graphic warning labels or the policy overall, and if yes whether GWL was discussed in positive or negative light. Coders also judged whether a message mentioned anything about smoking, and -- if yes -- whether it supported or criticized smoking. Since people tend to express conflicting opinions, the valence subcategories (i.e. pro-GWL vs. anti-GWL, pro-smoking vs. anti-smoking) were not forced to be mutually exclusive, meaning a comment could be coded as both supportive and oppositional (e.g. *“I believe GWL will help people quit, and the government is finally doing their job, but the design of these labels sucks. They look stupid and disgusting!”*).

Messages that touched upon the labels or the policy were further coded for the arguments they made. Six oppositional, four supportive, and three neutral arguments were identified by the author and coders in an iterative process. Oppositional reasoning includes a) analogy or the slippery slope argument i.e. GWL should be placed on other products (e.g. cars, beers, fast food); b) GWL violates the rights of tobacco companies; c) GWL violates the rights of smokers; d) GWL will have a boomerang effect, i.e. promote smoking; e) people have known these risks and thus GWL is unnecessary; f) GWL will be ineffective in general. Arguments in support of the policy include a) GWL may protect non-smokers from starting; b) Government has an interest in public health; c) GWL are adopted in other countries; d) GWL will be effective in general. Arguments that can be either positive or negative include a) suggestions of alternative policy (e.g. banning tobacco, imposing higher tax); b) comment on labels' information truthfulness (e.g.

accurate / fake); c) comment on labels' presentational features (e.g. images are disturbing / vivid). Each messages was coded for the presence or absence of every argument, as multiple arguments can appear in one message.

In addition, comments and replies were coded as refutational if they confront an argument directly rather than overwhelm it with a new topic or personal attacks. For example, in response to a comment "*This isn't the 70's. Everyone that smokes knows damn well it isn't good for them already. This new scare tactic isn't going to phase them*", a refutational reply reads "*Everyone knows the STATEMENT that cigarettes are dangerous. Most have not seen it first hand. Perhaps a graphic image will help*", and a non-refutational reply can read "*I have COPD, have never smoked ever, and my docter told me it is caused by second hand smoke. I think the pics should be even more graphic*" as the reply showed disagreement by changing topic, or "*That's bullshit. You are probably too smart to live in the 21 century. Go back to your 70s*" as the opposition was purely expressed through personal attack. A refutational message is not necessarily a reply to a comment. An original comment can be coded as refutational if it quoted or reiterated the argument it was trying to confront.

Testimonial messages were also identified. Coders looked for personal stories told in the messages with special attention paid to narrative about people's smoking status, quitting status, and smoking related behaviors. Appendix A shows the codebook with detailed coding instructions and examples.

### *Procedure*

The content analysis was conducted in two major stages, human coding and computerized coding. Firstly two human coders were trained to manually code a subset of



messages randomly drawn from the sample ( $n = 1081$ ). The coded set will then be used as the training set in machine learning to generate and validate an algorithm that can be applied to the rest of the sample. Detailed steps are described in Figure 1.

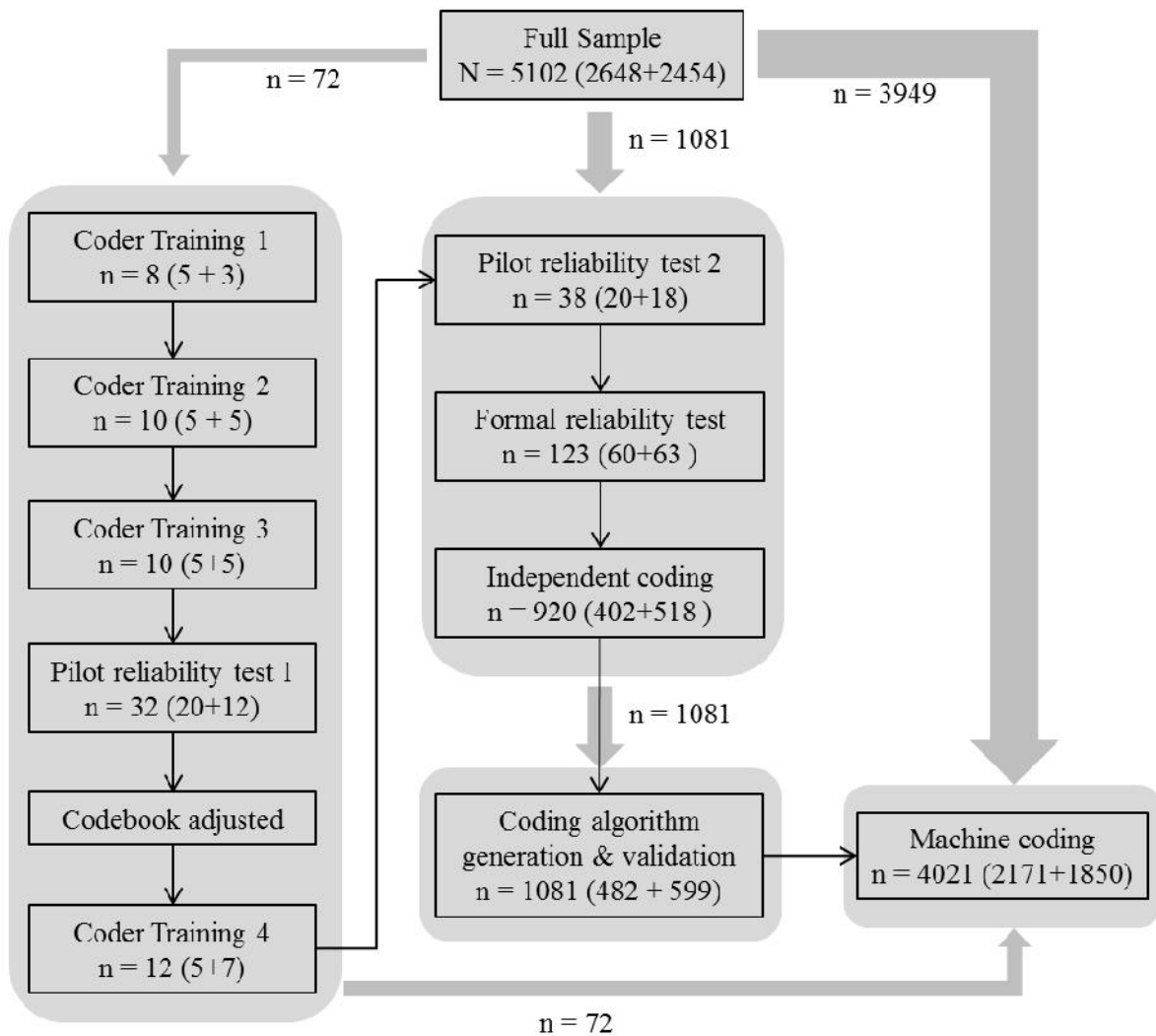


Figure 1. Content analysis procedure (black arrows) and sample allocation in each step (grey arrows). Values enclosed in parentheses represent (the number of independent comments + the number of replies).

### *Human Coding*

Each comment and its replies were considered as one unit and the random selection of messages for human coding were administered on the unit level. In practice, only independent comments were entered into the drawing, and once drawn an independent comment and all of its replies were selected. For example to draw the first coder training set in Figure 1 five independent comments were first randomly selected from the full sample of 2648 independent comments and then their three replies were retrieved.

Two undergraduate research assistant were recruited to serve as coders. Coders were trained extensively by the author in a week, and the training lasted around 10 hours in all. Simple agreement level and Cohen's (1960) Kappa were both calculated on every category for inter-coder reliability. The acceptance level was set at .90 for simple agreement, and .70 for Kappa.

Coder training and inter-coder reliability assessment follow the protocol recommended by Lombard, Snyder-Duch, and Bracken (2002). Firstly the author explained the definition of each category and subcategory to coders, and gave examples as elaboration. Coders were then given three training sets, each containing eight to ten comments and replies (as shown in Figure 1). Coders coded the first training set together with the author and moved on to independently code the second and third sets. When finishing a set coding results were compared item by item between two coders and differences were discussed and resolved. A pilot inter-coder reliability test was conducted with 32 messages randomly drawn from the sample after the first round of training, but Cohen's Kappa for some items did not achieve the acceptable level mentioned above.

After a brief discussion with the coders the codebook was revised with some categories added, some reorganized and some further clarified. The second round of training started with the author explaining the revisions of the coding sheet. The coders were then given a training set of 12 messages for independent coding. At the end of the second round of coder training another pilot reliability test was run with 38 messages, and both simple agreement and Kappa achieved the acceptance level. Since the reliability levels in the pilot test was adequate, coder training was officially completed and the coders proceeded to the formal assessment of inter-coder reliability using 123 messages randomly selected from the full sample. As reported in Table 3, reliability coefficients for all the categories reached satisfactory level, and therefore a set of 920 messages (402 comments and 518 replies) were randomly drawn from the full sample and were evenly divided between two coders for independent coding.

Table 3

*Inter-Coder Reliability Coefficients for Categories and Subcategories*

Category Name	Simple Agreement	Cohen's Kappa	n
Relevance & Valence			
About GWL	.98	.95	123
pro-GWL	.96	.88	57
anti-GWL	.95	.89	57
About smoking	1.00	1.00	123
pro-smoking	.99	.95	73
anti-smoking	.95	.89	73
Arguments			
Analogy / Slippery slope	.95	.89	57
Violate rights of tobacco companies	1.00	1.00	57
Violate rights of smokers	.96	.90	57
Reverse / boomerang effect	1.00	1.00	57
People know the risks already	.98	.92	57
Will not be effective	.96	.91	57
Protect new users from starting	1.00	1.00	57
Government's interest in public health	.98	.88	57
Adoption in other countries	1.00	1.00	57
Will be effective	1.00	1.00	57
Alternative policy	.98	.85	57
Labels' information truthfulness	1.00	1.00	57
Labels' presentational features	.98	.84	57
Other			
Refutation	.96	.91	123
Narrative / testimony	.99	.97	123

Messages used in training and the first pilot sessions ( $n = 72$ ) were excluded from the final set as they were coded before satisfactory reliability level were reached. They joined the rest of the messages in the sample and will be coded using computerized method in the next stage. The final set of human-coded messages consists of 1081 comments and replies used in the second pilot test, the formal reliability test, and the independent coding.

The five GWL events were fairly represented in the human coding sample. Through random selection, 20.56% of the Event 2 messages, 27.54% of the Event 3 messages, 12.53% of the Event 4, 16.31% of the Event 5, and 27.06% of the Event 6 messages were drawn to be manually coded.

### *Computerized Coding*

#### *Preprocessing.*

Three procedures were taken to preprocess the messages, namely spell correction, exclusion, and lemmatization. Wordstat converted all texts into uppercase and thus the preprocessing was case insensitive

Spell check is essential to the subsequent analysis due to the informal writing style of online commentary. British and American dictionaries were activated in Wordstat which then generated an unknown list that ranked unrecognized words by their frequencies. Popular internet phrases (e.g. LOL), name of organization (e.g. FDA), and name of people (e.g. Obama) were added to the dictionary and thus were included in the subsequent analysis. Colloquial expressions (e.g. gonna) and common abbreviation (e.g. ppl for people, cig for cigarette) were expanded to their full forms. Finally all the typos

were replaced with the first word the software recommended to ensure systematic spell correction.

To limit the analysis to the core texts three types of words were excluded: a) an exclusion dictionary was enabled to eliminate words with little semantic value, i.e. functional words including pronouns, conjunctions, etc.; b) words with a frequency of two or fewer were excluded; c) characters that are not letters of the alphabet were excluded (e.g. numbers, symbols, punctuation marks).

The lemmatization procedure was fulfilled with the substitution function of Wordstat, which uses a dictionary-moderated algorithm to reduce words of various forms to canonical forms, plural to singular, past tense to present tense, etc. So for example, “smoked” “smoking” “smokes” were all reduced to “smoke”.

#### *Supervised machine learning with Wordstat.*

Wordstat offers two learning algorithms for the supervised machine learning. The multinomial Naïve Bayes algorithm first uses the human coded set of messages to calculate the probability of each word appearing in each category, and then it takes a new message and combines the probabilities of every word associated with each category, and finally the program codes the message into the category with the highest probability.

The K-Nearest neighbor algorithm first takes a target message (i.e. an uncoded message) and compares it with all the human coded messages. A similarity score is calculated for each message pair. Similarity scores are computed based on various statistics including term frequency, term occurrence, or term percentage per message, and these statistics can be further weighted by inverse document frequency or chi-square. The human coded messages with the K highest similarity scores are retrieved, and finally the

unclassified message gets coded into the category that's most common among the retrieved set of K messages. K was set to range from 15 to 40, and the K with the optimal accuracy was selected.

Though all the word tokens can be entered into the model, it is not necessarily true that the more tokens a model uses the better it will be at classification. The model usually becomes more efficient when relatively less discriminating words (i.e. words that are equally likely to appear in any of the categories, for example "smoking") are excluded. Thus all the models were estimated using tokens with the M highest chi-squares. M is set to be 50, 100, 150, 200, ... till the maximum number of available tokens, and the model with an M that gives the most accurate prediction will be selected.

*Cross validation.*

Cross validation was conducted on the human coding set to evaluate the performance of Wordstat in predicting relevance, valence, and arguments of the messages. Two methods were used for cross validation. Since the coded set contains 1081 messages: a) the "Leave-One-Out" (LOO) method used 1080 messages as the training set to develop a model that in consequence predicts the valence of the one message left out. The process was repeated 1081 times and then the accuracy rate was accessed as the percentage of correct predictions; b) the "10-fold" method randomly divided the 1081 messages into ten subsets and took nine sets as the training set to develop a prediction model that was then applied to the rest 10% of the messages. The process was repeated ten times, one for each subset, and the accuracy rate was reported as the average correction rate across ten runs. The "10-fold" method is the standard practice in the field due to its superiority in performance (Borra & Ciaccio, 2010). The LOO

method makes use of the greatest possible amount of data and thus has the potential to achieve the best prediction accuracy but it has large variance of the estimated error as a result of the lack of stratification in test sample (Witten, Frank, & Hall, 2011).

Both the accuracy rate and Cohen's kappa were calculated for all the models so that the best prediction model can be selected to code the relevance, valence, and arguments of the 4021 messages in the machine coding set. Table 4 summarized the performance of optimal models selected from the two cross validation methods. All the categories obtained accuracy higher than .83. Several categories failed to reach the predetermined satisfactory kappa of .70 possibly due to low event occurrence (Caro, Roper, Young, & Dank, 1979). LOO performed about the same as 10-fold on accuracy but outperformed 10-fold on kappa in the coding of 20 out of 24 items. The optimal algorithms selected by both 10-fold and LOO were kept to code the full sample, which resulted in two sets of coding. Analyses were performed on both sets and results were compared.



Table 4

*Performance of Optimal Models Selected from Ten-Fold and Leave-One-Out Validation*

Category Name	Ten-Fold		Leave-One-Out	
	Accuracy	Cohen's Kappa	Accuracy	Cohen's Kappa
Relevance & Valence				
About GWL	.89	.76	.89	.79
pro-GWL	.89	.63	.90	.67
anti-GWL	.84	.66	.84	.67
About smoking	.86	.67	.87	.69
pro-smoking	.89	.62	.87	.65
anti-smoking	.85	.68	.85	.67
Arguments				
Analogy / Slippery slope	.95	.84	.94	.85
Violate rights of tobacco companies	.96	.64	.96	.68
Violate rights of smokers	.94	.75	.94	.80
Reverse / boomerang effect	.97	.58	.96	.62
People know the risks already	.93	.67	.93	.72
Will not be effective	.93	.70	.93	.77
Protect new users from starting	.97	.54	.97	.59
Will be effective	.92	.64	.92	.67
Adoption in other countries	.97	.69	.97	.74
Government's interest in public health	.97	.72	.96	.71
Alternative policy	.93	.69	.93	.70
Labels' information truthfulness	.96	.73	.97	.75
Labels' presentational features	.95	.78	.95	.83
Other				
Refutation	.83	.61	.87	.59
Narrative / testimony	.91	.65	.91	.69
Themes				
Legitimacy	.90	.82	.91	.81
Effectiveness	.88	.74	.88	.76
Presentation	.93	.79	.94	.83

## Results

Comments coded by algorithms selected from 10-fold versus LOO validation methods generated very similar outcomes in all major analyses.

The first research question looked at the qualification of comments as a form of public deliberation. Results showed comments are largely relevant to the policy under debate and the majority of the relevant comments provided at least one reason to justify their positions, and thus online comments to GWL news coverage can be considered a form of deliberation

Coding algorithms selected by both validation methods found about half (49.5% by LOO and 50.3% by 10-fold) of the comments talked about any of the graphic warning labels specifically or the GWL policy in general, and about three quarters (73.8% by LOO and 80.2% by 10-fold) of the comments discussed smoking related issues. When the two relevance items were cross tabulated 10-fold algorithms found 39.8% of the messages focused solely on smoking (37.8% by LOO), 9.9% focused on GWL (13.6% by LOO), 40.4% touched on both issues (36% by LOO), and the rest 9.9% talked about neither (12.6% by LOO), and thus were regarded as irrelevant. Some of the irrelevant comments were meaningless exclamations (e.g. Urgggg!), and a large proportion were pure personal attacks (e.g. So many morons so little time).

Comments were coded for the presence or absence of each of the thirteen arguments and the number of arguments was summed for every comment. As shown in Table 5, the majority of the commenters provided one to three reasons to justify their positions, and about a third of the comments mentioned none of the 13 arguments. The result here is a conservative estimate of the number of arguments mentioned by

comments because only the presence of the 13 pre-determined arguments were counted and it is very likely some comments listed reasons beyond the 13 but did not get credit.

Table 5

*The Percentage of Comments that Contain Zero to Eight Comments*

Number of Arguments	Hand-Coded	Ten-Fold	Leave-One-Out
0	14.3	34.8	31.1
1	43.0	40.3	37.7
2	21.3	16.2	18.8
3	13.0	6.1	8.8
4	5.6	1.9	2.7
5	2.3	.6	.8
6	0	0	.1
7	.2	0	0
8	.2	0	0
Total n	517	2565	2528

Five GWL events were valenced in nature and thus were collapsed into “pro-GWL events” (Event 2 and 5, n = 2583) and “anti-GWL events” (Event 3, 4, and 6, n = 2519). It was found messages on the comment board of pro-GWL stories were more on topic as they were more likely to be about GWL (10-fold: 54.5% vs. 45.9%,  $\chi^2 (1, N = 5102) = 37.55, p < .001$ ; LOO: 53.4% vs. 45.6%,  $\chi^2 (1, N = 5102) = 31.46, p < .001$ ), and were more likely to be about smoking (10-fold: 83.8% vs. 76.6%,  $\chi^2 (1, N = 5102) = 41.68, p < .001$ ; LOO: 77.4% vs. 70.1%,  $\chi^2 (1, N = 5102) = 34.98, p < .001$ ) than messages following anti-GWL stories.

Coding on message valence was reorganized into four categories: messages that only expressed oppositional views, messages that only expressed supportive views, messages that spoke on both sides (i.e. ambivalent views), and messages that did not take a stand. As Table 6 shows, the majority of the comments and replies relevant to GWL talked about the policy or the labels in a negative light, and only about one in ten messages expressed support. The overall valence of smoking related messages is less definite, with about a quarter expressing negative feeling towards smoking and 10% trying to justify smoking.

Table 6

*Percentage of messages supporting or opposing GWL and smoking.*

	Ten-Fold		Leave-One-Out	
	GWL	Smoking	GWL	Smoking
Oppose	66.1	24.7	69.3	29.0
Support	11.1	10.1	10.6	9.6
Ambivalent	1.6	2.1	2.2	2.3
Neutral/No Stand	21.2	63.1	10.6	59.2
Total (n)	2565	4093	2528	3765

The ambivalent messages were combined into the neutral category for further analysis because of its low frequency. A chi-square test was used to determine whether the overall valence of messages was influenced by the valence of the events. Results showed the majority of the commenters tend to oppose GWL regardless of the content of the news stories, 10-fold  $\chi^2(2, N = 2565) = 4.83, p = .09$ ; LOO  $\chi^2(2, N = 2528) = .20, p = .91$ .

# Analogy / Slippery slope

Violate rights of smokers

Government's interest in public health  
Adoption in other countries  
Violate rights of tobacco companies

Label features

Information truthfulness

Will not be effective

Alternative solutions

Will be effective

People know the risks already

People who use them smoking  
Neville often

■ Legitimacy

■ Presentation

■ Effectiveness

Figure 2. Prevalence of the 14 arguments and 3 themes.

As shown in Figure 2, the most popular argument concerning GWL was the analogy inference. About a quarter of the messages questioned the rationale of the GWL by asking whether it is acceptable to place warning labels on other potentially dangerous or harmful products like alcoholic beverages, fast food, or cars (25.8% for 10-fold model, 20.3% for LOO). People were also largely concerned the policy may violate the rights of the smokers (9.5% 10-fold, 13.1% LOO), may not be effective (15.2% for 10-fold, 18.1% for LOO), and they discussed the presentational features of the images (14.2 for 10-fold, 10.9 for LOO). The 13 arguments were then grouped into three general themes: the legitimacy of the policy, the effectiveness of the GWL, and the presentation of the labels. Both coding algorithms found legitimacy as the most discussed theme. Table 7 shows the grouping of arguments under three themes and it ranks the arguments within each theme by their popularity. Although the absolute prevalence of the arguments and themes differ between the two validation methods, the ranking of the arguments and themes is very similar. Both the argument rank and the argument prevalence correlates at  $r = .92$ ,  $p < .001$  across the two methods.

Table 7

*The Percentage of GWL Related Arguments and Themes*

Arguments	Hand-Coded	Ten-Fold	Leave-One-Out
Theme - Legitimacy	53.2	57.9	63.4
Analogy / Slippery slope	27.9	25.8	20.3
Violate rights of smokers	19.1	9.5	13.1
Violate rights of tobacco companies	6.2	2.6	5.4
Government's interest in public health	7.0	3	6.3
Adoption in other countries	6.2	3	4.5
Theme - Effectiveness	47.7	56.5	48
Will not be effective	22.4	15.2	18.1
Alternative solutions	13.5	8.8	8.2
Will be effective	12.4	6.6	11.8
People know the risks already	12.8	6.5	9.5
Reverse effect	4.6	1.5	3.1
Protect new users from starting	3.9	1.4	2.1
Theme - Presentation	22.6	18	16.2
Presentational features	17.4	14.2	10.9
Information truthfulness	8.3	3.9	4.3
Total n	517	2565	2528

To investigate content features that can attract future readers' attention independent comments were singled out and their content features were connected with the number of replies they received. There were a total of 1896 independent comments in the sample, and 456 of them were excluded from the analysis as they were collected from news sites that do not have a built-in "Reply" function, namely nytimes.com and

abcnews.com. Of the remaining 1440 comments, about half ( $n = 735$ ) were never replied to, a quarter ( $n = 399$ ) were responded to once or twice, and a very small portion ( $n = 34$ , 2.4%) received more than 10 replies. To reduce the skewness of the number of replies, comments with replies higher than 10 were given a value of 10. Same results were obtained in the following analysis when the number of replies was log transformed rather than truncated.

To examine the influence of comments' arguments and valence on their ability to call forth replies a hierarchical multiple regression analysis was performed on comments that were relevant to GWL ( $n = 937$ ). As demonstrated in Table 8, comment features that may predict the number of replies were entered into the model in three steps. Results showed people tend to reply more often to comments that were longer,  $b = .17$ ,  $p < .01$ , comments that were posted earlier,  $b = -.01$ ,  $p < .01$ , and comments that addressed the issue of policy legitimacy,  $b = .39$ ,  $p < .05$ . Legitimacy was a hot topic mainly because people tend to reply to comments that claimed GWL violated the rights of smokers,  $b = .61$ ,  $p < .05$ . The most extensive model explained 14% of the variance which was significantly different from zero,  $F_{ten-fold}(33, 903) = 4.41$ ,  $p < .001$ ;  $F_{LOO}(33, 898) = 4.29$ ,  $p < .001$ .



Table 8

*Summary of Hierarchical Regression Analysis for Variables Predicting Number of Replies*

Variable	Model 1			Model 2			Model 3		
	<i>B</i>	<i>SE B</i>	$\beta$	<i>B</i>	<i>SE B</i>	$\beta$	<i>B</i>	<i>SE B</i>	$\beta$
	Ten-Fold Validation								
Word Count (per 10 words)	.17	.06	.10**	0.02	0.01	.09*	.01	.01	.08*
Comment Order	-.01	.00	-.28**	-0.01	0.00	-.28**	-.01	.00	-.29**
Events									
3-Preliminary injunction	.20	.28	.03	0.22	0.28	.04	.24	.28	.04
4-Ruled as unconstitutional	-.05	.29	-.01	-0.06	0.29	-.01	-.10	.29	-.01
5-Ruled as constitutional	-1.28	.40	-.12**	-1.29	0.40	-.12**	-1.30	.40	-.12**
6-Ruled as unconstitutional	.43	.30	.05	0.41	0.30	.05	.43	.30	.05
About smoking				-0.07	0.22	-.01	-.07	.22	-.01
Narrative / testimony				0.18	0.25	.02	.16	.26	.02
Refutational				0.06	0.28	.01	.05	.28	.01
Pro-GWL				0.16	0.26	.02	.17	.28	.02
Anti-GWL				0.07	0.19	.01	.07	.20	.01
Theme – Legitimacy				0.39	0.17	.08*	.25	.21	.05
Analogy / slippery slope							.21	.22	.04
Rights of tobacco companies							-.20	.45	-.02
Rights of smokers							.61	.29	.07*
Adoption in other countries							-.04	.46	.00
Interest in public health							-.03	.47	.00

Variable	Model 1			Model 2			Model 3		
	<i>B</i>	<i>SE B</i>	$\beta$	<i>B</i>	<i>SE B</i>	$\beta$	<i>B</i>	<i>SE B</i>	$\beta$
Theme – Effectiveness				0.05	0.18	.01	.03	.20	.01
Reverse / boomerang effect							-1.18	.59	-.06*
Known risks already							-.25	.31	-.03
Will not be effective							.05	.23	.01
Prevent from starting							-1.18	.77	.05
Will be effective							.38	.37	.04
Alternative policy							.58	.27	.07*
Theme – Presentation				-0.23	0.20	-.04	-.28	.28	-.05
Information truthfulness							-.20	.42	-.02
Presentational features							.15	.28	.02
Model R <sup>2</sup>		.11**			.12**			.14**	
R <sup>2</sup> Change					.01			.02	

Leave-One-Out Validation

Word Count (per 10 words)	.16	.06	.09**	.01	.01	.08*	.01	.01	.06
Comment Order	-.01	.00	-.28**	-.01	.00	-.28**	-.01	.00	-.29**
Events									
3-Preliminary injunction	.43	.28	.07	.44	.28	.08	.43	.28	.07
4-Ruled as unconstitutional	.10	.29	.01	.10	.29	.01	.09	.29	.01
5-Ruled as constitutional	-1.18	.41	-.11**	-1.20	.41	-.11**	-1.32	.41	-.12**
6-Ruled as unconstitutional	.47	.29	.06	.45	.30	.06	.46	.30	.06
About smoking				.02	.19	.00	.09	.19	.02

Variable	Model 1			Model 2			Model 3		
	<i>B</i>	<i>SE B</i>	$\beta$	<i>B</i>	<i>SE B</i>	$\beta$	<i>B</i>	<i>SE B</i>	$\beta$
Narrative / testimony				.19	.22	.03	.18	.23	.03
Refutational				-.11	.26	-.01	-.05	.26	-.01
Pro-GWL				.06	.26	.01	.12	.28	.02
Anti-GWL				.03	.19	.01	.03	.20	.01
Theme – Legitimacy				.33	.16	.07*	.09	.19	.02
Analogy / slippery slope							.42	.22	.07
Rights of tobacco companies							.13	.34	.01
Rights of smokers							.61	.25	.08*
Adoption in other countries							-.03	.38	.00
Interest in public health							-.25	.36	-.02
Theme – Effectiveness				.14	.17	.03	.32	.19	.07
Reverse / boomerang effect							-.54	.41	-.04
Known risks already							-.33	.27	-.04
Will not be effective							-.30	.21	-.05
Prevent from starting							-.38	.70	.02
Will be effective							.14	.30	.02
Alternative policy							.37	.27	.05
Theme – Presentation				-.24	.21	.04	-.01	.31	.00
Information truthfulness							-.55	.46	-.04
Presentational features							-.17	.32	-.02
Model R <sup>2</sup>									.11**
R <sup>2</sup> Change									.12**
									.14**
									.02

Note. n = 937. News sources were controlled in all the models. \* $p < .05$ . \*\* $p < .01$

Several additive models of ANOVA were conducted to examine factors influencing the prevalence of 13 arguments and 3 themes on the 45 comment boards (nine news sources across five events). Prevalence was defined as the percentage of messages on the comment board that addressed any given argument or theme. The unit of analysis is argument/theme per comment board. As shown in Table 9, the intrinsic quality of arguments has a significant impact on their success on the comment board. The average prevalence of the 45 comment boards differed significantly across 13 arguments, meaning some arguments are consistently more prevalent than others. Argument contributed to the biggest portion of variance explained (41% in Model 1 and 33% in Model 2). Arguments that appeared in early comments were found to be more likely to become prominent overall. Similar results were found for argument themes. The mean prevalence differed significantly among three themes and theme explained more than 60% of the variance.

Two factors were entered into the prediction model to explore whether early comments have the power to direct topical focus of subsequent discussions: the position of every argument and theme's earliest occurrence on the comment board and arguments and themes' early success operationalized as their prevalence in the first ten comments. Results showed the position of an argument's first occurrence was a significant predictor of its overall success on the comment board but the effect of first occurrence was completely overwhelmed by early prominence when both variables were in the model. Similar results were found for themes (See Table 9 for details). To sum up, the sooner an argument or theme was brought up, and the more frequent it was mentioned in early discussion, the more likely it will become prominent overall.

Table 9  
*Summary of Additive ANOVA model for Variables Predicting Argument and Theme Prevalence*

Variable	Model 1			Model 2		
	<i>df</i>	<i>F</i>	$\eta^2$	<i>df</i>	<i>F</i>	$\eta^2$
Argument Prevalence						
Source	8	3.42**	.10	8	3.14**	.09
Events	4	3.42**	.05	4	2.80*	.04
Arguments	12	15.14**	.41	12	10.68**	.33
First Occurrence	1	8.98**	.03	1	2.52	.01
Prevalence in First 10				1	25.37**	.09
Error	257	(.01)		256	(.01)	
R <sup>2</sup>	.53			.57		
Theme Prevalence						
Source	8	.75	.08	8	.85	.09
Events	4	.48	.03	4	.65	.04
Theme	2	60.49**	.64	2	52.57**	.61
First Occurrence	1	3.77 <sup>†</sup>	.05	1	.23	.00
Prevalence in First 10				1	5.3*	.07
Error	67	(.01)		66	(.01)	
R <sup>2</sup>	.79			.80		

*Note.* <sup>†</sup> $p < .10$ , \* $p < .05$ . \*\* $p < .01$

## Discussion

Content analysis found comments that followed news articles on the graphic warning label policy were largely relevant to the issue under debate. The majority of the comments talked about smoking in general, the policy, or the proposed labels. Only about 10% of the comments were deemed irrelevant to the topic. Comments were also argumentative as the vast majority of the commenters listed at least one reasons to justify

their position on the policy. Both legitimacy and effectiveness considerations were widely discussed among commenters. This set of findings justified the qualification of online commentary as public deliberation and showed the potential of comment boards to serve as an extension of the traditional public sphere. It is hard to say at this point that deliberation on the comment board is as informative as face-to-face discussions, neither can conclusions be drawn on the effects of such deliberation on commenters as we don't know what they have gained during the commenting process and what knowledge or motivation they would walk out with. These questions are not meant for content analysis and shall be addressed by future study.

Comments were predominantly against GWL, but it did not mean commenters were all smokers resisting any idea that shed negative light on smoking. When talking about smoking, anti-smoking comments were more frequent than pro-smoking ones. Many commenters self-identified as non-smokers in their comments and claimed smoking was a terrible habit and yet still disliked the policy for various reasons. Non-smokers' sympathy with smokers' views on GWL was exemplified by the popularity of the analogy/slippery slope argument (i.e. GWLs on other products) where people expressed concerns about the government infringing on personal life.

It is worth noticing the nature of the events did not affect valence of the comments and the aggregated valence of the comments did not fluctuate with the nature of the court ruling. Comments showed a consistent level of opposition across board even when the news articles were on events supporting the policy, for example court ruling the GWL as constitutional. It seems to suggest the public has quite a stable mind on the policy regardless of what the media or the court say.

Although analogy/slippery slope was identified as the most popular argument on the comment board, it has no advantage in soliciting replies. Comments attracted an average of 0.61 more replies when they made the argument of GWL's violation of smoker's rights. This finding suggests the most prominent arguments may not be the most provoking ones. Slippery slope is an argument that is easy to adopt and repeat but hard to elaborate or debate on. An interesting question emerges from this observation: what is the standard of a successful argument in public deliberation? Popularity? Thought-provokingness? Or something else. Of course neither criterion assumes persuasiveness, and the relationship between these elements needs to be assessed in future research.

This content analysis found early comments to be more influential than those posted late. Early comments are replied more often, and the arguments they made are more likely to be adopted by late commenters and thus become prominent overall. Although the timeliness of making an argument mattered, what affects an argument's overall prevalence the most is still the its intrinsic quality. Some arguments are consistently more prevalent than others regardless of which comment board they are posted on and where they first appeared.

The sample in the current study is of relatively small size for automated content analysis but there is a high level of homogeneity among the textual documents involved (i.e. comments) in the sense that they all focused on one very specific topic. Given such characteristics of the sample it is of no surprise that very similar results were found in analyses using comments coded by algorithms selected from 10-fold versus LOO validation methods. Although the exact frequencies and beta coefficients differ from

model to model, the general pattern of findings stayed the same with one exception: the regression analysis based on ten-fold validated comments revealed the mentioning of arguments of “boomerang effect” discouraged replies and the argument of “alternative policy” tend to attract replies, but the influence of these two arguments was not significant in the LOO-based model. The inconsistency may or may not be the result of LOO’s lack of stratification in test sample. There is never a definite answer to the question of what is the optimal N for N-fold cross-validation as the number of folds depends on many factors including the size of the sample, number of classification categories, class attributes, data attributes, etc. This study finds texts coded by machine learning algorithms selected by ten-fold and LOO cross validation methods generate similar findings if:

- a) textual documents are user-generated content (thus are not formal writing)
- b) the sample is larger than 5,000
- c) the human-coded set is larger than 1,000
- d) documents are homogenous, meaning they focused on a specific topic
- e) rank order of valences and themes are the main interest

Study 1 of the dissertation established online comments’ qualification as public deliberation. It further identified three general topical domains that commenters were most concerned with: the legitimacy of the policy, the effectiveness of the GWL, and the presentation of the labels. In Study II the effect of these three topical frames on news readers’ response to the GWL policy is investigated.



## CHAPTER FOUR

### SOCIAL INFLUENCE OF USER-GENERATED COMMENTS

Preliminary results from Study 1 suggest a large proportion of the online comments to news articles on GWL are on topic and involve some level of exchange of ideas. The influence of early comments on subsequent opinion expressions was also examined, but what about impact of these comments on bystanders? Deliberation is of no efficacy if readers cannot leave the page informed of the basis for their own and other's opinions.

When people read news online they encounter information from two types of sources: social elites whose opinions were solicited by journalists and anonymous grassroots whose opinions were posted to follow the news article in the form of comments. The question is: how do people simultaneously process these two types of information? Study 2 explores how user-generated commentary together with editorial decisions like news framing would influence news readers' perception of the GWL policy.

#### Persuasive Effect of Comment Valence

Opinion climate in the form of aggregated valence of comments has been the most commonly investigated influencer of opinion formation. The effect of opinion climate is usually explained under the mechanism of social influence, i.e. people are affected by unknown readers' comments because they see these comments as a reflection of the level of public approval, and such perception can tilt their personal belief.

News readers see user-generated comments as a proxy of what other members of the public think despite the fact that they consist of a very small and non-representative sample of opinions. In an experiment, readers who were given a news story accompanied

by seven dissenting comments perceived the public opinion to be more discrepant from the position advocated by the news than those who read only the news article (Lee & Jang, 2010). In another study people assessed the public's opinion on an education policy as more congenial if they read 8 comments congruent with their pre-existing position rather than 8 comments against their original stance (Lee, 2012).

Apart from news perception, evaluative comments left by prior viewers were found to sway later viewers' perception of all sorts of media products, including music (Salganik, Dodds & Watts, 2006), public service announcements (Walther, DeAndrea, Kim & Anthony, 2010; Shi, Messaris & Cappella, 2014), or commercials (Shi & Cappella, 2015).

General findings from several experiments suggest people's judgments about the issue in question go in the same direction as the overall climate of opinions expressed in previous readers' comments. In one study for example, anti-smoking advertisements accompanied mostly by positive comments (i.e anti-smoking or pro-ad) were evaluated more favorably by smokers than the ads with mostly negative comments (i.e. pro-smoking or anti-ad). In another experiment college students evaluated anti-marijuana ads accompanied by positive comments as more effective than the same ads followed by negative comments (Walther, DeAndrea, Kim, & Anthony, 2010)

The relative effect of positive versus negative comments seems clear—positive comments elicit higher approval than negative comments— but the absolute effect of positive and negative comments was inconclusive. In many cases it is hard to tell whether the difference between positive and negative comments is due to positive comments improving the rating or negative comments decreasing the rating, or both. When testing

the persuasive effect of comment valence only a handful of studies included a no-comment control condition that would allow the observation of the absolute effect of positive or negative comments. Both positive and negative biases have been reported in these studies and the absolute effect may be contingent upon study design, topic discussed and sample recruited. Lee and Sung (as cited in Lee & Jang, 2010) reported positive comments resulted in news readers' greater agreement with the article but negative comments did not lower people's agreement level. Shi and Cappella (2015), on the other hand, found negative comments lowered smokers' favorable attitude of trying e-cigarette but positive comments did not improve their favorability. In addition, Shi, Messaris, and Cappella (2014) observed detrimental effect of all comment sets on smokers watching anti-smoking ads, be it positive, negative or balanced when compared with a no-comment control group. It is noticeable that the sample of this experiment is smokers and they were exposed to anti-smoking messages so high level of reactance was expected. Negative comments' predominant impact was also documented in marketing research where negative product reviews are found more influential than positive reviews (Chevelier & Mayzlin, 2006; Sen & Lerman, 2007)

It is generally believed that one's perceived public opinion and his/her personal attitudes were associated (e.g. Giner-Sorolila & Chaiken, 1997; Gunther, 1998; Hoffman, 2008; Hoge & Glynn, 2010; Kang, 1998). For example people were found to adjust their attitude and intention under the impact of polls (Chan & Lee, 2005; Chia, 2010; Sonck & Loosveld, 2010). Interestingly, a third-person effect was observed when people were surveyed about their feelings towards polls. People generally believed they were not influenced by the presidential election polls but other people were (Price, 2006).

Based on previous research news readers are expected to be influenced by the opinion climate such that:

H1: Those reading the news article on the Graphic Warning Label (GWL) policy accompanied by predominantly supportive comments will show stronger support for the policy than those reading the news accompanied by predominantly dissenting comments.

Since the absolute effect of comment valence is unclear in the literature, a research question rather than a hypothesis is raised:

RQ1a: Do supportive comments improve readers' support for the GWL policy?

RQ1b: Do oppositional comments diminish readers' support for the GWL policy?

People's judgments tend to depend on social cues under the condition of uncertainty or self-doubt (Tesser, Campbell, & Mickler, 1983; Wooten & Reed, 1998). The overall comment valence as opinion climate is most influential for those who have little past experience or prior knowledge of the topic discussed (Shi & Cappella, 2015). Thus it is further hypothesized that:

H2: The effect of comment valence on policy support will be moderated by readers' smoking status, such that non-smokers will be more influenced by the comments than smokers.

### Framing and Frame Diversity

In addition to simple valenced statements, comments contain arguments and rationales to support these statements, and the argument component could make

comments particularly influential compared with other online recommendation systems such as 5-star rating systems, lists of rankings, and number of “like”s (Lee & Jang, 2010).

Unlike comment valence however, the impact of arguments made in user-generated comments has rarely been studied (Willemsen, Neijens, Bronner, & De Ridder, 2011). Limited research in marketing and political communication that explored arguments’ influence tends to quantify arguments in the analysis. Studies have shown for example, that argument density—the proportion of relevant statements that include reasoning—and argument diversity—the variance of argument valence— present in Amazon product reviews predicted these reviews’ usefulness rated by potential consumers (Willemsen et al., 2011). They also found individual’s number of arguments expressed in an online group discussion correlated with both the number of mere-valenced statements and the number of arguments made by other group members (Price et al., 2006). The effect of the qualitative features or the actual content of the arguments made in the comments was generally overlooked with one exception where Price and colleagues mentioned in the discussion section of their experiment that they observed an interactive argument elicitation, (i.e., individuals mimic group tenor in their arguments) and speculated it was the result of cognitive priming, such that arguments expressed by others made certain aspect of the issue salient and thus simulated retrieval of one’s own related thoughts (Price et al., 2006).

The cognitive priming effect of arguments made in online comments has not been directly tested but past research on issue framing sheds light on how arguments made in comments could potentially affect news readers’ perception of and response to the topic under debate. Framing describes the indirect effect media have on the audience through

story presentation. Journalists tend to present social issues from certain perspectives and “the frame suggests what the controversy is about, the essence of the issue” (Gamson & Modigliani, 1987, p.143). Media studies in the past two decades have shown news readers’ understanding and judgment of an event or issue is partially dependent on how the issue is packaged (McCombs & Ghanem, 2001; Weaver, 2007). News frames not only serve the function of second-level agenda setting that alters the weight of particular concerns but could also add new beliefs to an individual’s existing set of beliefs and affect attitudes and cognitive complexity (de Vreese, Boomgaarden, & Semetko, 2011; Igartua & Cheng, 2009; Iyengar, 1991; Lecheler & de Vereese, 2012; Price, Tewksbury, & Powers, 1997).

In his review de Vreese (2005) summarized two ways news frames have been studied: either as issue-specific frames or generic frames. Issue-specific frames are only pertinent to a specific topic and thus were criticized as lacking generalizability and comparability which has led researchers to “too easily finding evidence for what they are looking for” (Hertog & McLeod, 2001, pp. 150–151). Generic frames on the other hand are identifiable across different topics, context and over time. For example the framing effect was widely found prominent when frames are set on problem structure as in gain versus loss frames (see O’Keefe & Jensen, 2006 for review), and responsibility attribution as in personal versus institutional responsibility (Iyengar, 1991; Jeong, 2008). Although the current study examined the framing of a specific policy, the three frames identified are generic in the sense that they are concerns common to many, if not all, policy changes.

Three major frames emerged from the content analysis of user-generated comments following news on the graphic warning label policy (i.e. Study 1). Commenters mainly discussed issues concerning a) government's legitimacy in creating the policy, b) the effectiveness of the GWLs in reducing smoking and, c) the presentational and informational features of labels (the *effectiveness, legitimacy, and presentation* frames hereafter). The three frames deduced from the comments were also present in the news coverage of the GWL policy.

Specific or generic, news frames in previous studies were compared against each other one at a time and the effect of frame diversity was largely overlooked. For readers of any news articles they may encounter one of the following three situations: a) the news provides only factual information with no perspectives offered; b) the news focused on a single aspect of the issue; and c) the news touches on multiple aspects of the issue. When online readers extend their reading to the comment board they may also see one of the following three situations: a) no comment is present; b) a focused discussion of a single aspect of the issue, and c) a thorough discussion of a mixture of concerns.

Researchers have argued diverse interpretive frames in the public realm and the media could help enhance the competence of citizens in the modern democratic systems, help the fulfillment of their civic roles, and cultivate reflexive citizenry (Huang, 2010; Porto, 2007). Huang (2010) offered a direct test of the effect of news frame diversity. The study compared two events, one covered by the media from various angles, one covered by the media from uniform angles. A survey was then conducted to collect people's general reflections on these two events. Results showed people had less diversified thoughts on the event that was covered by uniformly-framed news and that a diverse

news coverage corresponded to a diversified issue-relevant thinking in audience. The effect was only assessed at the aggregate level. Apart from the doubt on causality it is unclear whether the match between news frame diversity and audience thought diversity would carry over to serve as individual level conclusions

Taken together, previous research on news framing suggests news readers' attitudes can differ as a result of the activation of thoughts on different aspects of the policy. Furthermore, news and comments of single topical focus may limit readers' cognitive elaboration as readers will tend to think from the perspective discussed by previous commenters.

H3: Exposure to news and comments with diverse frames will increase the diversity of thoughts generated by news readers compared with those reading news and comments with a single argument frame.

Exposure to disagreement in political conversation as well as participation in deliberation were found to improve people's opinion quality conceptualized as argument repertoire—number of reasons one can generate that support or oppose their own opinion (Cappella, Price, & Nir, 2002; Price, Cappella, & Nir, 2002). In theory the larger the argument repertoire, the better-anchored one's political opinion is. Therefore I further hypothesize:

H4: Exposure to news and comments with diverse frames will improve news readers' opinion quality, such that compared to a thorough discussion of one aspect of the issue, a mixture of frames will enlarge readers' argument repertoire.



Frames are not equally consequential, and the policy in discussion may benefit more from the activation of a specific frame over others (Price, Tewksbury, and Powers, 1997). Among the three frames observed in study 1, the effectiveness and legitimacy frames get to the fundamental basis for the policy since they question whether and why the policy should stand, whereas the presentation frame more or less assumes necessity and legitimacy as it deals with how the policy should be implemented. Thus when reading a piece of news covering only debate on presentational features audience may be taken away by the debate and never give a thought to the core issues like necessity and legitimacy, or they may infer that these core issues were not discussed in the news because the elites and the public had achieved consensus. Therefore the GWL policy may benefit from the presentation frame such that:

H5: Those reading the news article discussing presentational and informational features of the labels will be more likely to support the GWL policy than those reading *effectiveness* and *legitimacy* framed comments.

Although restricted by the frame they read, news readers may still generate thoughts on issues other than the chosen frame (e.g. Price, Tewksbury, & Powers, 1997), and it is highly likely that comments posted after a single-framed news would talk about a variety of topics. The explanatory mechanism of framing effects has been theorized as knowledge activation, in the sense that exposure to a frame activates trains of thought, making individual's stored knowledge relevant to the frame salient and readily accessible. Price and colleagues described the effect as "a kind of hydraulic pattern, with thoughts of one kind, simulated by the frame, driving out other possible responses" (Price, Tewksbury, & Powers, 1997, p. 501). Although the source of news frame and comment

frame differ greatly on credibility, authority, and expertise, they may be equally capable of activating relevant knowledge and making certain considerations more salient than others. The interaction of news frame and comment frame is seldom studied and it is impossible to speculate how they would function together. One way to look at the combination of news frame and comments frame is frame repetition. The effect of a frame would be stronger and more persistent through repeated exposure to the frame (Lecheler, Keer, Schuck, & Hänggli, 2015). Thus a piece of single-framed news may become more powerful in restricting cognitive elaboration if its chosen frame is also the sole topic discussed on the comment board.

Based on considerations above, the following questions are posed:

RQ2a: Can comments limit readers' thoughts to one particular aspect of the policy even when multiple aspects are covered by the news.

RQ2b: Can comments expand readers' thoughts to multiple aspects of the policy even when the news story only focuses on one particular aspect.

RQ2c: Do news story and comment board have equal power in shaping readers' thought diversity and opinion quality

### Message Sidedness and Refutation

Refutational and non-refutational messages occur regularly on the comment page of news websites. To take a stand against the issue discussed by the news story, a commenter can leave an oppositional comment without a reason (i.e. oppositional statement), leave an oppositional comment with a reason (i.e. an oppositional argument), or refute a supportive argument made in the comment left by a previous commenter. On

the other hand, a commenter in support of the issue can leave a supportive statement, make a supportive argument or refute an oppositional argument. There is a distinction between *making an argument* and *refuting an expressed argument*. Although both can show disagreement, refutation requires the confrontation of an argument directly rather than to simply deny its merit or overwhelm it with a new topic. To illustrate the difference the example in Study 1 is replayed here, so consider the following comments:

- A. This isn't the 70's. Everyone that smokes knows damn well it isn't good for them already. This new scare tactic isn't going to phase [sic] them.
- B. The Europeans started doing this on packs of cigs in the 1980's. What took America so long? You are right if you said Lobbyist.
- C. Everyone knows the STATEMENT that cigarettes are dangerous. Most have not seen it first hand. Perhaps a graphic image will help

Comment A makes an oppositional argument that falls into the *effectiveness* frame. Comment B makes a supportive argument belonging to the *legitimacy* frame, and thus it is considered non-refutational towards Comment A because the disagreement is shown by changing topic. Comment C, on the other hand, is refutational towards Comment A because it addresses the A's argument directly as it stays in the argument frame of *effectiveness*.

Refutational and non-refutational messages have different persuasive effects and such a difference has been addressed to a degree in the research on message sidedness. Message sidedness research was initiated during WWII by Hovland and his colleagues at the Research Branch of Information and Education Division of the War Department. An

experiment was designed to resolve a frequent debate when orientation films were produced. The experiment aimed to find out whether it was good enough to provide audience with only the arguments supporting the point advocated, or would it be more persuasive to also include the opposing arguments in the message. The rationale for a preference to the two-sided message was that firstly it may appear to be more balanced and thus be perceived as more trustworthy by the audience; secondly it would minimize counter arguing, especially among those who were initially opposed to the point being advocated, by acknowledging the legitimacy of some of the opposing arguments (Hovland, Lumsdaine & Sheffield, 1949).

The persuasion effect of one-sided versus two-sided messages had been compared more than a hundred times in studies scattered in communication, psychology, and marketing journals when O'Keefe (1999) did a meta-analytical review. Based on the analysis of effect comparisons of a total of 107 message pairs O'Keefe concluded the overall persuasiveness of one-sided and two-sided messages were the same. Among the classic moderators including education level and subjects' initial attitude none was found to be clearly associated with the effect size. Emerging from the 70 studies was a new moderator--the nature of the two-sided messages. In his review O' Keefe made a distinction between refutational two-sided message and non-refutational two-sided message. The former not only acknowledges but also refutes the opposing arguments. The latter does not refute the opposing arguments directly but attempts to overwhelm them with supporting arguments. Significant differences in the effectiveness of these two kinds of two-sided messages were reported. The refutational two-sided messages

performed consistently better than one-sided messages while its non-refutational counterpart was shown to be inferior to the one-sided messages.

Classic persuasion studies on message sidedness focused on the difference between one-sided messages versus two-sided messages, but such a difference is no longer interesting because it is very rare to see comments endorsing or opposing an issue unanimously (even for websites that moderate comments before posting them) and therefore audiences receive two-sided messages all the time in today's new media environment. What is interesting is the dynamics within the two-sided messages, i.e. the direct comparison between two-sided refutational versus two-sided non-refutational messages. Such comparison was rarely made in the literature since refutation was always considered as a moderator rather than a predictor in message sidedness studies. Empirical evidence for the ranking of the persuasiveness of one-sided, two-sided refutational, and two-sided non-refutational messages was mainly from meta-analyses rather than direct experimental test (Allen, 1991). One exception is the experiment conducted by Hale and colleagues (1991) as a follow-up of Allen's meta-analysis (1991). They replicated Allen's finding on refutation and tried to explain the mechanism underneath the advantage of refutational messages over non-refutational messages. The authors argued that the non-refutational two-sided message triggered less positive cognitive responses because the arguments presented (pros and cons) were hard for readers to compare (Hale, Mongeau & Thomas, 1991).

The power of refutation in persuasion was further stressed by Inoculation Theory (McGuire, 1964) which was essentially a strategy to help individuals resist persuasion and stick to their pre-existing opinion. The theory proposed a strategy analogous to

physical immunization, i.e. preventing disease by injecting a small dose of virus so the body can develop a defense system on its own. To resist persuasion subjects were given a small sample of the opposing arguments and were taught to counter argue and defend their initial position. Inoculation theory required the practice of refutation as a means to strengthen existing values and beliefs.

Studies on message sidedness seem to have reached a conclusion in the past two decades when several meta-analyses were published (Allen, 1991; O’Keefe, 1999) and an integrative framework proposed (Crowley & Hoyer, 1994) and validated (Eisend, 2007). Past research however focused mainly on messages presented by traditional media, be it radio, TV, or print, and it is not clear how applicable the conclusions are to messages in the new media environment. Unlike the one or two-sided message in the traditional media where one coherent message is conveyed by a single source, messages in the new media usually consists of a series of fragmented arguments from various sources of varying or unknown credibility.

As mentioned before, when a reader enters the comment board after reading the news, the discussion on the top section may appear as an interactive debate about one aspect of the issue or a loosely organized pool of all possible arguments. By definition refutation is inevitable when a single argument frame is prominent on the comment board, and it is kept at a minimum level when diverse argument frames are prominent. Therefore it is argued comments within a single argument frame will be more persuasive than comments from highly diverse argument frames:

H6a: People reading the supportive comments with a single argument theme will be more likely to support the GWL policy than those reading the supportive comments with diverse argument themes.

H6b: People reading the oppositional comments with a single argument theme will be less likely to support the GWL policy than those reading the oppositional comments with diverse argument themes.

### Participation in Deliberation

In news websites a small proportion of readers are posting comments for a large proportion of audience to read. In a recent survey of German-speaking internet users for example, 12% self-identified as commenters on news sites, 57% as lurkers, and 31% read news exclusively (Springer, Engelmann, & Pfaffinger, 2015). Apart from demographic characteristics and personal traits like gender, age, and need for cognition that are related to people's tendency to participate in deliberation (Cacioppo & Petty, 1982; Lasorsa, 1991; Salmon & Neuwirth, 1990; Shestowsky, Wegener, & Fabrigar, 1998), the overall opinion climate expressed in the existing comments may also motivate or discourage readers to participate. On the one hand "spiral of silence" (Noelle-Neumann, 1984) posits the overall opinion climate can inhibit individuals from expressing their position if they disagree with the predominant voices. On the other hand news readers post comments because they want to participate in the journalistic endeavor (Springer, Engelmann, & Pfaffinger, 2015). To practice journalistic principles of balance and objectivity individuals may be more willing to speak out if they see their side of the story as under-

represented, that is they will be more willing to participate in public deliberation if they disagree with the predominant voices (e.g. Boyle et al., 2006).

RQ3. How would opinion climate on the comment board influence news readers' willingness to participate in the discussion? Would people be more or less likely to post a comment if their position is incongruent with the position held by the majority of the comments?

To test the idea that diverse interpretive frames in the public realm could enhance the competence of citizens in fulfillment of civic role (Porto, 2007), it is further asked:

RQ4. Can news and comments addressing a variety of aspects of the policy encourage readers to participate in the online discussion?



CHAPTER FIVE  
STUDY 2 - IMPACT OF COMMENT CLIMATE,  
COMMENT THEMES AND NEWS FRAMES

Method

*Sample*

A total of 2421 U.S. adults were recruited through Amazon Mechanical Turk. Smokers were oversampled to constitute about half of the sample (49.5%). Table 10 describes the demographic features of the sample. All the demographic features were equally distributed across the 15 experiment conditions. Compared with non-smokers in the sample smokers were less educated (14.6 v.s. 15.3 years of schooling), had lower income (47.12k vs. 54.73k), had less political knowledge, were more aware of the proposed GWL policy, were more liberal on economic issues, and tended to read and post online comments in general more often.

Table 10

*Demographics of the Study Sample*

Variable	Range	Mean	SD	%
Age	18 - 77	35.32	11.47	
Gender - female				50
Education (yr of school)	0 - 19	14.96	1.96	
Income (k)	12.5 - 175	50.96	35.67	
Ethnicity - Hispanic				7
Race - White				93
GWL Prior Knowledge	0 - 4	1.05	1.5	
Political Knowledge	0 - 5	4.19	1.08	
Political Ideology – Social liberal	1 - 4.33	3.66	.77	
Political Ideology – Econ liberal	1 - 4	2.94	.81	
Online news reading habit				
Read news online	1 - 4	3.45	.68	
Read comments	1 - 4	3.00	.77	
Post comments	1 - 4	1.92	.84	

*Note.* N=2421 with 49.5% smokers

*Study Design and Procedure*

The experiment adopted a 3 news frame (no frame vs. single frame vs. multiple frames) x 2 comment valence (supportive vs. oppositional) x 2 comment theme (single theme vs. multiple themes) + 3 (no comment control) between subject factorial design. Topics addressed in news are called “frames” and topics in comments are called “themes” from this point on to distinguish between the two.

Since balance is an important journalistic principle all the news frames in the experiment were balanced in valence, meaning both the positive and negative

considerations on legitimacy, effectiveness, or presentation were covered by the news stories. Commenters on the other hand are not bound by professional or ethical codes and thus comments were manipulated to be predominantly in support of or against the GWL policy.

Participants were randomly assigned to one of the 15 conditions. They all read a short news story about the GWL policy with the nine labels chosen by the FDA embedded in the display. The treatment groups then went on to read 10 user-generated comments and were given a chance to leave their own comment to the comment page. After exposure to the stimulus material, all subjects were asked to complete a thought listing task. They then went on to answer questions concerning their support for the GWL policy and they were asked to list reasons they had for supporting or opposing the policy and the possible reasons of other people for opposing or supporting the policy.

#### *Stimulus Materials*

Each participant read one of the *five* pre-selected news stories. The no-frame and the multi-frame news conditions were each represented by only one piece of news so subjects in the same condition all read the same story. The single-frame news condition however, was represented by three pieces of news. For the no-frame news conditions subjects saw a story presenting only the basic information about FDA's requirement (See Appendix B *Version 1: No-Frame* for the script of the news). The single-frame news condition showed news stories covering the basic information of the GWL plus some viewpoints concerning *one* of the three frames, namely the legitimacy of the policy, the effectiveness of the labels, or the presentational features of the labels (See Appendix B *Version 2.1 Single-Frame: Legitimacy, Version 2.2 Single-Frame: Effectiveness, and*

*Version 2.3 Single-Frame: Presentation*). Subjects in the single-frame condition received one of the three frames randomly, i.e. about a third of the participants in this condition read news coverage on legitimacy, a third read coverage on effectiveness, and a third read about presentation. The multiple-frame news conditions showed basic GWL information plus a mixture of viewpoints concerning all three frames mentioned above (See Appendix B *Version 3: Multi-Frame* for the script of the news). Viewpoints in the single-frame and multi-frame conditions were balanced in valence such that the news stories discussed both pros and cons for each of the frames. All stories were about the same in length (ranging from 238 to 251 words). The writing of the basic information of the GWL as well as viewpoints on the three frames was selected from top news outlets' actual coverage of FDA's releasing of the nine GWLs.

Participants were told the news was selected from one of the top news outlets including: New York Times, CNN, Huffington Post, Fox News, Wall Street Journal, U.S. News etc. These media sources were named to increase the credibility of the news story, and the six chosen outlets were meant to create a feeling of balanced ideology (An, Cha, Gummadi, Crowcroft, & Quercia, 2012) and thus avoid unintended priming effect.

Subjects all read one of the same five news articles but everyone received a unique set of comments. Case-category confound (Jackson, 1992) was addressed with comment manipulation when a pool of about 200 comments was first constructed based on real online comments following the GWL news stories. A comment selection algorithm was then used to allocate a unique set of 10 comments to each participant in the 12 treatment conditions. The comment pool was balanced across two valences and three themes. Thus it contained six compartments: one sixth of the comments in the pool

supported GWL from the legitimacy perspective, and one sixth argued GWL violated personal or organizational rights; one sixth predicted GWL would be an effective tool for tobacco control, and one sixth claimed GWL would not reduce smoking rate; one sixth expressed favorability toward the presentational features, and one sixth observed that the GWLs were disgusting and untruthful.

Since unanimous support and unanimous opposition are very rare on comment board, readers in the supportive comment conditions read eight supporting and two opposing comments. Those in the oppositional comment conditions read eight opposing and two supporting comments. The single comment theme conditions displayed 10 comments discussing one of the three themes, namely the effectiveness of the labels, the legitimacy of the policy, and the presentational features of the label. The multiple comment theme conditions displayed 10 comments discussing a mixture of all three themes mentioned above.

The comment allocation algorithm selected 10 comments from the pool for each participant based on his/her condition and displayed the comments in random order. For a subject in the supportive single-theme condition, for example, the algorithm would randomly select eight comments from the supportive-legitimacy compartment of the pool and two comments from the oppositional-legitimacy compartment. The determination of the theme in the single-theme condition is random for those who read no-frame news or multi-frame news. One may read just the basic information in the news and then see 10 comments on effectiveness; one may also read a thorough discussion covering all aspects in the news and then receive 10 comments focusing on legitimacy. For those in the single-frame news plus single-themed comment condition however, comment theme was

matched with the news frame they just read, so one may read a story discussing the issue of legitimacy and then read 10 comments on legitimacy; one may NOT read a story on legitimacy and then read 10 comments on effectiveness.

For a subject in the supportive multi-theme condition, the algorithm would randomly select eight comments from the three supportive compartments and two comments from the three oppositional compartments. Three themes would distribute randomly across the 8 supportive and 2 oppositional comments, so for example one may see 2 supportive comments on legitimacy, 2 supportive comments on effectiveness, 3 supportive comments on presentation, 1 oppositional comment on legitimacy and 1 oppositional comment on presentation.

Figure 3 lists all the experimental conditions with a sample stimuli composition. Appendix C shows a sample stimulus page that includes a news article and 10 comments.

Although the 3 news frame x 2 comment valence x 2 comment theme + 3 no comment control design generated 15 conditions, the variation in single-frame news and single-theme comments created an extra layer of complexity. The operationalization of the design resulted in a total of 33 different news + comment combinations. Appendix D lists what the algorithm has selected for each of the combinations.

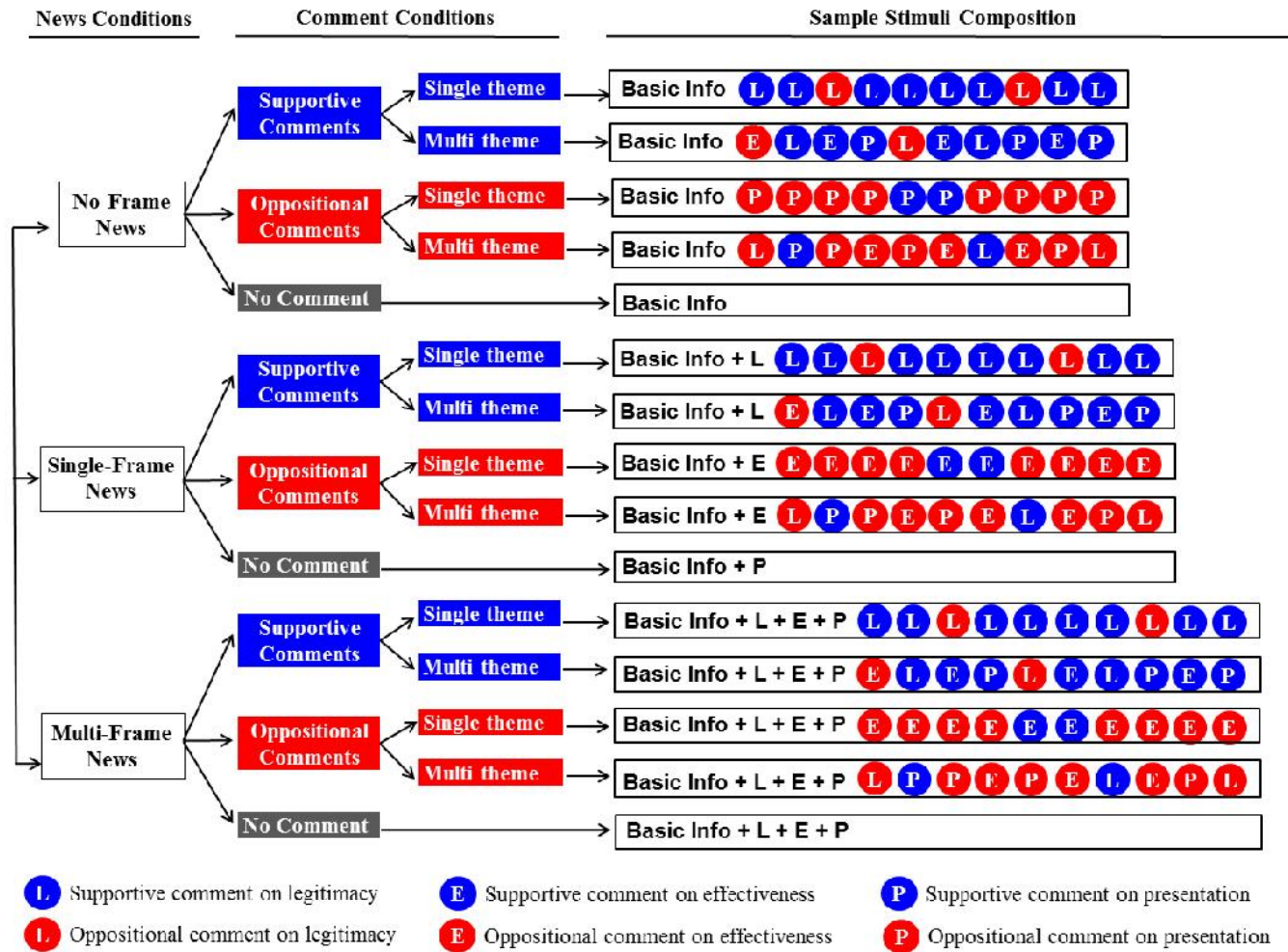


Figure 3. Experiment conditions and a sample stimuli composition for each condition.

## *Measurement*

### *Smoking Status*

Participants' smoking status was determined by two questions. They were asked whether they've smoked 100 cigarettes in their lifetime, and those who answer "yes" to the first question were then asked whether they currently smoke cigarettes every day, some days, or not at all. Subjects were defined as non-smokers if they have not smoked 100 cigarettes in their lifetime or if they were currently not smoking at all. Subjects were treated as smokers if they were smoking every day or some days.

### *Policy Support*

Participants were asked to indicate a) whether they support or oppose the proposed changes to the warning labels that appear on cigarette packs, and b) whether they support or oppose the legal action by the tobacco companies to try to stop the law that requires them to put these warning labels onto cigarette packs. Responses were on a 4-point scale ranging from "strongly support" to "strongly oppose". The two items were highly correlated ( $r = -.68$ ,  $p < .001$ ). Level of policy support was calculated as the difference of the two items, i.e. Policy Support = a - b. It ranged from -3 to 3 with 3 meaning the highest level of support ( $M = .49$ ,  $SD = 1.98$ ). Table 11 lists means of policy support across 15 experimental conditions.

An alternative method to compute policy support is to take the mean of item (a) and the reversely-coded item (b), i.e. Policy Support =  $[a + (5-b)] / 2$ . The two-item scale had a Cronbach's alpha of .81. Policy support based on these two calculation methods generated the exact same result in all the analytical models. All the statistical models with



policy support as the outcome variable were also analyzed using only item (a) as the dependent measure, and the results stayed in the same pattern.

Table 11

*Mean (SD) of Policy Support by Comment Valence, Comment Themes, and News Frames*

Comment Valence x Theme	News Frame		
	No frame	Single frame	Multi frame
Support - Single theme	.84 (1.87)	.55 (1.94)	.57 (2.06)
Oppose – Single theme	.21 (2.00)	.07 (1.98)	.22 (2.02)
Support – Multi theme	.95 (1.83)	.66 (2.09)	.94 (1.76)
Oppose – multi theme	.31 (2.09)	.18 (1.93)	.23 (1.95)
No comment (control)	.92 (1.88)	.40 (2.05)	.40 (2.10)

*Note.* Policy support ranges from -3 to 3.

### *Participation*

Subjects in the 12 treatment conditions saw a “leave a comment” button at the bottom of the comment page (See Appendix C for the appearance of the comment button). Clicking the button was recorded as an indication of their willingness to participate in the discussion. Only 8.8% of all subjects clicked on the button. A prompt came to participants’ screen once the commenting buttons was clicked to instruct them to proceed with the survey and they would be given a chance to comment at the very end of the survey.

### *Thought Diversity*

All the participants were asked to write down the thoughts they had while reading the page of news and comment (Cacioppo & Petty, 1981). Their thoughts were submitted to computerized coding for the presence or absence of the three themes (i.e. legitimacy, effectiveness, presentation) using the optimal algorithm constructed and selected in study 1. The three topical focuses were not mutually exclusive, so for example a thought could be coded as addressing both effectiveness and legitimacy. Thought diversity was computed as the total number of topics present in each thought. Participants' thoughts addressed an average of 1.39 topics ( $SD = 0.73$ ). Thought diversity correlates weakly with people's time spent on the thought listing page at  $r = .10, p < .01$ , and it also correlates with word count of their responses at  $r = .19, p < .01$ , as well as political knowledge at  $r = .11, p < .01$ .

### *Argument Repertoire*

Those who indicated they "strongly support" or "somewhat support" the GWL policy were asked to list reasons why they supported the policy and why others may oppose it. Those indicating they "strongly oppose" or "somewhat oppose" the policy listed reasons why they opposed the policy and why others may support it. Each subject's responses were then coded for relevance and the number of reasons given. Irrelevant response or valence-only statement got a score of zero, and for each substantive response one point was given to every reason listed. Each individual has two scores, one representing the total number of pro-GWL reasons he / she wrote ( $M = 56, SD = .83$ ), the other representing the total number of anti-GWL reasons ( $M = .74, SD = .88$ ). The two argument repertoire scores correlate with political ideology at  $r = .07 \sim .08, p < .01$ .

### *Political Ideology*

People's economic and social policy preferences were assessed as an indicator of their pre-existing attitudes towards the GWL policy. The economic dimension included three issues concerning government spending and services (e.g. The government should provide more services in areas such as health and education even if it means an increase in spending). The social dimension included three questions concerning gay rights, gender equality, and abortion. Questions were adopted from the 2000 American National Election Study, and the six issues were selected because they showed the highest loadings on the latent economic or social factor (Treier & Hilligus, 2009). Social and economic questions were aggregated separately into two scales, and both scales showed satisfactory reliability (Cronbach's  $\alpha = .70$  for social scale and Cronbach's  $\alpha = .77$  for economic scale). Overall the study sample is very liberal on social issues (ranges from 1 to 4.33,  $M = 3.66$ ,  $SD = .77$ ) and moderately liberal on economic issues (ranges from 1 to 4,  $M = 2.94$ ,  $SD = .81$ ). Respondents' social and economic ideology correlate at  $r = .45$ ,  $p < .01$ .

## Results

### *Manipulation Check*

Opinion climate on the comment board was successfully manipulated. Participants in the supportive condition were more likely to agree that most of the comments they read were in favor of the GWL policy ( $M = 3.55$ ,  $SD = 0.89$ ) than those in the oppositional condition ( $M = 2.39$ ,  $SD = 0.93$ ),  $t(1811) = 27.61$ ,  $p < .01$ . The supportive group was also less likely to think that most of the comments were critical of

the GWL policy ( $M = 2.55$ ,  $SD = 0.94$ ) than the oppositional group ( $M = 3.71$ ,  $SD = 0.91$ ),  $t(1811) = -27.06$ ,  $p < .01$ .

### *Policy Support*

#### *Tests for Hypotheses and Research Questions*

To examine factors affecting viewers' support of the GWL policy a three-way ANCOVA was first performed where the first factor had three levels indicating comment valence (no comment vs. supportive vs. oppositional), the second factor had three levels representing news frames (no frame vs. single frame vs. multiple frames), and the third factor had two levels of smoking status (smoker vs. non-smoker). Political ideology on social issues and economic issues were entered into the model as covariates to confirm their role as indicators of pre-existing attitudes, and all the results remain the same when the two covariates are removed from the model.

Table 12

Three-way ANCOVA of Policy Support by Comment Valence, News Frame, and Smoking Status Controlling for Political Ideology

Source	Model 1				Model 2			
	<i>df</i>	<i>F</i>	$\eta^2$	<i>p</i>	<i>df</i>	<i>F</i>	$\eta^2$	<i>p</i>
Comment Valence (V)	2	20.43**	.017	.000	2	12.93**	.011	.000
Three-level News Frame <sup>a</sup> (F)	2	5.64**	.005	.004	-	-	-	-
Five-level News Frame <sup>b</sup> (F)	-	-	-	-	4	7.54**	.012	.000
Smoking Status (S)	1	194.65**	.075	.000	1	141.22**	.056	.000
V x F	4	0.99	.002	.414	8	2.12*	.007	.031
V x S	2	0.052	.000	.949	2	0.15	.000	.862
F x S	2	0.36	.000	.700	4	0.54	.001	.706
V x F x S	4	0.63	.001	.639	8	1.16	.004	.322
PI - Social Liberal	1	0.00	.000	.987	1	0.001	.000	.977
PI – Economic Liberal	1	156.04**	.061	.000	1	159.04**	.062	.000
Error	2400	(3.36)			2388	(3.33)		
R <sup>2</sup>	.16				.17			

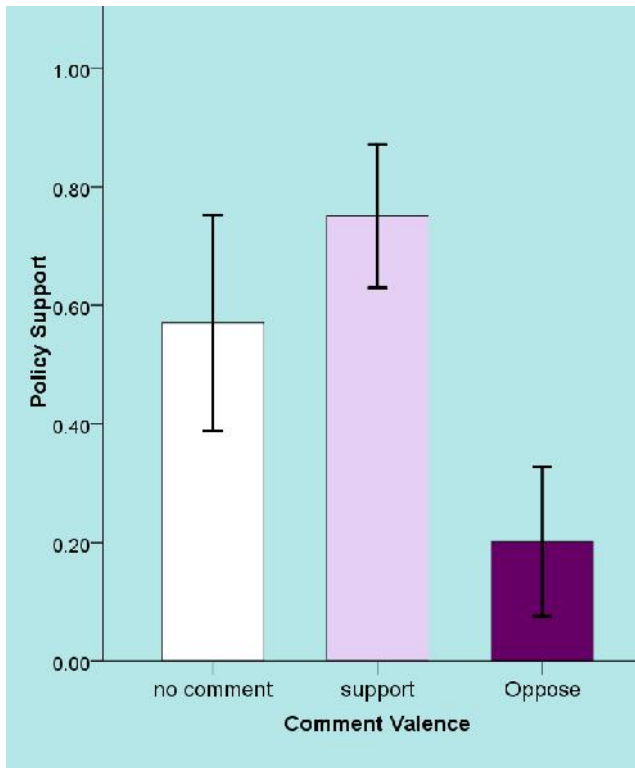
Note. PI = Political Ideology. Values enclosed in parentheses represent mean square errors.

<sup>a</sup>News Frame contained three levels: no frame vs. multiple frame vs. single frame. <sup>b</sup>News Frame contained five levels: no frame vs. multiple frame vs. legitimacy frame vs. effectiveness frame vs. presentation frame.

\*  $p < .05$ . \*\*  $p < .01$

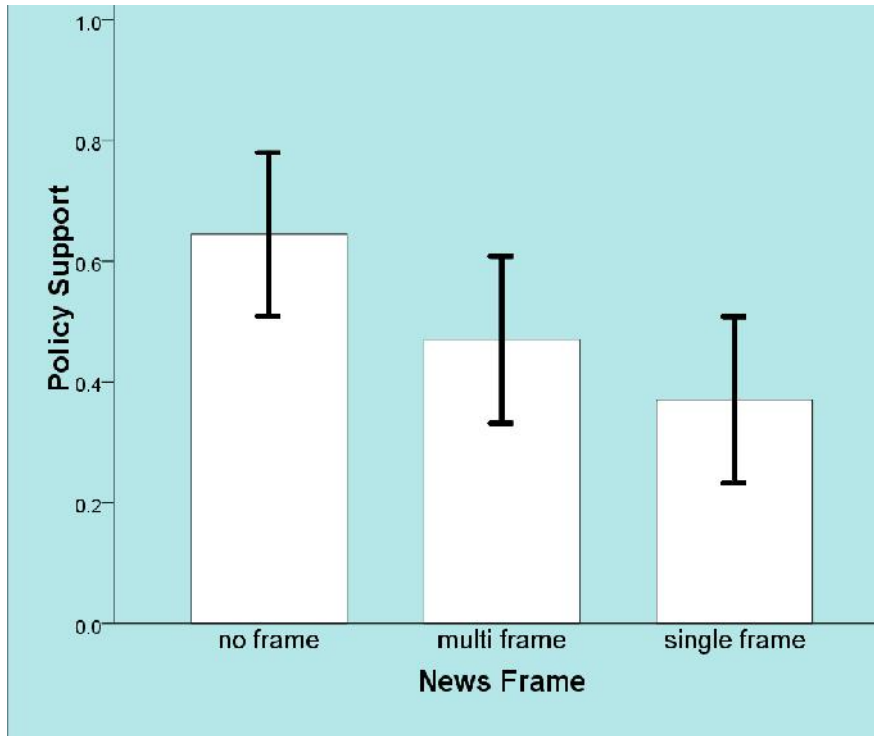
Model 1 in Table 12 presents results from the ANCOVA where comment valence, news frames, people's smoking status, and economic political ideology showed significant main effect on people's policy support in this full factorial model. Non-smokers ( $\text{adj } M = 1.06, SE = .06$ ) were more likely to support the GWL policy than smokers ( $\text{adj } M = -.05, SE = .06$ ),  $F(1, 2400) = 194.65, p < .001, \eta^2 = .08$  and economic liberals are more likely to support GWL than conservatives  $F(1, 2400) = 156.04, p < .001, \eta^2 = .06$ , but smoking status did not interact with comment valence or news frames to influence policy support.

As depicted in Figure 4, post hoc analysis found oppositional comments ( $\text{adj } M = .21, SE = .06$ ) significantly lowered subjects' endorsement for GWL compared with the no-comment control group ( $\text{adj } M = .57, SE = .08$ ),  $p < .01$ , Cohen's  $d = .18$  and the oppositional comments also received lower policy support than supportive comment condition ( $\text{adj } M = .73, SE = .06$ ),  $p < .01$ , Cohen's  $d = .27$ . Supportive comments increased policy support over the no-comment control but the improvement was not statistically significant,  $p = .12$ , Cohen's  $d = .08$ .



*Figure 4.* Mean policy support for those who read no comment, supportive comments, and oppositional comments. Error bars showed the 95% CI. The oppositional comment group showed significantly lower policy support than the other two groups.

Figure 5 presents the influence of news frame on policy support. The no-frame news story elicited significantly higher level of policy support (adj  $M = .68$ ,  $SE = .07$ ) than the multi-framed news (adj  $M = .48$ ,  $SE = .07$ ),  $p < .05$ , Cohen's  $d = .10$ , the no-frame news also received higher policy support than and the single-framed news (adj  $M = .36$ ,  $SE = .07$ ),  $p < .01$ , Cohen's  $d = .16$ .



*Figure 5.* Mean policy support received by five versions of news articles. Error bars showed the 95% CI.

To test the persuasiveness of focused versus dispersed discussions, a two-way ANOVA was performed for policy support as a function of comment valence and comment themes. Neither the main effect nor the interaction of the two factors was significant.

Figure 6 summarized results for the hypotheses and research questions concerning policy support.



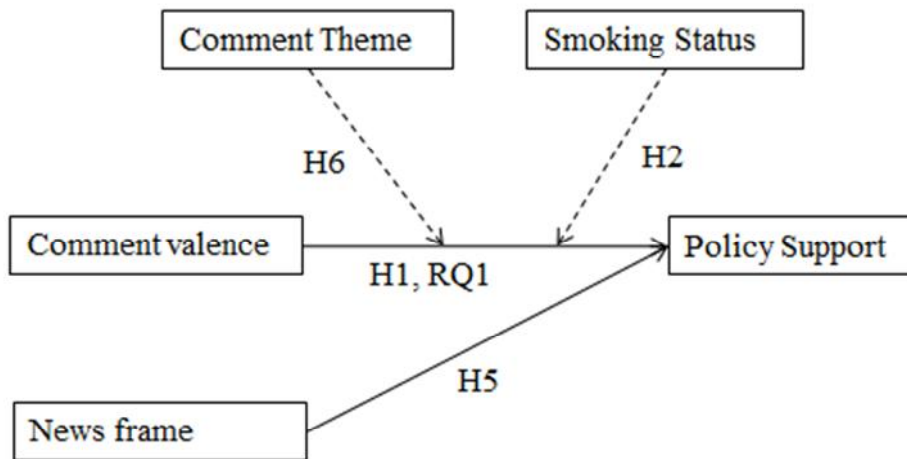


Figure 6. Summary of results for all the hypotheses and research questions on policy support. Dashed lines marked proposed relationships with no significant finding.

*Additional Analysis on Policy Support*

The single-framed news condition was further broken down to “legitimacy”, “effectiveness”, and “presentation” groups and the same ANCOVA was performed with news frame entered as containing five levels (no frame vs. multiple frame vs. legitimacy vs. effectiveness vs. presentation). Results of the new ANCOVA model was shown as Model 2 in Table 12. Post hoc analysis found the no-frame news achieved higher policy support than all but the presentation frame. The news story addressing the issue of legitimacy elicited lower policy endorsement than all but the effectiveness frame. See pairwise comparison results in Figure 7.

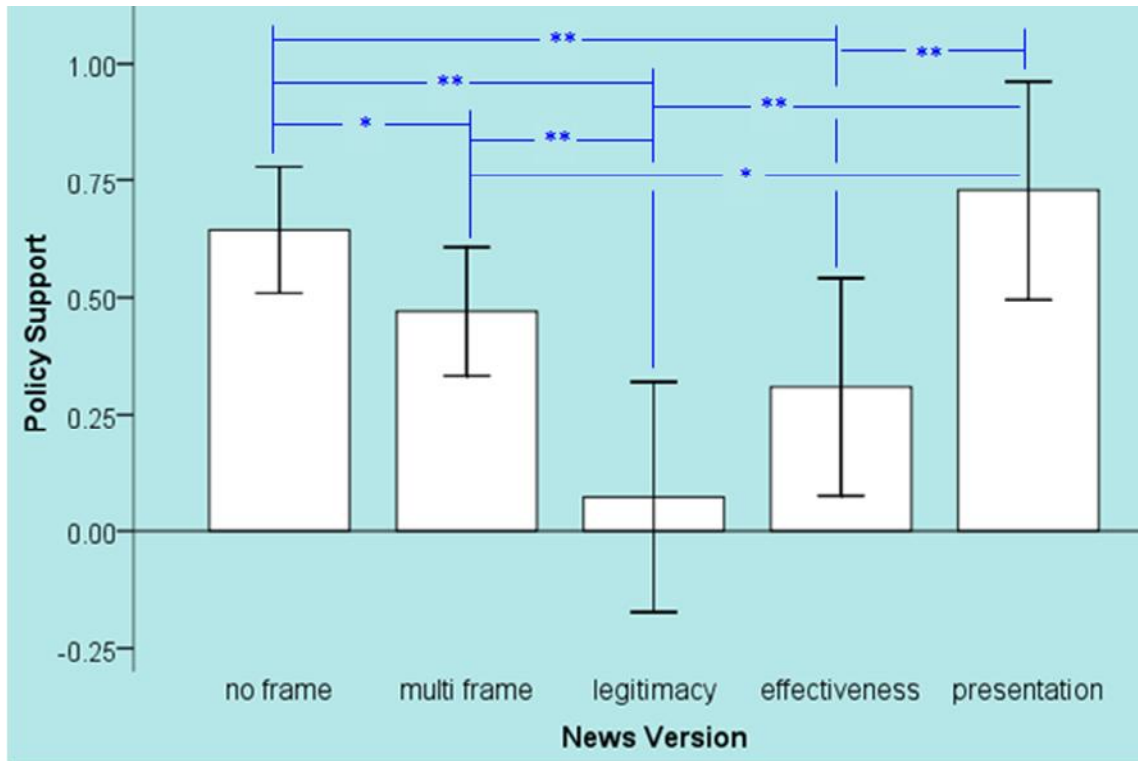


Figure 7. Mean policy support received by five versions of news articles. Error bars showed the 95% CI. The no-frame news stimulated higher policy support than all but the presentation group. The legitimacy news elicited lower policy support than all but the effectiveness group. \* differ at  $p < .05$ , \*\* differ at  $p < .01$ .

In addition, comment valence and news frame interacted to influence policy support,  $F(1, 2388) = 2.12, p < .05, \eta^2 = .01$ . As shown in Figure 8, while supportive and oppositional comments following news on policy effectiveness and label presentation did not make much difference, readers were most likely to be influenced by comment climate when concerns about legitimacy were salient.

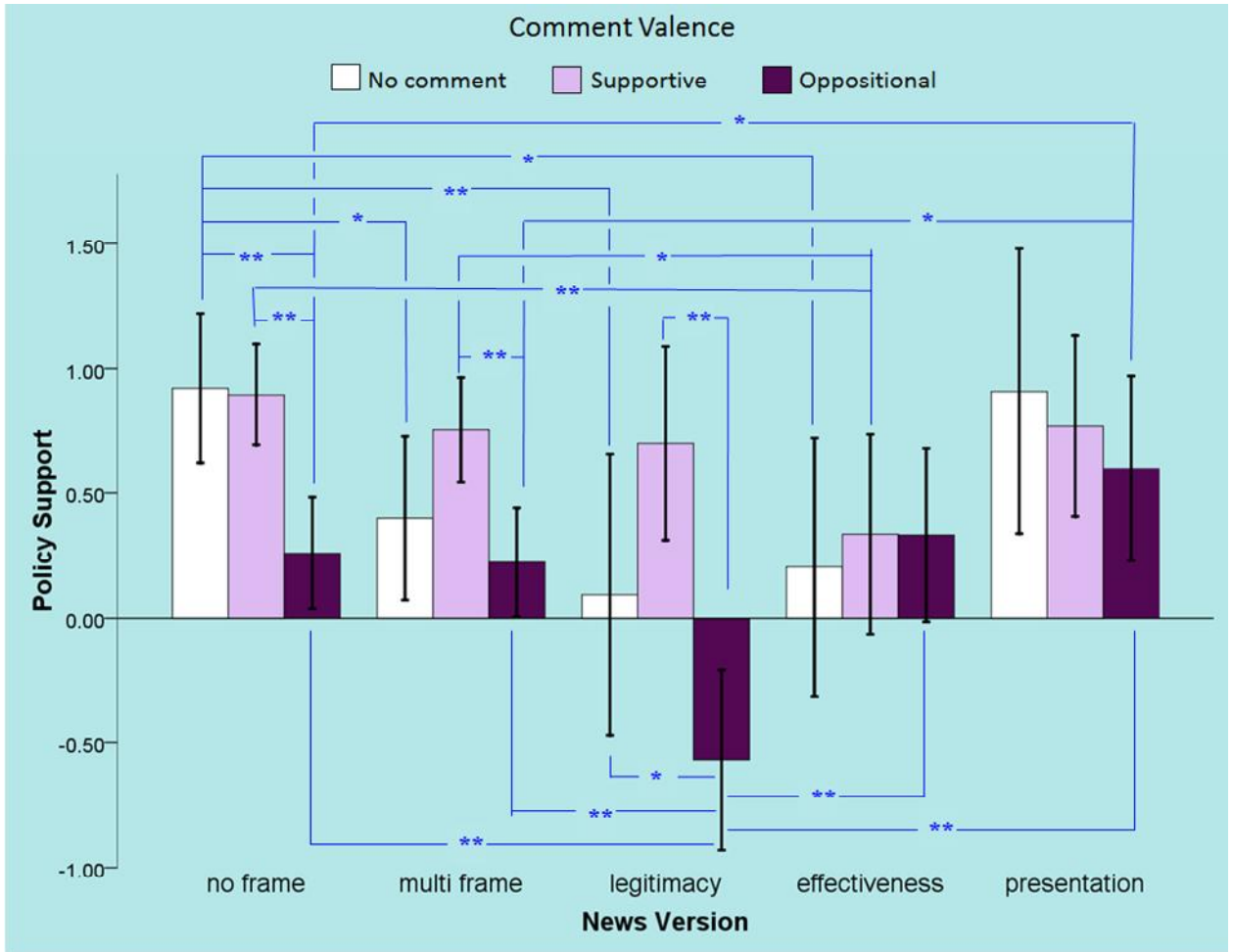


Figure 8. Policy support for none, supportive and, oppositional comments across five versions of news articles. Error bars showed the 95% CI. Pairs with \* differed at  $p < .05$ ; pairs with \*\* differed at  $p < .01$ .

The white bars in Figure 8 showed the absolute effect of news frames independent from comments, and again the no-frame news, that is the news with only the basic information about the GWL requirement, received higher level of policy support than news that focused on legitimacy ( $p < .01$ ), effectiveness ( $p < .05$ ), and all frames

combined ( $p < .05$ ). When there was no comment, legitimacy-based news did not differ significantly from effectiveness-focused or presentation-focused news, but the non-significance could be a result of the lack of power as the three groups each only contains about 54 or 55 subjects (the sample size of legitimacy/effectiveness/presentation-only news was one third of the sample of no-frame or multi-frame news due to study design).

The low rating on the no-comment legitimacy-only news raised the possibility that the mere presence of this frame (although balanced) were seen by the audience as an oppositional argument: “this must be a bad policy since people are still discussing its legitimacy.” To further investigate this possibility three news frames were compared across readers’ political ideology, but the interaction term was not a significant predictor of policy support,  $F(2, 809) = .33, p = .72$ , meaning conservatives rated the policy as low as liberals when legitimacy was discussed by the news. It is noticeable that once the legitimacy news was surrounded by supportive comments it generated policy endorsement as high as other stories, which indicates the legitimacy perspective was not negative in nature and it had the potential to win support. What stood out from the result pattern is the legitimacy framed news coupled with oppositional comments. It seems oppositional arguments from the legitimacy perspective were particularly persuasive compared with oppositions on other issues concerning the GWL policy, and the availability of strong opposing argument could be the main reason for the low policy rating after legitimacy news.

### *Opinion Quality*

Opinion quality was operationalized as the measure of argument repertoire. Participants were asked to list reasons why they support / oppose GWL, and they also

listed reasons others with opposite opinions might have. A three-way MANOVA was first conducted on the influence of comment valence, comment themes, and news frames on people's number of own reasons and opponent's reasons. Comment valence included two levels (support vs. oppose), comment themes consisted of two levels (single theme vs. multiple themes), and news frame had three levels (no frame vs. single frame vs. multiple frame). Initial MANOVA found people's number of own reasons and opponent's reasons were not influenced by any of the experimental factors. However, people's ability to list pro-GWL and anti-GWL reasons was found to be influenced by the comments they read. Table 13 presented the MANOVA model.

Table 13

*Three-way MANOVA of Argument Repertoire by Comment Valence, Comment Theme, and News Frame.*

Effect	Wilks' $\lambda$	df	Pro-GWL reasons		Anti-GWL reasons	
			F	$\eta^2$	F	$\eta^2$
Comment Valence (V)	1.00**	1	4.61*	.002	4.37*	.002
Comment Theme (T)	1.00	1	0.30	.000	1.13	.001
News Frame (F)	1.00	2	1.97	.002	2.12	.002
V x T	1.00*	1	0.01	.000	8.59**	.004
V x F	1.00	2	0.07	.000	0.87	.001
T x F	1.00	2	0.10	.000	1.21	.001
V x T x F	1.00	2	0.76	.000	0.89	.000
Error		1926	(0.71)		(0.76)	
R <sup>2</sup>				.005		.012

*Note.* Three no-comment control conditions were excluded from the model, n = 1938.

Values enclosed in parentheses represent mean square errors.

\* p < .05. \*\* p < .01

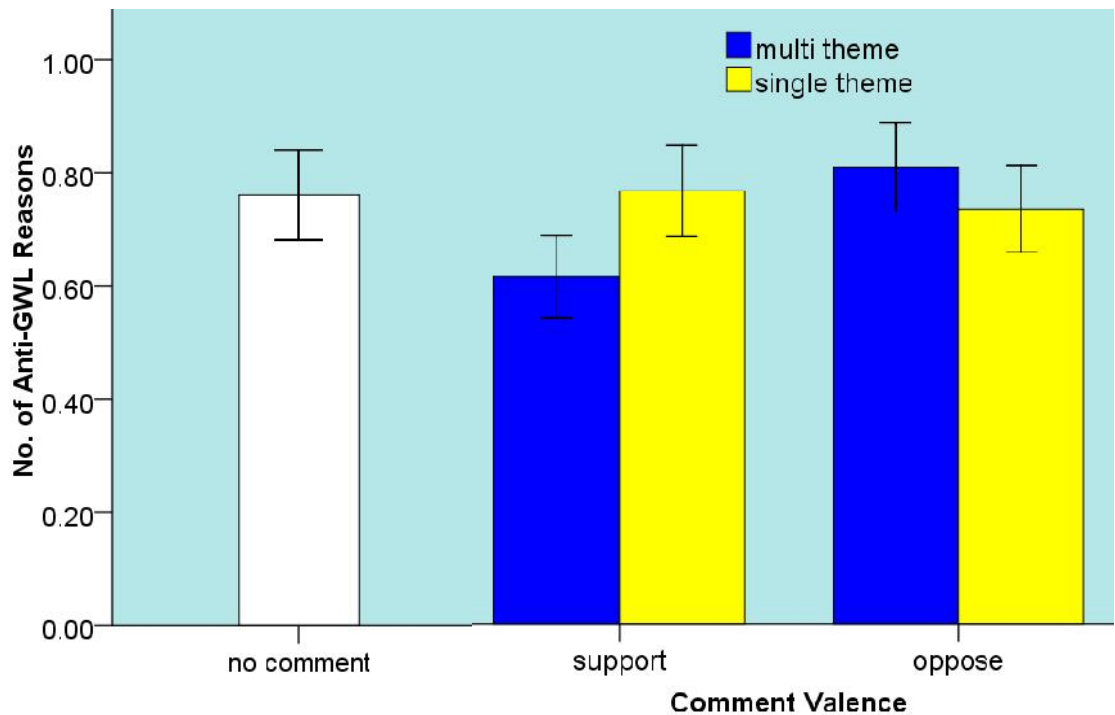
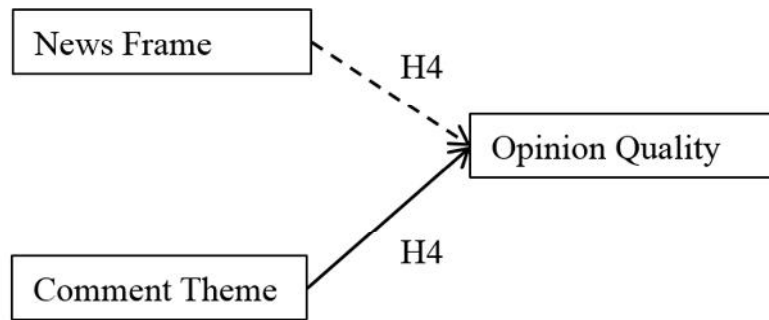


Figure 9. Number of anti-GWL reasons listed by people reading four types of comments or no comment. People in the support single theme condition generated significantly less reasons than the support multi theme condition as well as the no-comment control.

Regardless of their own position, supportive comments enabled people to list more reasons in support of GWL,  $F(1, 1926) = 4.61, p = .03$ , and oppositional comments helped people list more reasons against GWL,  $F(1, 1926) = 4.37, p = .04$ . In addition, reading supportive multiple-themed comments lowered the number of anti-GWL reasons people listed, but no such effect was found for single-themed comments. The no-comment control condition was excluded from the MANOVA model because the model included both comment valence and comment themes as factors. Thus a one-way

ANOVA with planned contrast was then conducted to compare the four comment groups with the no-comment control. Results showed the support single theme condition was the only comment condition that differed significantly from the no-comment control on the number of anti-GWL reasons, indicating people’s understanding of the downside of the policy was undermined only if they read comments supporting GWL from various aspects. Figure 9 showed the comment valence by comment theme interaction with the no-comment control included as a reference group.

Figure 10 summarized results for the hypotheses and research questions concerning opinion quality.



*Figure 10.* Summary of results for all the hypotheses and research questions on opinion quality. Dashed lines marked proposed relationships with no significant finding.

#### *Thought Diversity*

A two-way ANOVA was performed to assess the influence of news frame and comment themes on people’s level of cognitive elaboration operationalized as thought diversity. News frame had three levels (no frame vs. single frame vs. multiple frames)

and comment themes included three levels (no comment vs. single theme vs. multiple themes). The main effect of neither factor was significant, but their interaction term was significant,  $F(4, 2409) = 2.87, p = .02, \eta^2 = .005$ . As shown in Figure 11, when there is no comment on the site, single-framed news can limit people’s cognitive elaboration. Readers’ thought diversity however, could be boosted if the single-framed news was followed by single-themed comments. Multi-framed news story could also suppress elaboration if the accompanying comments focused on only one aspect of the policy.

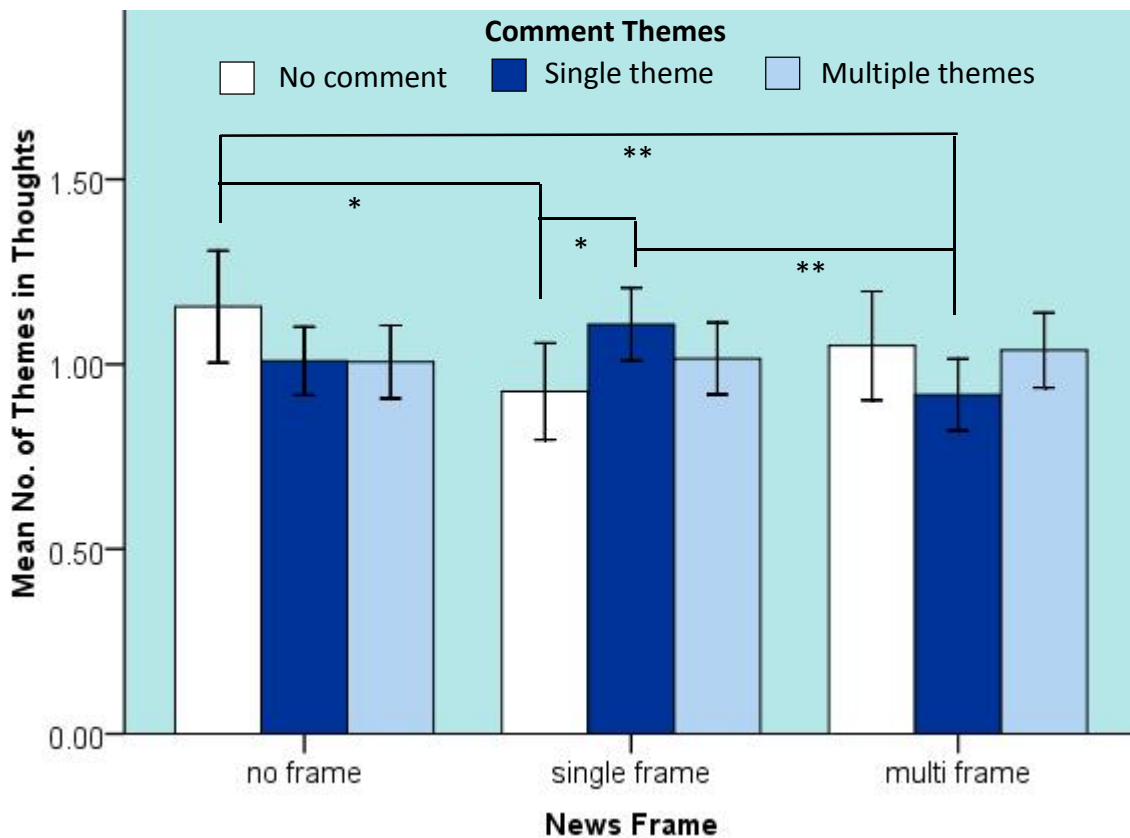
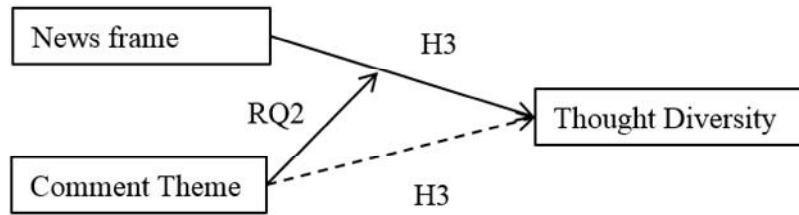


Figure 11. People’s thought diversity after reading three types of news accompanied by three types of comments. \* differ at  $p < .05$ , \*\* differ at  $p < .01$ .



Figure 12 summarized results for the hypotheses and research questions concerning thought diversity.



*Figure 12.* Summary of results for all the hypotheses and research questions on thought diversity. Dashed lines marked proposed relationships with no significant finding.

### *Participation*

Logistic regression was conducted to examine the effect of news frame and comment theme on people’s likelihood of clicking the “leave a comment button”. As shown in Model 1 of Table 14 neither the main effect nor the interaction term of the two factors was related to participation.

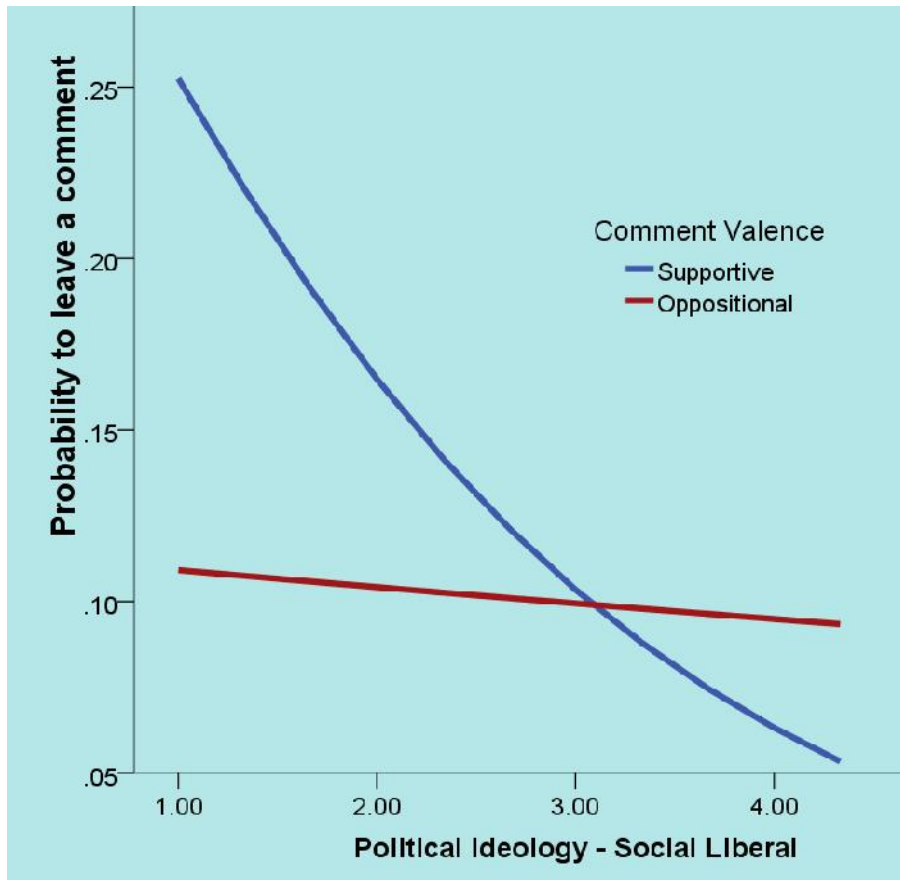
Table 14

*Binary Logistic Regression Models for Variables Predicting Clicking on the “Leave a Comment” Button*

Independent variable	Model 1				Model 2				Model 3				
	B	S.E.	P	OR	B	S.E.	P	OR	B	S.E.	P	OR	
News Frame (F)			.421								.326		
- none vs. single (F1)	.37	.28	.188	1.45					.42	.28	.135	1.53	
- multi vs. single (F2)	.21	.29	.480	1.23					.26	.29	.358	1.31	
Comment Theme (T)	.45	.28	.101	1.57					.47	.28	.091	1.60	
F x T			.117								.098		
- F1 x T	-.66	.39	.090	.52					-.68	.39	.081	.51	
- F2 x T	-.76	.41	.063	.47					-.80	.41	.051	.45	
Comment valence (V)					-1.18	.76	.119	.31	-.90	.98	.357	.41	
PI - social liberal (PIS)					-.66**	.15	.000	.52	-.67**	.16	.000	.51	
PI - economic liberal (PIE)					.28	.17	.101	1.32	.25	.18	.15	1.29	
V x PIS					.58**	.21	.007	1.79	.59**	.22	.006	1.80	
V x PIE					-.22	.22	.323	.80	-.15	.23	.509	.86	
Smoking status (SS)									.04	.25	.869	1.04	
Policy support (PS)									.04	.07	.589	1.04	
V x SS									-.33	.34	.338	.72	
V x PS									-.15	.09	.092	.86	
Model evaluation					$\chi^2(5) = 5.67, p = .340$				$\chi^2(5) = 19.08, p = .002$				$\chi^2(14) = 32.91, p = .003$
Hosmer & Lemeshow goodness-of-fit					$\chi^2(4) = 0, p = 1.00$				$\chi^2(8) = 4.17, p = .841$				$\chi^2(8) = 3.38, p = .908$
Nagelkerke R <sup>2</sup>					.01				.02				.04

*Note.* PI = Political Ideology. Three no-comment control conditions were excluded from the model, n = 1941.

Participants' position on the GWL policy at the moment of exposure was unclear and it was speculated from three variables: political ideology and smoking status that would indicate their predisposition and their response to the policy support question afterwards. The effect of people's stance and the opinion climate on participation was then tested. As illustrated in Model 2 and Model 3 of Table 14, people's tendency to leave a comment was significantly influenced by their political ideology on social issues and its interaction with comment valence. Those who were conservative on social issues were more likely to leave a comment. Every unit increase in social liberalism resulted in a 29% decrease in people's odds of clicking the "leave a comment" button (OR = .71,  $p < .01$ ). Figure 13 showed the comment valence by political ideology interaction. When comments were predominantly against the GWL policy people's political ideology was not related to their chance of leaving a comment (OR = .92,  $p = .60$ ), but when comments on the board were mostly in support of the policy socially conservative subjects were more likely to leave a comment than liberals. For the supportive comment condition every unit increase in socially liberal ideology resulted in a 49% decrease in people's odds of posting a comment (OR = .51,  $p < .01$ ). Respondents' smoking status and self-reported policy endorsement were not related to their interest in online participation, which indicates the influence of political ideology on participation was unique and ideology may serve the purpose beyond a proxy of pre-existing attitude.



*Figure 13.* People’s probability to click the “leave a comment” button as a function of comment valence and their political ideology on social issues.

The overall interaction effect of news frame and comment theme turned marginally significant in model 2. Post-hoc analysis showed it was the single themed news coupled with the single framed comment that generated the most clicks on the comment button.

Figure 14 summarized results for the hypotheses and research questions concerning participation.

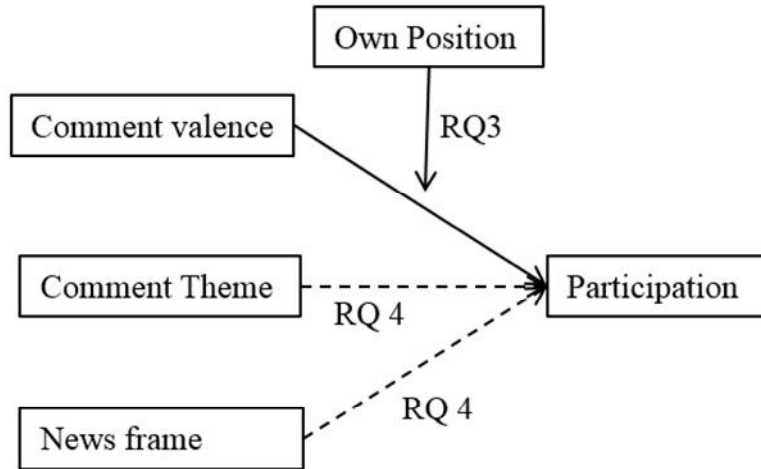


Figure 14. Summary of results for all the hypotheses and research questions on participation. Dashed lines marked proposed relationships with no significant finding.

## Discussion

### *Negativity Bias of Comments and News*

The overall opinion climate on the comment board to news articles is an important determinant of news readers' perception of the policy under debate. In this study supportive comments were found to elicit higher level of policy support than dissenting comments. When compared with a no-comment control group the negativity bias (Cacioppo, Gardner, & Berntson, 1997) seemed to prevail in the sense that oppositional comments lowered readers' policy endorsement but supportive comments failed to improve the rating. As shown in Figure 8, the only situation where positive comments may have a chance to improve policy support over the no-comment control, if given a larger sample size, is when the news story focused solely on legitimacy (arguably

the most controversial issue of the GWL policy). With all other versions of the news articles supportive comments offered no noticeable persuasive effect.

Although non-smokers are much more likely to support GWL than smokers, the two groups are equally influenced by the overall opinion climate on the comment board. Audience's judgment is particularly affected by comment valence when the legitimacy concern became salient, probably because people sensed high level of uncertainty on this focus of controversy.

News story elicited the highest level of policy support when only the basic information of the policy was covered. Both a thorough coverage of multiple considerations and an in-depth coverage of a single frame could lower readers' support for the policy. This finding is unhypothesized and thus unexpected. It is tempting to reason that readers of the information-only news showed high support for the policy because they did not think it through, that is the lack of perspective in media coverage prevented them from cognitive elaboration, but their performance in the thought listing task suggests otherwise. As shown in Figure 11, participants who read no-framed news followed by no comments engaged in the same, if not higher, level of issue-relevant thinking as their peers who were exposed to more argumentative messages. Another plausible explanation for the deleterious effect of news framing is (again) negativity bias. Although news stories used in the experiment, as well as many cases in the real world, are a balanced coverage of the policy, meaning opinions from both sides of the debate are included, it is likely that readers are more influenced by negative accounts

Frames are not equally consequential, and the policy in discussion may benefit more from the activation of certain frame over others. Subjects in the current study are

more likely to support the GWL policy when their attention is directed to the considerations about the presentational features of the labels because such discussion implicitly treats legitimacy and effectiveness as prerequisite (i.e. of course the GWL is legit and necessary and that's why these labels are even worth our close examination and critique). Legitimacy considerations generated the lowest policy endorsement among audience because of the availability of strong opposing arguments. People's support for the policy was not quite influenced by positive or negative comments when the news focused on effectiveness and presentation frames, but when legitimacy was the topic under discussion people's judgment was heavily affected by comment climate. Finally, as essential, controversial, and popular as a frame legitimacy may be, when activated it did not overpower other co-existing frames that are bland. To make a decision about the policy, readers of the multiple-framed news took into consideration all three aspects discussed by the article.

#### *Suppression Effect of News and Comment Framing*

As hypothesized, single framed news can limit people's thought diversity, but such suppression effect can sometimes be offset by comments. Comments can expand readers' thoughts to multiple aspects of the policy when the news story only focuses on one particular aspect. When multiple issues are covered by the news however, single themed comments can limit readers' thoughts, so for example a focused discussion on the comment board on the issue of effectiveness can decrease the salience of the issue of presentation and legitimacy in the readers' mind even though these two topics are mentioned by the news article. This set of findings suggests, when put together, comments and news are not equally powerful in shaping readers' thought diversity:

comments outperformed news. Comments can stimulate people to think more when news is narrow, and think less when news is thorough.

Neither the multiple-framed news nor the multiple-themed comments improved people's opinion quality. Contrary to the hypothesis, comment sets covering multiple topics tend to lower opinion quality under certain circumstances. People's understanding of the downside of the policy was undermined only if they read supportive comments on various issues related to the policy, but their ability to reason against the policy remain unchanged if the supportive comments focused on only one issue. Such effect is possibly due to mental overload, in the sense that people are unable to list reasons against the policy because their mental capacity is taken up by multiple pro-policy issues. Diversified discussion costs more cognitive resources.

Results from this study suggest a new social policy may receive the highest level of public support if it is communicated in an open-ended manner that sticks to facts rather than opinions. But if perspectives are called for, thoroughness should be a journalistic principle as important as balance and objectivity. Covering all the relevant issues (instead of only the most controversial issue) makes the public better informed and the policy more supported.

#### *Participation and Political Ideology*

Conservatives tend to post comments if the opinion climate is overly positive, but liberals did not show interest in posting when the opinion climate is overly negative. At the first glance such finding may be explained as a function of people's stance on the policy, that is conservatives are more likely to speak out because they oppose the policy and they disagree with the supportive comments, and yet respondents' smoking status



and the endogenous measure of self-reported policy endorsement were not related to their interest in online participation, which indicates online participation (at least in this study) is not motivated by predisposition, position taken, or personal relevance. The influence of political ideology on participation is unique and ideology may serve the purpose beyond a proxy of pre-existing attitude.

There is a general concern that deliberation itself has a liberal bias because participatory democracy are traditionally connected with justice and social equality (Kuran, 1998), but this study finds participation more connected with the conservative value. One additional complexity is worth noting: it is the socially rather than economically conservative ideology that dictates participation. Social and economic ideology are moderately related ( $r = .45$ ) and both are predictive of people's policy support if entered into the model separately. When they co-exist in the model for policy support the effect of social ideology is completely taken away by economic ideology, meaning the common ground of the two values, i.e. the conservativeness contributes to people's decision to oppose the policy. For participation however, social ideology is the sole predictor regardless of how the ideology variables are entered into the regression.

To sum up, socially conservative readers are more likely to post comments online, especially if the overall opinion climate is in support of the policy. Their participation is not motivated by their pre-existing attitude or the position they take on the policy. It remains unclear what element specific to social conservatism motivates deliberation on the comment board and the question shall be addressed by future research. One possibility is that conservatives are more out-spoken than liberals on the internet, especially when they represent the minority opinion in the deliberation environment, but

data from the current study does not allow such generalization. Future study with can investigate such possibility with public deliberation in other topic domains.

Single-frame news combined with single-themed comments showed the tendency to stimulate comment posting. In a content analysis of online community posts Velasquez (2012) found comments accumulated faster in stories where commenters reply to each other, and it is likely readers participate more on the site when everybody is discussing one single topic because they perceive higher level of interactivity.

#### *User-Generated Comment as Indicator of Public Opinion*

In a sense news websites nowadays are becoming public forums where opinions are expressed and social issues debated. Just like audience on the public forums, the majority of the website visitors do not participate in the discussion directly. Most of them read, watch, listen, and then leave the page without a word. This pattern can be usually confirmed by website statistics like the contrast between the number of page views versus the number of comments. Of all the subjects exposed to comments in the current study, 3% choose to skip the comment section, about half read some comments and 50% claimed they've read all the comments, and yet only 9.3% of the comment readers clicked the "leave a comment" button.

Commenters are everything but a representative sample of all news readers, and their comments are clearly a distorted reflection of public opinion. Take data from the two studies in this dissertation for example: content analysis in Study I showed the comment boards of GWL related news are predominated by objections with about 10% expressed any form of support while the majority of the people surveyed in Study II actually supported the policy (61% support rate, and it is a conservative estimate of

public support as half of the sample is smokers). Content analysis identified legitimacy as the most discussed topic in the public sphere (58%) while the majority of the participants of the experiment mentioned concerns about effectiveness (75%) when listing their post-reading thoughts. The disconnection between what's on the comment board and what the public truly think is important because, as this experiment shows, comment board has consequences. As unrepresentative and distorted as comment boards can be, readers see them as a proxy of public opinion and are influenced by them.

Shutting off comment may be the last resort. After all in this study policy support is not improved by any type of comments and the quality of individual's opinion does not enhance no matter what comments they read. The *Popular Science* magazine recently decided to shut off comment of their websites because the discussions were overwhelmed by trolls and spambots and thus is bad for science as “commenters shape public opinion; public opinion shapes public policy; public policy shapes how and whether and what research gets funded” (LaBarre, 2013, para. 6). News sites and social media outlets of various layers of government agencies are not necessarily doomed enough to follow *Popular Science's* step, but it is time to take this option into consideration.

## Appendix A: Codebook for the Content Analysis of GWL News Comments

### RELEVANCE & VALENCE

1. Is the comment about Graphic Warning Labels (GWL) or the policy overall?

0 - no

1 – yes

***Code 1a and 1b if Q1 = (1)yes. Skip and go to Q2 if Q1 = (0)no.***

#### 1a. Pro-GWL

Does any part of the comment discuss the labels / policy in a positive light or compliment the labels?

0 - no

1 – yes

#### 1b. Anti-GWL

Does any part of the comment criticize or express negative feeling towards the GWL policy or the labels

0 - no

1 - yes

2. Is the comment about smoking?

0 - no

1 – yes

***Code 2a and 2b if Q2 = (1)yes. Skip Q2 = (0)no.***

#### 2a. Pro-Smoking

Does any part of the comment support or try to justify smoking?

0 - no

1 – yes

#### 2b. Anti-Smoking

Does any part of the comment criticize or express negative feeling towards smoking, desire to quit, or regret for initiation?

0 - no

1 - yes

### THEMES

***Code Q3 – Q14 if Q1 = (1)yes.***

***Skip and go to Q15 if Q1 = (0)no.***

3. Analogy / Slippery slope (i.e. GWL on other products e.g. cars, beers, fast food )

0 - no

1 – yes

4. GWL violates the rights of tobacco companies (e.g. unconstitutional / First amendment / Freedom of speech/ nanny state)

0 - no

1 – yes

5. GWL violates the rights of smokers (e.g. unconstitutional / nanny state)  
0 - no  
1 - yes
6. Reverse / boomerang effect (e.g. cigarette cases are cool and will be popular )  
0 - no  
1 - yes
7. People know these risks already and thus GWL is unnecessary  
0 - no  
1 - yes
8. GWL won't work in general  
0 - no  
1 - yes
9. GWL may protect new users from starting  
0 - no  
1 - yes
10. GWL were / will be effective in general  
0 - no  
1 - yes
11. Other countries are doing it  
0 - no  
1 - yes
12. Government's interest in public health / health care  
0 - no  
1 - yes
13. Alternate solutions (such as making tobacco illegal or imposing a higher tax)  
0 - no  
1 - yes
14. Labels' information truthfulness (e.g. content of GWLs are accurate / conveying facts / fake / exaggerated / misleading / manipulative / meant to scare)  
0 - no  
1 - yes
15. Labels' presentational features (e.g. image of GWLs are explicit / disgusting / disturbing / of bad taste / vivid / strong / too large, etc.)  
0 - no

1 – yes

Other

16. Refutational

Confront an argument directly rather than overwhelm it with a new topic or personal attacks

Code	Example
<b>(1) Yes</b>	<p>This isn't the 70's. Everyone that smokes knows damn well it isn't good for them already. This new scare tactic isn't going to phase them.</p> <p>--- Everyone knows the STATEMENT that cigarettes are dangerous. Most have not seen it first hand. Perhaps a graphic image will help</p>
<b>(0) No</b>	<p>This isn't the 70's. Everyone that smokes knows damn well it isn't good for them already. This new scare tactic isn't going to phase them.</p> <p>--- I have COPD, have never smoked EVER, and my doctor told me it is caused by second hand smoke from my fathers and ex husbands. I think the pics should be even MORE graphic.</p> <p>--- The Europeans started doing this on packs of cigs in the 1980's. What took America so long? You are right if you said Lobbyist.</p> <p>--- That's bullshit. You are probably too smart to live in the 21 century. Go back to your 70s</p>

A refutational comment does not have to be a reply to other comments. An original comment should be coded as refutational if it quoted or reiterated the argument it was trying to confront.

Code	Example
<b>(1) Yes</b>	<p>- DANJAI1978-That is a pretty stupid comparison. As a society we are not trying to get people to stop driving a car. Car accidents are just that, an accident. Smoking and lung cancer are not accidents. They are deliberate acts of abuse.</p> <p>- For all those complaining about this is a waste of tax-payer resources, remember that the tax-payers are ultimately paying for the health care of a lot of these medicare and medicaid smokers at an a expense that is surely much much greater than hiring a bunch of marketers.</p>
<b>(0) No</b>	...

17. Narrative / testimony

Whether the comment include a personal story.

Pay close attention to personal confession / narratives / stories about smoking status (smoker, non-smoker, ex-smoker), quitting status (have quit, is quitting, won't quit), and any other smoking related behaviors.

0 - no

1 – yes

## Appendix B: News Articles Used in Study 2

### Version 1: NO-FRAME

Federal health officials released on Tuesday their final selection of nine graphic warning labels to cover the top half of cigarette packages beginning next year.

The warnings will cover the upper portion of the pack both front and back. At least 50% of the package will have to be covered. In addition, the warnings will have to cover at least 20% of a cigarette ad. Small ads less than 12 inches don't require the 20% coverage, but must still have a warning. The agency will require all manufacturers to use the labels on all U.S. sold cigarettes.

Such warnings were required by a 2009 law that gave the Food and Drug Administration the authority to regulate tobacco products. The requirement is the first major overhaul of cigarette warnings in a quarter-century.

The modest one-liners on the dangers of smoking, now featured on cigarette packs, will soon turn into graphic images and messages that cover nearly half the pack.

The labels represented the agency's exercise of its new authority over tobacco products and the most significant change in cigarette warnings since companies were forced to add the mandatory Surgeon General's warning in 1965.

Current warning labels, which were put on cigarette packs in the 1980s, are contained in a small box with black and white text warning about the dangers of smoking.

"These warnings mark the first change in cigarette warnings in more than 25 years" the FDA says.

### Version 2.1 SINGLE-FRAME: LEGITIMACY

Federal health officials released on Tuesday their final selection of nine graphic warning labels to cover the top half of cigarette packages beginning next year.

Such warnings were required by a 2009 law that gave the Food and Drug Administration the authority to regulate tobacco products. The requirement is the first major overhaul of cigarette warnings in a quarter-century.

The modest one-liners on the dangers of smoking, now featured on cigarette packs, will soon turn into graphic images and messages that cover nearly half the pack.

The four leading tobacco companies were all threatening legal action, saying the images would unfairly hurt their property and free-speech rights by obscuring their brand names in retail displays, demonizing the companies and stigmatizing smokers. "Any government requirement that compels a private entity to carry a message not of its own choosing raises constitutional



concerns," wrote Philip Morris, the country's largest tobacco company. It said the sheer size of the warnings violates the First Amendment.

According to the Centers for Disease Control and Prevention, about 443,000 people in the U.S. die from smoking or exposure to secondhand smoke annually and more than 8 million are living with a disease that's directly tied to smoking. "This is going to be a very important element in the tobacco control tool box," said Thomas Glynn, director of cancer science and trends for the American Cancer Society. "The labels are not just for smokers, the labels are for anyone interested in public health."

## Version 2.2: SINGLE-FRAME: EFFECTIVENESS

Federal health officials released on Tuesday their final selection of nine graphic warning labels to cover the top half of cigarette packages beginning next year.

Such warnings were required by a 2009 law that gave the Food and Drug Administration the authority to regulate tobacco products. The requirement is the first major overhaul of cigarette warnings in a quarter-century.

The modest one-liners on the dangers of smoking, now featured on cigarette packs, will soon turn into graphic images and messages that cover nearly half the pack.

Health advocacy groups hoped that images would shock and deter new smokers and motivate existing smokers to quit.

Government officials project the U.S. will have 213,000 fewer smokers in the first year after the new labels are introduced, said Lawrence Deyton, director of the FDA's Center for Tobacco Products. More than 25% of smokers in 13 of 14 countries in a recent survey reported that large, graphic warning labels prompted them to think about quitting.

But intent to quit is different than actually quitting, cautioned by Joanna Cohen, PhD, director of the Institute for Global Tobacco Control at Johns Hopkins University.

A few smokers surveyed on New York sidewalks were unswayed by the images. Khariton Popilevsky, 46, a pawnbroker, shrugged and said: "Telling me things we already know. I'll still be smoking."

Saiful Islam, 34, a convenience store clerk, said higher prices would cut sales a lot more than the images on cigarette packs.

## Version 2.3: SINGLE-FRAME: PRESENTATION

Federal health officials released on Tuesday their final selection of nine graphic warning labels to cover the top half of cigarette packages beginning next year.

Such warnings were required by a 2009 law that gave the Food and Drug Administration the authority to regulate tobacco products. The requirement is the first major overhaul of cigarette warnings in a quarter-century.

The modest one-liners on the dangers of smoking, now featured on cigarette packs, will soon turn into graphic images and messages that cover nearly half the pack.

Philip Morris, R.J. Reynolds, Lorillard and Commonwealth Brands, the four largest United States cigarette makers, said the images were “nonfactual and controversial”. They claimed the selected labels were not intended to provide information that smokers and potential smokers can consider rationally in weighing the risks and benefits from smoking, but rather the graphic images and designs were intended to elicit loathing, disgust, and repulsion. Philip Morris also said the sheer size of the warnings is problematic.

Joanna Cohen, PhD, director of the Institute for Global Tobacco Control at Johns Hopkins University thinks the FDA's requirement of 50 percent of a pack is respectable. "Bigger is better, just because people notice more," Cohen explained.

“These labels are frank, honest and powerful depictions of the health risks of smoking,” said Kathleen Sebelius, the secretary of health and human services. "Somebody said when they first saw the warning, these are really gross, and they are. We want kids to understand smoking is gross, not cool."

### Version 3: MULTI-FRAME

Federal health officials released on Tuesday their final selection of nine graphic warning labels to cover the top half of cigarette packages beginning next year.

Such warnings were required by a 2009 law that gave the Food and Drug Administration the authority to regulate tobacco products. The requirement is the first major overhaul of cigarette warnings in a quarter-century.

The modest one-liners on the dangers of smoking, now featured on cigarette packs, will soon turn into graphic images and messages that cover nearly half the pack.

Smoking causes 443,000 deaths in the U.S. annually. "The labels are not just for smokers, the labels are for anyone interested in public health," said Thomas Glynn from the American Cancer Society.

“These labels are frank, honest and powerful depictions of the health risks of smoking,” said Kathleen Sebelius, the Secretary of Health and Human Services.

The four leading tobacco companies were threatening legal action, saying the images were unconstitutional and would unfairly hurt their property and free-speech rights, demonizing the companies and stigmatizing smokers. They claimed the graphic images and designs were “nonfactual and controversial” and were intended to elicit loathing, disgust, and repulsion.

According to the Centers for Disease Control and Prevention, more than 25% of smokers in 13 of 14 countries in a recent survey reported that large, graphic warning labels prompted them to think about quitting. But intent to quit is different than actually quitting, cautioned by Joanna Cohen, director of the Institute for Global Tobacco Control at Johns Hopkins University.

## Appendix C: Sample Stimuli Page

### FDA Reveals Graphic Warning Labels for Cigarette Packages



Federal health officials released on Tuesday their final selection of nine graphic warning labels to cover the top half of cigarette packages beginning next year.

Such warnings were required by a 2009 law that gave the Food and Drug Administration the authority to regulate tobacco products. The requirement is the first major overhaul of cigarette warnings in a quarter-century.



The Warnings cover the top half of cigarette packages.

A few smokers surveyed on New York sidewalks were unswayed by the images. Khariton Popilevsky, 46, a pawnbroker, shrugged and said: "Telling me things we already know. I'll still be smoking."

Saiful Islam, 34, a convenience store clerk, said higher prices would cut sales a lot more than the images on cigarette packs.

The modest one-liners on the dangers of smoking, now featured on cigarette packs, will soon turn into graphic images and messages that cover nearly half the pack.

Health advocacy groups hoped that images would shock and deter new smokers and motivate existing smokers to quit.

Government officials project the U.S. will have 213,000 fewer smokers in the first year after the new labels are introduced, said Lawrence Deyton, director of the FDA's Center for Tobacco Products. More than 25% of smokers in 13 of 14 countries in a recent survey reported that large, graphic warning labels prompted them to think about quitting.

But intent to quit is different than actually quitting, cautioned by Joanna Cohen, PhD, director of the Institute for Global Tobacco Control at Johns Hopkins University.

Proceed



## Comments



**Viewer 261** 13 hours ago

I didn't realize that we were still living in the 1950's. Smoking causes cancer and the fact is many people start smoking when they are young. Young people obviously know that cigarettes are dangerous and addictive but it's easy not to worry about it when you are stressed and feel like you have years and years good health ahead of you. These pictures do an excellent job of reminding people how serious the effects of smoking can be. In case you haven't been paying attention cigarettes are ADDICTIVE and purposely marketed at young people because so many of their old "customers" end up dead early.



**Viewer 295** 13 hours ago

Many countries have introduced similarly hard hitting adverts for packaging. They work, and they're honest. What's the problem?



**Viewer 322** 12 hours ago

After smoking dozens and dozens of packs of cigs over a lifetime - who really looks at the packaging anymore anyway? We are not idiots - we know smoking can kill - if we choose to pay to do it - then let us. Ok, so we are idiots - but at least we are aware of it! Leave us alone!!!!



**Viewer 348** 12 hours ago

I find the repeated comment that "if the government was serious, it was just ban tobacco" to be instantly worthy of chuckles and head shaking. The biggest scratch-out on the U.S. Constitution is alcohol prohibition, which was backed by the same empty-headed thinking that drives people today to comment that "if the government was serious, it was just ban tobacco." Prohibition does not work. Simultaneous appeals to intelligence and emotion do. Note how well this works in advertising. So, basically, what we now have are pictures and words that are anti-smoking advertising directly on packs of cigarettes. These images are going to quite effective. The cigarette manufacturers must think they will be effective -- they're fighting them. They ought to know. They know just how powerful advertising -- just words and pictures -- can be.



**Viewer 352** 12 hours ago

Hell... if those pictures do not prevent you from smoking, I do not know what will. I guess a higher being would literally need to come down, and tell you to STOP SMOKING! I am a non-smoker, but those above pictures are startling.



**Viewer 353** 10 hours ago

Everyone knows the STATEMENT that cigarettes are dangerous. Most have not seen it first hand. Perhaps a graphic image will help.



**Viewer 390** 7 hours ago

Yeah, we all have common sense and know that smoking is bad for us. But usually, what's out of sight is out of mind. While smoking, I wouldn't give the sight of a diseased lung a second thought, but if you have to look at it every time you lit up, it would certainly make you think. So glad I gave the damn thing's up.



**Viewer 412** 5 hours ago

If this concept worked then pictures of a dead Osama would prevent terrorism.



**Viewer 467** 3 hours ago

Sadly common sense is hardly enough to stop people from smoking nowadays, and smoking has become such an issue that it does take these drastic measures to stop.



**Viewer 496** 2 hours ago

Everyone knows smoking is bad for you. Not everyone knows just how bad it is. The photos might educate. "

[Leave a Comment](#)

[Next](#)

## Appendix D: News and Comments Selection Algorithm Programming

There are 33 different news + comments combinations (or conditions).

Please follow the table below to select news and comments for every participant.

**NOTICE: required number of participants (N) is NOT the same across conditions.**

Condition	Quota	News	Comments
1	54	No-frame	Randomly select 8 O and 2 S from Theme L
2	54	No-frame	Randomly select 8 O and 2 S from Theme E
3	54	No-frame	Randomly select 8 O and 2 S from Theme P
4	160	No-frame	Randomly select 8 O and 2 S from ALL THREE themes
5	54	No-frame	Randomly select 2 O and 8 S from Theme L
6	54	No-frame	Randomly select 2 O and 8 S from Theme E
7	54	No-frame	Randomly select 2 O and 8 S from Theme P
8	160	No-frame	Randomly select 2 O and 8 S from ALL THREE themes
9	160	No-frame	none
10	54	Multi-frame	Randomly select 8 O and 2 S from Theme L
11	54	Multi-frame	Randomly select 8 O and 2 S from Theme E
12	54	Multi-frame	Randomly select 8 O and 2 S from Theme P
13	160	Multi-frame	Randomly select 8 O and 2 S from ALL THREE themes
14	54	Multi-frame	Randomly select 2 O and 8 S from Theme L
15	54	Multi-frame	Randomly select 2 O and 8 S from Theme E
16	54	Multi-frame	Randomly select 2 O and 8 S from Theme P
17	160	Multi-frame	Randomly select 2 O and 8 S from ALL THREE themes
18	160	Multi-frame	None
19	54	Single-frame: L	Randomly select 8 O and 2 S from Theme L
20	54	Single-frame: L	Randomly select 2 O and 8 S from Theme L
21	54	Single-frame: L	Randomly select 8 O and 2 S from ALL THREE themes
22	54	Single-frame: L	Randomly select 2 O and 8 S from ALL THREE themes
23	54	Single-frame: L	None
24	54	Single-frame: E	Randomly select 8 O and 2 S from Theme E
25	54	Single-frame: E	Randomly select 2 O and 8 S from Theme E
26	54	Single-frame: E	Randomly select 8 O and 2 S from ALL THREE themes
27	54	Single-frame: E	Randomly select 2 O and 8 S from ALL THREE themes
28	54	Single-frame: E	None
29	54	Single-frame: P	Randomly select 8 O and 2 S from Theme P
30	54	Single-frame: P	Randomly select 2 O and 8 S from Theme P
31	54	Single-frame: P	Randomly select 8 O and 2 S from ALL THREE themes
32	54	Single-frame: P	Randomly select 2 O and 8 S from ALL THREE themes
33	54	Single-frame: P	none
Total	2400		

Note. L = Legitimacy; E = Effectiveness; P = Presentation. S = Supportive; O = Oppositional.

## Appendix E: Questionnaire for Study 2

### Survey - Online Comments and Health Policy News

**A total of 2400 people will be recruited through MTurk. We have the quota for recruiting SMOKERS set at 1200, and the quota for NON-SMOKERS is also 1200.**

#### **General request:**

- 1. Include a progress bar**
- 2. Don't display question titles ( as shown in green).**
- 3. Start a new page per [SP]**
- 4. Display the following text on termination page:**

Thank you for your interest in this study! Based on your responses, you either do not match the demographic criteria for this survey or the quota group you qualify for has been closed.
- 5. We'll force response for S1 - S7, CA1, PS1, and CR1 meaning people can NOT skip these questions. For unanswered items display in red:**

Please answer all the questions before proceeding  
**For all other pages, display in red:**  
Please answer all the questions before proceeding  
If you prefer not to answer, please click here [radio button]

#### **[DISPLAY]**

The University of Pennsylvania is conducting an online academic research study on a health policy. The survey will take approximately 25 minutes to complete.

Your participation in this study is completely voluntary and you may withdraw at any time. There are no known risks but if any of the questions make you feel uncomfortable, you may skip that question or leave the survey. The information you give will be kept confidential and will not be linked to your name. Only the research team and authorized staff, faculty and doctoral students at the Annenberg School for Communication will have access to the anonymous data. All data will be stored securely at the Annenberg School for Communication at the University of Pennsylvania.

If you have any questions about the study, you may contact Rui Shi (rshi@asc.upenn.edu).

If you would like to participate in this short survey, please proceed to the next page. We ask that you please complete the survey in one sitting.

If you would not like to participate, please close the browser now.

Please enter your MTurkID

[Text box]

**[Check MTurkID for duplicate. Send duplicates to termination page]**

[SP]

**[DISPLAY]**

Please complete the survey at one sitting, otherwise your survey will expire and you will not be allowed to participate again.

### PRE-MANIPULATION MEASURES

**A total of 2400 people will be recruited through MTurk. We have the quota for recruiting SMOKERS set at 1200, and the quota for NON-SMOKERS is also 1200.**

**Question S1 to S7 are used to screen people into the two categories.**

**Please shut off the non-smoker group if its quota is reached sooner than the smoker group.**

[SP]

#### Screenener

S1. How old are you? (Please type in your answer)

[number box, range 0-99]

**[If S1 < 18, terminate the survey]**

[SP]

**[Randomize the order of S2 to S6]**

Have you ...

S2. Gotten a vaccine against the flu, also known as flu shot or the influenza vaccine?

1. Yes
2. No
3. Not sure

S3. Been screened to see if you have cancer or a malignancy of any kind?

1. Yes
2. No
3. Not sure

S4. Smoked at least 100 cigarettes in your entire life?

1. Yes
2. No
3. Not sure

S5. Exercised more than 150 minutes per week in the past month?

1. Yes
2. No
3. Not sure



S6. Received a vaccine against Ebola in the United States?

1. Yes
2. No
3. Not sure

**[if S6 = 1, terminate the survey]**

**[if S4 = 2 or 3, fill the NON-SMOKER quota, and skip S7]**

**[SP]**

S7. Do you now smoke cigarettes every day, some days, or not at all?

1. Every day
2. Some days
3. Not at all

**[if S7 = 1 or 2, fill the SMOKER quota]**

**[if S7 = 3, fill the NON-SMOKER quota]**

## Demographics

**[SP]**

**[Randomize the order of D1 to D4. Display 2 items per page]**

D1. Are you male or female?

1. Male
2. Female

D2. What is the highest level of school you completed or the highest degree you received?

1. Never attended school
2. Elementary or grade school
3. Some high school
4. High school graduate or GED
5. Some college
6. College graduate
7. Postgraduate/masters/doctorate/law/MD

D3. Are you Hispanic, Latino/a, or Spanish origin? (One or more categories may be selected)

1. No, not of Hispanic, Latino/a, or Spanish origin
2. Yes, Mexican, Mexican American, Chicano/a
3. Yes, Puerto Rican
4. Yes, Cuban
5. Yes, another Hispanic, Latino, or Spanish origin

D4. What is your race? (One or more categories may be selected)

1. White
2. Black or African American

3. American Indian or Alaska Native
4. Asian
5. Native Hawaiian or Other Pacific Islander

### Political Ideology

[SP]

[Randomize the order of PI1 to PI8. Display 3-3-2 items per page]

**Please tell us your opinion on each of the following statements:**

PI1. Gay or lesbian couples, in other words, homosexual couples, should be legally permitted to adopt children.

1. Strongly Disagree
2. Disagree
3. Agree
4. Strongly Agree
99. Don't know

PI2. Homosexuals should NOT be allowed to serve in the United States Armed Forces.

1. Strongly Disagree
2. Disagree
3. Agree
4. Strongly Agree
99. Don't know

PI3. Some people feel that women should have an equal role with men in running business, industry, and government. Others feel that a woman's place is in the home. Where would you place yourself on this scale?

Women and men should	1	2	3	4	5	A woman's place
have equal roles	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	is in the home

PI4. There has been some discussion about abortion during recent years which one of the following opinions best agrees with your view?

1. By law, abortion should never be permitted.
2. The law should permit abortion only in case of rape, incest, or when the woman's life is in danger.
3. The law should permit abortion for reasons other than rape, incest, or danger to the woman's life, but only after the need for the abortion has been clearly established.
4. By law, a woman should always be able to obtain an abortion as a matter of personal choice.
99. Don't know

PI5. Should federal spending on aid to poor people be:

1. Decreased
2. Kept about the same
3. Increased
99. Don't Know

PI6. The government should provide more services in areas such as health and education even if it means an increase in spending.

1. Strongly Disagree
2. Disagree
3. Agree
4. Strongly Agree
99. Don't know

PI7. Some people feel the government in Washington should see to it that every person has a job and a good standard of living. Others think the government should just let each person get ahead on their own. Where would you place yourself on this scale?

Government should see to jobs and good standard of living	1	2	3	4	5	Government should let each person get ahead on own
	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	

PI8. Some people feel there should be a government insurance plan which would cover all medical and hospital expenses for everyone. Others feel that all medical expenses should be paid by individuals through private insurance plans like Blue Cross or other company paid plans. Where would you place yourself on this scale?

Private insurance	1	2	3	4	5	Government insurance
	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	

Prior Knowledge: Confirmed Awareness of Changes to Warning Labels (2T3T4T5F)  
[SP]

CA1. Are you Aware of any proposed changes to the warning labels that appear on cigarette packs?

- 1- Yes
- 2- No
- 3- Unsure

[if CA1 = 2, skip CA2 – CA5 ]

[SP]

**[Randomize the order of CA2 to CA5. Display 2 items per page]**

CA2. Warning labels will combine a written statement with a color image about the risks associated with smoking

- 1- True
- 2- False

CA3. Warning labels will include the 1-800-QUIT-NOW number

- 1- True
- 2- False

CA4. Warning labels cover half of the front of the cigarette pack

- 1- True
- 2- False

CA5. Warning labels and the brand name will be the only things that appear on the pack. The rest of the pack will be plain

- 1- True
- 2- False

### Need for Cognition

[SP]

**[Randomize the order of NFC1 to NFC6. Display 3 items per page]**

Please tell us how well each of the following statements describes you.

1	2	3	4	5
A lot like me	Somewhat like me	Uncertain	Not too much like me	Not at all like me

NFC1. I really enjoy a task that involves coming up with new solutions to a problem

NFC2. Thinking is not my idea of fun.

NFC3. I would prefer complex to simple problems.

NFC4. I prefer my life to be filled with puzzles that I must solve

NFC5. The notion of thinking abstractly is appealing to me.

NFC6. Learning new ways to think doesn't excite me very much.

-----[News + Comments]-----

[SP]

**[DISPLAY]**

On the following screen we will show you a news story selected from one of the top news outlets including: New York Times, Wall Street Journal, Fox News, CNN, Huffington Post, U.S. News etc.

[Do NOT display the following sentence if Condition = 9 or 18 or 23 or 28 or 33, i.e. the no-comment conditions]

After the news story you will be shown some comments generated by other viewers.

[SP]

[DISPLAY one news article] (See details of the selection procedure in *News and Comments Programming Instruction*)

[SP]

[DISPLAY 10 comments] (See details of the selection procedure in *News and Comments Programming Instruction*)

[Put a “Leave A Comment” button at the bottom center of the page. Once clicked, display the following text in RED below the button “Please go on to the next page to continue with the survey. You will be given the chance to post a comment later.”]

[Record in admin whether people click on the “leave a comment” button]

---

## CORE POST-MANIPULATION MEASURES

### Thought listing

[SP]

TL. Please write down the thoughts you had while reading the news story.

[Do NOT display the following sentence if Condition = 9 or 18 or 23 or 28 or 33, i.e. the no-comment conditions]

(Note. Your response to this question will NOT be posted on the comment board)

[Text box. Allow 500 words max]

### Policy Support

[SP]

PS1. Do you support or oppose the proposed changes to the warning labels that appear on cigarette packs?

- 1- Strongly support
- 2- Somewhat support
- 3- Somewhat oppose
- 4- Strongly oppose

[SP]

PS2. Do you support or oppose the legal action by the tobacco companies to try to stop the law that requires them to put these warning labels onto cigarette packs?

- 5- Strongly support
- 6- Somewhat support
- 7- Somewhat oppose
- 8- Strongly oppose

### Argument Repertoire

[SP]

[Ask AR1-2 if PS1 = 1 or 2]

[Ask AR3-4 if PS1 = 3 or 4]

AR1. What are the reasons you have for supporting the proposed changes to the warning labels that appear on cigarette packs warning labels?

[Text box. Allow 500 words max]

[SP]

AR2. What reasons do you think **other people** might have for opposing the proposed changes to the warning labels that appear on cigarette packs warning labels?

[Text box. Allow 500 words max]

[SP]

AR3. What are the reasons you have for opposing the proposed changes to the warning labels that appear on cigarette packs warning labels?

[Text box. Allow 500 words max]

[SP]

AR4. What reasons do you think **other people** might have for supporting the proposed changes to the warning labels that appear on cigarette packs warning labels?

[Text box. Allow 500 words max]

### Political Knowledge

[SP]

[Randomize the order of PK1 to PK5. Display 3-2 items per page]

Here are a few questions about the government in Washington. Many people don't know the answers to these questions, so if there are some you don't know just indicate so, and you can go on.

PK1. Do you happen to know what job or political office is now held by Joe Biden?

[Text box. Allow 50 words max]

PK2. Whose responsibility is it to determine if a law is constitutional or not?

- 1- President
- 2- The Congress
- 3- The Supreme Court

PK3. How much of a majority is requires for the U.S. Senate and House to override a presidential veto?

[Text box. Allow 50 words max]

PK4. Which party has the most members in the House of Representatives in Washington now?

[Text box. Allow 50 words max]

PK5. Which one of the parties is more conservative than the other at the national level?

[Text box. Allow 50 words max]

### Defensive Processing/Credibility

[SP]

[Randomize the order of DR1 to DR6. Display 3 items per page]

The news story...

1 Strongly Disagree	2 Disagree	3 Neither Agree Nor Disagree	4 Agree	5 Strongly Agree
------------------------	---------------	------------------------------------	------------	---------------------

DP1. was exaggerated.

DP2. was dishonest.

DP3. tried to manipulate me.

DP4. was accurate.

DR5. was balanced.

DR6. was objective.

[If Condition = 9 or 18 or 23 or 28 or 33, skip CR1, SI1- SI6, MC1-MC2, CE1-CE4]

### Comment reading check

[SP]

CR1. How many comments did you read?

1. None
2. A few
3. Some
4. All

[If CR1 = 1, Skip SI1- SI6, MC1-MC2, CE1-CE4.]

## SECONDARY POST-MANIPULATION MEASURES

### Social Identification

[SP]

[Randomize the order of SI1 to SI6. Display 3 items per page]

The following statements are about the people who left comments to the news you just read. How much do you agree or disagree with each statement?

1 Strongly Disagree	2 Disagree	3 Neither Agree Nor Disagree	4 Agree	5 Strongly Agree
------------------------	---------------	------------------------------------	------------	---------------------

SI 1. I have a lot in common with them

SI 2. I find it easy to form a bond with them

SI 3. I feel a sense of being “connected” with them

SI 4. They are similar to me in the way they think

SI 5. They are similar to me in their life experiences

SI 6. They are similar to me in their overall outlook on life

### Manipulation Check

[SP]

[Randomize the order of MC1 and MC2]

Think about all the comments following the news, how much do you agree or disagree with the following statements?

1 Strongly Disagree	2 Disagree	3 Neither Agree Nor Disagree	4 Agree	5 Strongly Agree
------------------------	---------------	------------------------------------	------------	---------------------

MC1. Most of the comments were favorable toward the news

MC2. Most of the comments were critical of the news

### Comment Evaluation

[SP]

[Randomize the order of CE1 to CE4]

Think about all the comments following the news, how much do you agree or disagree with these statements?

1 Strongly Disagree	2 Disagree	3 Neither Agree Nor Disagree	4 Agree	5 Strongly Agree
------------------------	---------------	------------------------------------	------------	---------------------

CE1. Most of the comments were ignorant

CE 2. Most of the comments were offensive

CE 3. Most of the comments made sense to me

CE 4. Most of the comments helped me think through the news

### Online news reading habit

[SP]



**[Randomize the order of NR1 to NR3]**

1 Never	2 seldom	3 sometimes	4 Often
------------	-------------	----------------	------------

NR1. How often do you read news on the internet?

NR2. How often do you read comments left by previous viewers?

NR3. How often do you post your own comment on news websites?

## CLOSING DEMOGRAPHICS

**[SP]**

INC. What was your annual household income from all sources in 2014? Was it...?

1. Less than \$25,000
2. Between \$25,000 and \$49,999
3. Between \$50,000 and \$74,999
4. Between \$75,000 and \$99,999
5. Between \$100,000 and \$149,999
6. \$150,000 or more

## DEBRIEFING SCRIPT

**[SP]**

**[DISPLAY]**

Thank you for participating in our study.

The purpose of the study is to see if online comments posted by previous viewers could affect the way people respond to news and policy. The news and the comments were taken from real examples. We hope your participation will assist us in answering our research question.

This is your completion code: **[MTurk ID 7857]**

Please enter it into the MTurk HIT page to receive credit.

## References

- An, J., Cha, M., Gummadi, K. P., Crowcroft, J., & Quercia, D. (2012, June). Visualizing media bias through twitter. Paper presented at the *Sixth International AAAI Conference on Weblogs and Social Media*, Dublin, Ireland
- Asch, S. (1956). Studies of independence and conformity: A minority of one against a unanimous majority. *Psychological Monographs: General and Applied*, 70(9), 1-70.
- Baek, Y. M., Cappella, J. N., & Bindman, A. (2011). Automating content analysis of open-ended responses: Wordscores and affective intonation. *Communication Methods & Measures*, 5(4), 275–296.
- Bikhchandani, S., Hirshleifer, D., & Welch, I. (1998). Learning from the behavior of others: Conformity, fads, and informational cascades. *Journal of Economic Perspectives*, 12(3), 151-170.
- Borra, S., & Ciaccio, A. (2010) Measuring the prediction error. A comparison of cross-validation, bootstrap and covariance penalty methods. *Computational Statistics & Data Analysis* 54(12): 2976-2989.
- Boyle, M. P., Schmierbach, M., Armstrong, C. L., Cho, J., McCluskey, M., McLeod, D. M., et al. (2006). Expressive responses to news stories about extremist groups: A framing experiment. *Journal of Communication*, 56(2), 271–288.
- Brady, H. (1999). Political participation. In J. P. Robinson, P. R. Shaver & L. S. Wrightsman (Eds.), *Measures of political attitudes* (737– 801). San Diego, CA: Academic.

Brady, H. E., Verba, S., & Schlozman, K. L. (1995). Beyond SES: A resource model of political participation. *The American Political Science Review*, 89(2), 271.

Brief of Amici Curiae American Academy of Pediatrics, American Cancer Society, American Cancer Society Cancer Action Network, American Heart Association, American Legacy Foundation, American Lung Association, American Medical Association, American Public Health Association, Campaign For Tobacco-Free Kids, Citizens' Commission To Protect The Truth, Public Citizen, And The Tobacco Control Legal Consortium In Support Of Defendants-Appellants, R.J. Reynolds Tobacco Company et al., V Food and Drug Administration et al., 696 F.3d 1205; 402 U.S. App. D.C. 438; 2012 U.S. App. LEXIS 17925. (Case # 11-5332; Filed 12/19/2011)

Brief for Appellants, R.J. Reynolds Tobacco Company et al., V Food and Drug Administration et al., 696 F.3d 1205; 402 U.S. App. D.C. 438; 2012 U.S. App. LEXIS 17925. (Case # 11-5332; Doc # 1347139; Filed 12/21/2011)

Brief for Appellees, R.J. Reynolds Tobacco Company et al., V Food and Drug Administration et al., 696 F.3d 1205; 402 U.S. App. D.C. 438; 2012 U.S. App. LEXIS 17925. (Case # 11-5332; Doc # 1354221; Filed 01/23/2012)

Cacioppo, J. T., Gardner, W. L., & Berntson, G. G. (1997). Beyond bipolar conceptualizations and measures: The case of attitudes and evaluative space. *Personality and Social Psychology Review*, 1(1), 3-25

Cacioppo, J. T., & Petty, R. E. (1981). Social psychological procedures for cognitive response assessment: The thought-listing techniques. In T. Merluzzi, C. Glass, & M. Genest (Eds.), *Cognitive assessment* (pp. 114-138). New York: Guilford.

- Cacioppo, J.T., & Petty, R. E. (1982). The need for cognition. *Journal of Personality and Social Psychology*, 42(1), 116–131.
- Cacioppo, J. T., Petty, R. E., & Kao, C. F. (1984). The efficient assessment of need for cognition. *Journal of Personality Assessment*, 48(3), 306-307.
- Cappella, J. N., Price, V., & Nir, L. (2002). Argument repertoire as a reliable and valid measure of opinion quality: Electronic dialogue during campaign 2000. *Political Communication*, 19(1), 73–93.
- Caro, T. M., Roper, R., Young, M., & Dank, G. R. (1979). Inter-observer reliability. *Behaviour*, 69(3), 303
- Chambers, S. (2003). Deliberative democratic theory. *Annual Review of Political Science*, 6, 307–326.
- Chan, J., & Lee, F. F. (2005). Media Use, Looking-glass Perception, and Majority Rule Principle: A Study of Perceived Public Opinion. *Conference Paper - International Communication Association*, 1-31.
- Cheng, A., Evans, M., & Harshdeep, S. (2009). *Inside Twitter: An In-Depth Look Inside the Twitter World*. Sysomos Inc. Retrieved from <http://www.sysomos.com/docs/Inside-Twitter-BySysomos.pdf>
- Chevalier, J. A., & Mayzlin, D. (2006). The effect of word of mouth on sales: Online book reviews. *Journal of Marketing Research*, 43, 345–354.
- Chia, S. C. (2010). How Social Influence Mediates Media Effects on Adolescents' Materialism. *Communication Research*, 37, 400-419
- Coleman, S., & Gotze, J. (2001). *Bowling together: Online public engagement in policy deliberation*. London: Hansard Society.

- Connolly, T., Jessup, L. M., & Valacich, J. S. (1990). Effects of anonymity and evaluative tone on idea generation in computer-mediated groups. *Management Science*, 36(6), 689-703.
- Dahlberg, L. (2001). Computer-mediated communication and the public sphere: A critical analysis. *Journal of Computer-Mediated Communication*, 7(1) 0.
- de Vreese, C. H. (2005). News framing: Theory and typology. *Information Design Journal + Document Design*, 13(1), 51–62
- de Vreese, C.,H., Boomgaarden, H. G., & Semetko, H. A. (2011). (In)direct framing effects: The effects of news media framing on public support for turkish membership in the european union. *Communication Research*, 38(2), 179-205.
- De Zúñiga, H. G., Veenstra, A., Vraga, E., & Shah, D. (2010). Digital democracy: Reimagining pathways to political participation. *Journal of Information Technology & Politics*, 7(1), 36–51.
- Delli Carpini, M. X., Cook, F. L., & Jacobs, L. R. (2003, April). *Talking together: discursive capital and civic deliberation in America*. Paper presented at the Midwest Political Science Association meeting, Chicago, IL.
- Delli Carpini, M. X., Cook, F. L., & Jacobs, L. R. (2004). Public deliberation, discursive participation, and citizen engagement: A Review of the empirical literature. *Annual Review of Political Science*, 7(1), 315–344.
- Delli Carpini, M. X., Keeter S. (1993). Measuring political knowledge: Putting first things first. *American Journal of Political Science*, 37(4), 1179-1206.

- Devine DJ, Clayton LD, Dunford BB, Seying R, Pryce J. (2001). Jury decision making: 45 years of empirical research on deliberating groups. *Psychology, Public Policy, and Law* 7 (3), 622–727
- Deutsch, M. and Gerard, H. (1955). A study of normative and informational social influences upon individual judgment. *Journal of Abnormal and Social Psychology*, 51, 629-636.
- Finn, J., & Banach, M. (2000). Victimization online: The downside of seeking human services for women on the internet. *CyberPsychology & Behavior*, 3(5), 785-796.
- Fishkin, J. (1995). *The voice of the people*. New Haven, CT: Yale University Press.
- Forkosh-Baruch, A., & Hershkovitz, A. (2012). A case study of Israeli higher-education institutes sharing scholarly information with the community via social networks. *Internet and Higher Education*, 15(1), 58-68.
- Fox, S. (2011). The social life of health information, 2011. Pew Internet and American Life Project. Retrieved from <http://pewinternet.org/Reports/2011/Social-Life-of-Health-Info.aspx> [2012, Aug 10].
- Frankfort-Nachmias, C. & Leon-Guerrero, A. (2006). *Social Statistics for a Diverse Society*. Thousand Oaks, CA: Pine Forge Press.
- Gaertner, S. L., Dovidio, J. F., Rust, M. C., Nier, J. A., Banker, B.S., Ward, C. M.,...Houlette, M. (1999). Reducing intergroup bias: elements of intergroup cooperation. *Journal of Personality and Social Psychology*, 76(3), 388–402.
- Gallupe, R. B., DeSanctis, G., & Dickson, G. W. (1988). Computer-based support for group problem-finding: An experimental investigation. *MIS Quarterly*, 12(2), 277.

- Gamson, W. A., & Modigliani, A. (1987). The changing culture of affirmative action. In R. G. Braungart & M. M. Braungart (Eds.), *Research in political sociology* (Col. 3, pp. 137-177). Greenwich, CT:JAI.
- Gastil, J. (2000). *By popular demand*. Berkeley: University of California Press.
- ~~Gastil, J., Bacci, C., & Dollinger, M. (2010). Is deliberation neutral? patterns of attitude change during "the deliberative polls". *Journal of Public Deliberation*, 6(2)~~
- Gastil, J., Dees, E.P., & Weiser, P. (2002). Civic awakening in the jury room: a test of the connection between jury deliberation and political participation. *Journal of Politics*, 64(2), 585–595.
- Giner-Sorolila, R., & Chaiken, S. (1997). Selective use of heuristic and systematic processing under defense motivation. *Personality and Social Psychology Bulletin*, 23(1), 84-97
- Glynn, C. J., Hayes, A. F., & Shanahan, J. (1997). Perceived support for one's opinions and willingness to speak out: A meta-analysis of survey studies on the "spiral of silence." *Public Opinion Quarterly*, 61(3), 452-463.
- Gunther, A. C. (1998). The persuasive press inference. *Communication Research*, 25(5), 486.
- Habermas, J. (1989). *The Structural transformation of the public sphere: An inquiry into a category of bourgeois society*. Cambridge, Mass.: MIT Press.
- Halpern, D., & Gibbs, J. (2013). Social media as a catalyst for online deliberation? Exploring the affordances of Facebook and YouTube for political expression. *Computers in Human Behavior*, 29(3), 1159–1168.

- Han, J. Y., Shah, D. V., Kim, E., Namkoong, K., Lee, S.-Y., Moon, T. J., ... Gustafson, D. H. (2011). Empathic exchanges in online cancer support groups: Distinguishing message expression and reception effects. *Health Communication, 26*(2), 185–197.
- Hedges, L. W., & Rhoads, C. (2010). *Statistical power analysis in education research*. Washington, DC: U.S. Department of Education, Institute of Education Sciences.
- Hertog, J. K., & McLeod, D. M. (2001). A multiperspectival approach to framing analysis: A field guide. In S. D. Reese, O.H. Gandy, & A. E. Grant (Eds.), *Framing public life* (pp. 139–162). Mahwah, NJ: Lawrence Erlbaum
- Ho, S. S., & McLeod, D. M. (2008). Social-psychological influences on opinion expression in face-to-face and computer-mediated communication. *Communication Research, 35*(2), 190–207.
- Hoffman, L. (2008). Public Opinion in Context: A Multilevel Model of Media Effects on Perceptions of Public Opinion. *Conference Papers -- International Communication Association, 1-26*.
- Huang, H. (2010). Frame-rich, frame-poor: An investigation of the contingent effects of media frame diversity and individual differences on audience frame diversity. *International Journal of Public Opinion Research, 22*(1), 47-73.
- Huge, M., & Glynn, C. J. (2010). Hostile Media and the Campaign Trail: Perceived Media Bias in the Race for Governor. *Journal of Communication, 60*(1), 165-181.



- Igartua, J., & Cheng, L. (2009). Moderating effect of group cue while processing news on immigration: Is the framing effect a heuristic process? *Journal of Communication*, 59(4), 726-749.
- Iyengar, S. (1991). *Is anyone responsible? How television frames political issues*. Chicago: The University of Chicago Press.
- Iyengar, S., Kinder, D. (1987). *News that matters: Television and American opinion*. Chicago: University of Chicago Press.
- Jeong, S. (2008). *Attributions and racial cues in news about obesity: Effects on the public's attributions about weight and opinions about health policies*. (Doctoral dissertation). Retrieved from ProQuest dissertations and theses (Order Number 3346137).
- Kang, M. (1997). The influence of public opinion polls on public opinion: The role of motivation and ability in the elaboration likelihood model. *Dissertation Abstracts International Section A: Humanities and Social Sciences*, 59 (1998-95015-092; AAM9825262)
- Keeter, S., Zukin, C., Andolina, M., & Jenkins, K. (2002). *The civic and political health of the nation: a generational portrait*. Washington, DC: The Center for Information & Research on Civic Learning & Engagement.
- Kennedy, S. D. (2012). A few comments ... about comments. *Information Today*, 29(8), 23.
- Kriplean, T. (2011). *Encouraging reflective discussion on the web*. (Doctoral dissertation). Retrieved from ProQuest dissertations and theses (Order Number 3506519).

- Kuran, T. (1998). Insincere deliberation and democratic failure. *Critical Review*, 12, 529-544
- Kushin, M. J., & Kitchener, K. (2009). Getting political on social network sites: Exploring online political discourse on facebook. *First Monday*, 14(11)
- LaBarre, S. (2013, September 24). Why we're shutting off our comments. *Popular Science*. Retrieved October 2, 2013, from <http://www.popsci.com/science/article/2013-09/why-were-shutting-our-comments>
- Landauer, T. K. (2007). *Handbook of Latent Semantic Analysis*. Lawrence Erlbaum Associates.
- Lasorsa, D. L. (1991). Political outspokenness: Factors working against the spiral of silence. *Journalism Quarterly*, 68(1-2), 131-139.
- Lea, M., & Spears, R. (1991). Computer-mediated communication, de-individuation and group decision-making. *International Journal of Man Machine Studies*, 34, 283-301.
- Leal, D. L. (2002). Political participation by Latino non-citizens in the United States. *British Journal of Political Science*, 32(2), 353-370.
- Lecheler, S., & de Vreese, C.,H. (2012). News framing and public opinion: A mediation analysis of framing effects on political attitudes. *Journalism and Mass Communication Quarterly*, 89(2), 185-204.
- Lecheler, S., Keer, M., Schuck, A. R., & Hänggli, R. (2015). The Effects of Repetitive News Framing on Political Opinions over Time. *Communication Monographs*, 82(3), 339-358

- Lee, E.-J. (2012). That's not the way it is: How User-generated comments on the news affect perceived media bias. *Journal of Computer-Mediated Communication*, 18(1), 32–45.
- Lee, E., & Jang, Y. J. (2010). What do others' reactions to news on internet portal sites tell us? effects of presentation format and readers' need for cognition on reality perception. *Communication Research*, 37(6).
- Lenth, R. V. (2006-9). Java Applets for Power and Sample Size [Computer software]. Retrieved 10/23/13, from <http://www.stat.uiowa.edu/~rlenth/Power>.
- McCombs, M., & Ghanem, S. I. (2001). The convergence of Agenda Setting and Framing. In S. D. Reese, O. H. Gandy, & A. E. Grant (Eds.), *Framing public life* (pp. 67–81). Mahwah, NJ: Erlbaum.
- Marichal, J. (2012). *Facebook Democracy: The Architecture of Disclosure and the Threat to Public Life*. Farnham: Ashgate.
- Mendelberg T., & Oleske, J. (2000). Race and public deliberation. *Political Communication*, 17(2), 169–191.
- Morrell, M. (1999). Citizens' evaluations of participatory democratic procedures. *Political Research Quarterly*, 52(2), 293–322.
- Noelle-Neumann, E. (1984). *The spiral of silence: Public opinion - our social skin*. Chicago, IL.: The University of Chicago Press.
- O'Keefe, D. J., & Jensen, J. D. (2006). The advantages of compliance or the disadvantages of noncompliance? A meta-analytic review of the relative persuasive effectiveness of gain-framed and loss-framed messages. In C. S. Beck (Ed.), *Communication yearbook 30* (pp. 1-43). Mahwah, NJ: Erlbaum..

- Olmstead, K., Mitchell, A., & Rosenstiel, T. (2011, May 9). Navigating news online: The top 25. *Pew Research Center's Project for Excellence in Journalism*. Retrieved September 9, 2013, from [http://www.journalism.org/analysis\\_report/top\\_25](http://www.journalism.org/analysis_report/top_25)
- Orenga, V., Zornoza, A. M., Prieto, F., & Peiró, J. M. (2000). The influence of familiarity among group members, group atmosphere and assertiveness on uninhibited behavior through three different communication media. *Computers in Human Behavior*, 16, 141–159.
- Papacharissi, Z. (2004). Democracy online: Civility, politeness, and the democratic potential of online political discussion groups. *New Media & Society*, 6(2), 259–283
- Porto, M. P. (2007). Frame diversity and citizen competence: Towards a critical approach to news quality. *Critical Studies in Media Communication*, 24(4), 303-321.
- Price, V., & Cappella, J. N. (2002). Online deliberation and its influence: The electronic dialogue project in campaign 2000. *IT & Society*, 1(1), 303–329.
- Price, V., Cappella, J. N., & Nir, L. (2002). Does disagreement contribute to more deliberative opinion? *Political Communication*, 19(1), 95–112.
- Price, V., Nir, L., & Cappella, J. N. (2005). Framing public discussion of gay civil unions. *Public Opinion Quarterly*, 69(2), 179–212.
- Price, V., Nir, L., & Cappella, J. N. (2006). Normative and Informational Influences in Online Political Discussions. *Communication Theory*, 16(1), 47–74.
- Price, V., & Stroud, N. (2006). Public attitudes toward polls: evidence from the 2000 U.S. presidential election. *International Journal of Public Opinion Research*, 18(4), 393-421

- Price, V. & Tewksbury, D. (1997). News value and public opinion: A theoretical account of media priming and framing. In G. A. Barnett & F.J. Boster (Eds.), *Progress in Communication Sciences* (pp. 173-212). Greenwich, CT: Ablex
- Price, V., Tewksbury, D., & Powers, E. (1997). Switching trains of thought. *Communication Research*, 24(5), 481.
- Quick, B. L. (2012). Applying the health belief model to examine news coverage regarding steroids in sports by ABC, CBS, and NBC between March 1990 and May 2008. *Health Communication*, 25(3), 247-257
- Salmon, C. T., & Neuwirth, K. (1990). Perceptions of opinion “climates” and willingness to discuss the issue of abortion. *Journalism Quarterly*, 67(3), 567-577.
- Salganik, M. J., Dodds, P. S., & Watts, D. J. (2006). Experimental study of inequality and unpredictability in an artificial cultural market. *Science*, 311(5762), 854-856.
- Sen, S., & Lerman, D. (2007). Why are you telling me this? An examination into negative consumer reviews on the Web. *Journal of Interactive Marketing*, 21(4), 76–94.
- Sherif, M. (1935). A study of some social factors in perception. *Archives of Psychology*, 27(187).
- Sherif, M. (1936). *The Psychology of Social Norms* Harper & Brothers.
- Shestowsky, D., Wegener, D. T., & Fabrigar, L. R. (1998). Need for cognition and interpersonal influence: Individual differences in impact on dyadic decisions. *Journal of Personality and Social Psychology*, 74(5), 1317–1328.
- Shi, R., & Cappella, J. N. (2015) Influence of user-generated comments to online electronic cigarette commercials: Support, opposition and warnings about

- deception. *International Communication Association Annual Convention*, San Juan, Puerto Rico.
- Shi, R., Messaris, P., & Cappella, J. N. (2014). Effects of online comments on smokers' perception of anti-smoking public service announcements. *Journal of Computer-Mediated Communication*, 19 (4), 975-990.
- Siegel, J., Dubrovsky, V., Kiesler, S., & McGuire, T. W. (1986). Group processes in computer-mediated communication. *Organizational Behavior and Human Decision Processes*, 37(2), 157-187.
- Sonck, N. & Loosveld, G. (2010) Impact of Poll Results on Personal Opinions and Perceptions of Collective Opinion. *International Journal of Public Opinion Research*, 22, 230-255
- Sonderman, J. (2012, Oct 22). How the Huffington Post handles 70+ million comments a year. *Poynter*. Retrieved from <http://www.poynter.org/latest-news/top-stories/190492/how-the-huffington-post-handles-70-million-comments-a-year/>
- Spears, R., & Lea, M. (1994). Panacea or panopticon? The hidden power in computer-mediated communication. *Communication Research*, 21, 427– 459.
- Spears, R., Postmes, T., Lea, M., & Wolbert, A. (2002). When are net effects gross products? Communication. *Journal of Social Issues*, 58(1), 91.
- Springer, N., Engelmann, I., & Pfaffinger, C. (2015). User comments: Motives and inhibitors to write and read. *Information, Communication & Society*, 18(7), 798-815.

- Stasser, G., & Titus, W. (1985). Pooling of unshared information in group decision making: biased information sampling during discussion. *Journal of Personality and Social Psychology*, 48(6), 1467–1478.
- Stromer-Galley, J., & Wichowski, A. (2010). Political discussion online. In R. M. Burnett, M. Consalvo, & C. Ess (Eds.), *The handbook of Internet studies* (pp. 168–187). Chichester, UK: John Wiley & Sons.
- Tesser, A., Campbell, J., & Mickler, S. (1983). The role of social pressure, attention to the stimulus, and self-doubt in conformity. *European Journal of Social Psychology*, 13(3), 217-233.
- Treier, S., & Hillygus, D. S. (2009). The nature of political ideology in the contemporary electorate. *Public Opinion Quarterly*, 73(4), 679-703.
- Tsukayama, H. (2013, March 21). *Twitter turns 7: Users send over 400 million tweets per day*. *Washington Post*. Retrieved September 16, 2013, from [http://articles.washingtonpost.com/2013-03-21/business/37889387\\_1\\_tweets-jack-dorsey-twitter](http://articles.washingtonpost.com/2013-03-21/business/37889387_1_tweets-jack-dorsey-twitter)
- Turner, J. C. (1982). Towards a cognitive redefinition of the social group. In H. Tajfel (Ed.), *Social identity and intergroup relations* (pp. 14–40). Cambridge, UK: Cambridge University Press.
- Turner, J. C. (1985). Social categorization and the self-concept: A social cognitive theory of group behavior. In E. J. Lawler (Ed.), *Advances in group processes: Theory and research* (Vol. 2, pp. 77–122). Greenwich, CT: JAI.

- Walther, J. B., DeAndrea, D., Kim, J., & Anthony, J. C. (2010). The influence of online comments on perceptions of anti-marijuana public service announcements on YouTube. *Human Communication Research*, 36(4), 469-492
- Watkins, T. (2011, November 8). Judge blocks law on cigarette pack warnings. *CNN*. Retrieved September 9, 2013, from <http://www.cnn.com/2011/11/07/us/tobacco-labels/index.html>
- Weaver, D. H. (2007). Thoughts on agenda setting, framing and priming. *Journal of Communication*, 57(1), 142–147.
- Willemsen, L. M., Neijens, P. C., Bronner, F., & de Ridder, J. A. (2011). “Highly recommended!” the content characteristics and perceived usefulness of online consumer reviews. *Journal of Computer-Mediated Communication*, 17(1), 19–38.
- Witten, I., Frank, E., & Hall, M. (2011) *Data mining: Practical machine learning tools and techniques*. Burlington, MA: Morgan Kaufmann.
- Wooten, D. B., & Reed II, A. (1998). Informational influence and the ambiguity of product experience: order effects on the weighting of evidence. *Journal of Consumer Psychology*, 7(1), 77-99.
- Wuthnow, R. (1994). *Sharing the Journey: Support Groups and America's New Quest for Community*. New York: Free Press.