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What's the Story? National Media Coverage of Higher Education in Canada Appendix

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Appendix A: Literature Review

The ability of propaganda produced during the First and Second World War to persuade or incite fear was the primary inspiration for early enquiries about the importance of mass media in the fields of political science, sociology and psychology (Lasswell, 1947; Lippmann, 1922; McLeod, Kosicki, & McLeod, 2002). Walter Lippmann, a newspaper columnist, provided a classic description of the relationship in his 1922 book, *Public Opinion*: the media translates what actually happens in the world into an image of that event in our mind.

Harold Lasswell refined this model into two stages: “surveillance” and “correlation.” First, the media scans the environment, gathers available information and selects issues to receive attention. Second, the media directs attention to these issues, creating a correlation in awareness between the news media and its consumers: the public and policy makers (Lasswell, 1947).

Today, scholars have developed three general models of how the media shapes public awareness and opinion: agenda setting, priming and framing (Scheufele & Tewksbury, 2007). Agenda setting is a more nuanced understanding of surveillance. Though the media selects what issues to report about, a variety of actors — from politicians to community groups and individual activists — are typically involved in bringing media attention to an issue they care about (McCombs & Shaw, 1972). The resultant visibility, or *salience*, is what makes an issue important in the public agenda, and more likely to influence what governments and policy makers decide to act upon (Dearing & Rogers, 1996, p. 5). As Walgrave and Van Aelst put it, “when mass media emphasize a topic, the audience public receiving this message will consider this topic to be important” (Walgrave & Van Aelst, 2006, p. 89).

However, the media not only “tell people what to think *about*... [but] also influence the way people *think* and *act*” (Wolfe, Jones & Baumgartner, 2013, p. 178). *Priming* the public to not only see an issue as important but to evaluate subsequent action on that issue in a particular way is a second pathway of media influence (Iyengar & Kinder, 1987, p. 63). For example, Kim et al. (2012) investigate television news reporting on a controversial government plan to move South Korea’s administrative capital. They find that not only did frequency of television news coverage influence how aware the public was of the plan, but the standards proposed by the media for evaluating the proposal shaped the opinions that viewers formed about the plan’s effectiveness (Kim et al., 2012, pp. 53-54). Some scholars also refer to this process as “attribute agenda setting” (Kim et al., 2012, p. 43) or “second-level agenda setting” (Wanta, Golan & Lee 2004, p. 364).

Does only the information presented by the media matter, or does *framing* of the issue by the author or presenter have an impact on awareness? A frame is “a central organizing idea or story line that provides meaning to an unfolding strip of events, weaving a connection among them...” (Gamson & Modigliani, 1987, p. 143). The framing story told when information is provided can have significant effects on the opinions people form. In one prominent example, study participants demonstrated significantly different levels of tolerance for a Ku Klux Klan rally depending on whether it was framed as a racist protest or an example of free speech (Nelson, Clawson & Oxley, 1997).

Early framing studies assumed audiences were passive and interchangeable, and employed tightly-controlled experimental settings to test the effect of different media messages on opinions. Critics pointed out these conditions did not translate well to real-life media consumption (Hovland, 1959; Hovland, Kelley & Janis, 1982). To study the effects of media outside of a laboratory setting, some scholars focus on the content of actual news reports: what aspects of content coverage cause an effect on readers or listeners, and why (Krippendorff, 1980)? Others focus on audience characteristics that shape their interpretation and acceptance of a message, such as existing attitudes and values, social structures and relationships, and previous exposure to similar information (Brewer & Gross, 2005; Zaller, 1992).

For example, Barabas and Jerit (2009) investigate the effect of real-life media on public knowledge of a policy area. They document the relationship over time between actual American newspaper and television coverage of a set of medical policy issues, and the awareness of these policy issues reported by study panel participants. They find that frequency, breadth and prominence of media coverage are the main variables affecting public awareness of a policy issue. Notably, these factors significantly outweigh individual characteristics commonly thought to impact citizens' awareness of policy, such as educational background and personal interest in the policy area (Barabas & Jerit, 2009, p. 83).

One way of investigating framing in real-world news coverage is through the study of tone. Kiousis (2004) performs an analysis of coverage in the *New York Times* of eight issues of importance (such as education, crime and health care) during the 2000 United States presidential election. He finds that while visibility (frequency and prominence) of news coverage is the main factor shaping its salience, tone comes in at a significant second. He proposes a model for understanding media salience as a two-part phenomenon (Kiousis, 2004, p. 82).

Wanta, Golan, and Lee (2004) provide a supporting example in their study of Americans' perceptions of foreign countries. First, does more coverage about a foreign country influence how important people believe that country is? Second, does the tone (positive or negative) influence how people evaluate those countries? They find that the more network news coverage a country received, the more likely individuals perceived that country to be important to American foreign policy interests. Interestingly, negative coverage of a country led people to think more negatively about that nation, but positive coverage had no parallel effect on positive attitudes. In general, scholars find that negative media coverage has stronger agenda-setting effects (McCombs & Shaw, 1993). The anecdotal observation that bad news sells has recently been confirmed by Soroka (2014), who performs a computerized analysis of 74,000 economic and crime news articles and finds a significant, cross-national negative bias to media coverage (Soroka, 2014, p. 73, p. 92). The evolution of media coverage over time adds another dimension to its effects. For example, societal views on capital punishment in the United States have undergone a significant change over the last 50 years. Dardis et al. (2008) investigate how changes in media coverage correlate with this shift by analyzing coverage of capital punishment in the *New York Times* since 1960 as well as testing the impact of the framing choices used in an experimental setting. They find that media coverage of capital punishment has increased considerably and has become more critical, especially since the late 1990s. Both increasing frequency of coverage and a shift in framing were significant influences on public opinion in this issue area (Dardis et al., 2008, p. 125).

Another important facet of understanding media coverage over time is the election cycle. Scholars find that the dynamics of media coverage change distinctively during election campaigns, as politicians and parties become the dominant agenda setters and the media follows their lead, having little to no influence on platforms or promises during the campaign (Norris et al., 1999; Brandenburg, 2002).

Finally, as mentioned previously, media coverage of small issue areas can have disproportionately large effects on public awareness. When a subject is infrequently and less prominently covered, the framing of individual articles matters. For example, public health and emergency preparedness receive very little coverage in the American media. During and after Hurricane Katrina, news media coverage focused overwhelmingly on government response and remediation and minimized the importance of prevention and individual preparedness measures that could have saved lives. Public health practitioners have suggested learning from this event to ensure safety information reaches the public by effectively framing coverage before, during and after disasters. Providing knowledge through human interest stories, conducting personal interviews between experts and reporters in "lay language," and demonstrating key facts through stories and examples are suggested techniques (Barnes et al., 2008).

Coverage of small policy gaps can also identify unforeseen issues and establish de facto policy frameworks that governments cannot ignore. In Australia, following a series of media reports drawing attention to boys' performance in the public education system, parent demands spurred changes from the ground up in individual schools' gender policies. Subsequent official policies were confined within the bounds of these less formal frameworks (Lingard & Rawolle, 2004). In short, it is precisely because the PSE sector receives only a small amount of media attention that the content of individual stories is more likely to have an impact on attitudes and policy.

Appendix B: Topic Modeling Output

The following output from our topic-modeling analysis defines and describes the 25 most important topics discovered within our PSE article dataset. Each topic has been assigned a label (shown in parentheses) by our team according to its associated key words and articles. Those topics without labels, such as Topic 14, reflected no clear PSE-related topic and resulted from background "noise" present in the data. Topics are numbered in an arbitrary order that *does not* reflect their prevalence in the data. See Figure 5 for a ranking of these topics by prevalence.

Key words are grouped into four categories, and are listed in descending order of importance to the topic. "Highest Prob" words are those which have the highest probabilities of association with the topic. "FREX" stands for "FREquent" and "EXclusive": these words are the most topic-distinguishing as they appear frequently only in this topic and not in others. "Lift" and "Score" are measures provided for comparison across other text-mining algorithms than the one employed in this study, and are of lesser importance for interpretation here (Roberts, Stewart, & Tingley, 2016).

Topic 1 (Cost of PSE) Top Words:

Highest Prob: money, loan, cost, debt, financi, save, credit

FREX: loan, debt, save, payment, repay, credit, borrow

Lift: payer, repay, resp, bankruptci, cesg, creditor, eap

Score: eap, radi, loan, debt, tuition, incom, resp

Topic 2 (Skills and Training) Top Words:

Highest Prob: work, skill, career, employ, job, graduat, peopl

FREX: trade, career, job, apprenticeship, employ, workforc, skill

Lift: apprentic, bricklay, millwright, rosia, autobodi, boilermak, cabinetmak

Score: eap, nsse, parl, radi, tertulia, skill, employ

Topic 3 (Plagiarism and Legal) Top Words:

Highest Prob: academ, board, presid, decis, report, letter, case

FREX: complaint, legal, cheat, lawyer, court, letter, plagiar

Lift: affidavit, deferipron, dishonesti, exoner, plagiar, plagiarist, plaintiff

Score: eap, nsse, radi, alleg, cheat, plagiar, court

Topic 4 (Business and Industry) Top Words:

Highest Prob: busi, compani, engin, technolog, say, manag, industri

FREX: engin, compani, manufactur, entrepreneur, busi, technolog, corpor

Lift: aftermarket, agribusi, avion, ethanol, mbas, semiconductor, supercomput

Score: eap, nsse, parl, radi, tertulia, compani, engin

Topic 5 (Enrolment) Top Words:

Highest Prob: colleg, last, number, enrol, say, institut, applic

FREX: colleg, applic, admiss, enrol, appli, fall, doubl

Lift: colleg, waitlist, cutoff, registrar, duguay, admiss, applic

Score: eap, nsse, parl, radi, tertulia, colleg, applic

Topic 6 (Society) Top Words:

Highest Prob: public, societi, mani, must, fact, academ, right

FREX: religi, religion, societi, editori, belief, argument, inde

Lift: downtrodden, mainlin, obfusc, relativ, unquest, specious, sinecur

Score: eap, nsse, radi, religi, religion, societi, polit

Topic 7 (Technology) Top Words:

Highest Prob: use, comput, book, inform, game, say, site

FREX: laptop, anim, print, digit, game, copyright, video

Lift: earphon, hardcov, indi, netbook, piraci, planetarium, screenwrit

Score: eap, nsse, parl, radi, tertulia, comput, video

Topic 8 (Medicine) Top Words:

Highest Prob: rank, medic, doctor, health, french, montreal, medicin

FREX: medic, rank, physician, doctor, patient, french, bilingu

Lift: allophon, bilingu, chiropract, physician, unilingu, anesthesia, anglic

Score: eap, nsse, parl, radi, tertulia, rank, medic

Topic 9 (History, Biography, Popular Science) Top Words:

Highest Prob: world, histori, life, write, book, stori, first

FREX: famous, novel, ancient, writer, historian, fascin, black

Lift: memoir, newton, autobiographi, cosmic, creationist, emperor, eulog
Score: eap, nsse, radi, world, book, love, write

Topic 10 (Tuition) Top Words:

Highest Prob: tuition, increas, million, fund, govern, fee, budget
FREX: freez, budget, cut, fee, tuition, revenu, billion
Lift: freez, deregul, doer, underfund, unfund, solvenc, surplus
Score: eap, nsse, radi, tuition, fee, million, fund

Topic 11 (Research) Top Words:

Highest Prob: research, scienc, develop, fund, project, innov, invest
FREX: research, scientist, innov, scientif, scienc, collabor, climat
Lift: synchrotron, cartilag, fungi, sshrc, acoa, geneticist, aquacultur
Score: nsse, radi, research, scienc, fund, scientist, innov

Topic 12 (Government Policy) Top Words:

Highest Prob: govern, provinc, public, system, provinci, need, fund
FREX: aborigin, minist, provinc, provinci, govern, premier, feder
Lift: inac, intergovernment, telegramjam, mlas, throne, treati, aborigin
Score: eap, nsse, parl, radi, govern, provinc, aborigin

Topic 13 (Statistics) Top Words:

Highest Prob: cent, graduat, averag, rate, report, studi, high
FREX: averag, cent, rate, compar, declin, higher, lower
Lift: statscan, census, median, outpac, proport, plummet, averag
Score: eap, nsse, parl, radi, cent, averag, rate

Topic 14 Top Words:

Highest Prob: peopl, like, just, want, think, make, time
FREX: think, thing, realli, just, know, someth, want
Lift: realli, thing, everybodi, someth, think, anymor, mayb
Score: eap, nsse, parl, radi, realli, think, thing

Topic 15 (Scholarships and Awards) Top Words:

Highest Prob: scholarship, award, communiti, event, donat, music, graduat
FREX: ceremoni, donat, award, honour, scholarship, winner, music
Lift: alto, choir, powwow, soloist, ceremoni, bach, beethoven
Score: eap, nsse, parl, radi, tertulia, scholarship, award

Topic 16 (Infrastructure and Community Impact) Top Words:

Highest Prob: build, campus, citi, project, hous, space, communiti
FREX: citi, renov, build, downtown, hous, architectur, facil
Lift: acr, boulevard, canopi, dingi, leed, retrofit, rezon
Score: eap, nsse, parl, radi, build, campus, citi

Topic 17 (Food) Top Words:

Highest Prob: food, week, home, class, hour, live, summer
FREX: cook, meal, food, kitchen, lunch, eat, sleep
Lift: kalori, chees, diver, getaway, greasi, lentil, menus
Score: eap, nsse, parl, radi, tertulia, food, meal

Topic 18 (Protest and Politics) Top Words:

Highest Prob: group, protest, polit, vote, campus, elect, montreal

FREX: protest, abort, boycott, israel, march, voter, activist

Lift: annul, boo, brith, bullhorn, camel, elector, hooligan

Score: eap, radi, protest, vote, jewish, elect, isra

Topic 19 (Programs and Curriculum) Top Words:

Highest Prob: cours, learn, teach, studi, class, professor, experi

FREX: cours, learn, instructor, art, teach, lectur, experi

Lift: asynchron, athabasca, mooc, clicker, syllabus, introductori, wikipedia

Score: eap, nsse, parl, radi, tertulia, cours, learn

Topic 20 (Safety on Campus) Top Words:

Highest Prob: campus, polic, sexual, peopl, secur, incid, offic

FREX: sexual, assault, victim, incid, bulli, alcohol, crime

Lift: abdomen, abduct, assail, blackfac, cathet, columbin, coron

Score: eap, nsse, radi, sexual, polic, assault, incid

Topic 21 (National and International) Top Words:

Highest Prob: canada, canadian, countri, intern, world, nation, state

FREX: china, foreign, india, intern, chines, countri, canadian

Lift: brazil, china, india, hong, iceland, kong, korea

Score: eap, nsse, parl, radi, canada, intern, canadian

Topic 22 (Labour Issues) Top Words:

Highest Prob: strike, union, faculti, contract, class, member, salari

FREX: strike, contract, negoti, union, bargain, agreement, salari

Lift: lockout, walkout, concili, cupe, munaca, nationaux, opseu

Score: eap, nsse, parl, strike, union, contract, negoti

Topic 23 (Primary and Secondary Education) Top Words:

Highest Prob: teacher, test, grade, math, read, high, teach

FREX: math, teacher, test, grade, literaci, district, curriculum

Lift: eqao, kinesthet, penmanship, phonic, pisa, speller, worksheet

Score: eap, nsse, parl, radi, tertulia, teacher, math

Topic 24 (Nursing and Certifications) Top Words:

Highest Prob: program, offer, train, nurs, degre, call, inform

FREX: nurs, program, certif, offer, regist, diploma, train

Lift: tertulia, parl, radi, midwiferi, baccalaur, agrologist, nurs

Score: eap, nsse, parl, radi, tertulia, program, nurs

Topic 25 (Children) Top Words:

Highest Prob: children, parent, say, kid, women, famili, child

FREX: boy, girl, children, women, kid, mother, daughter

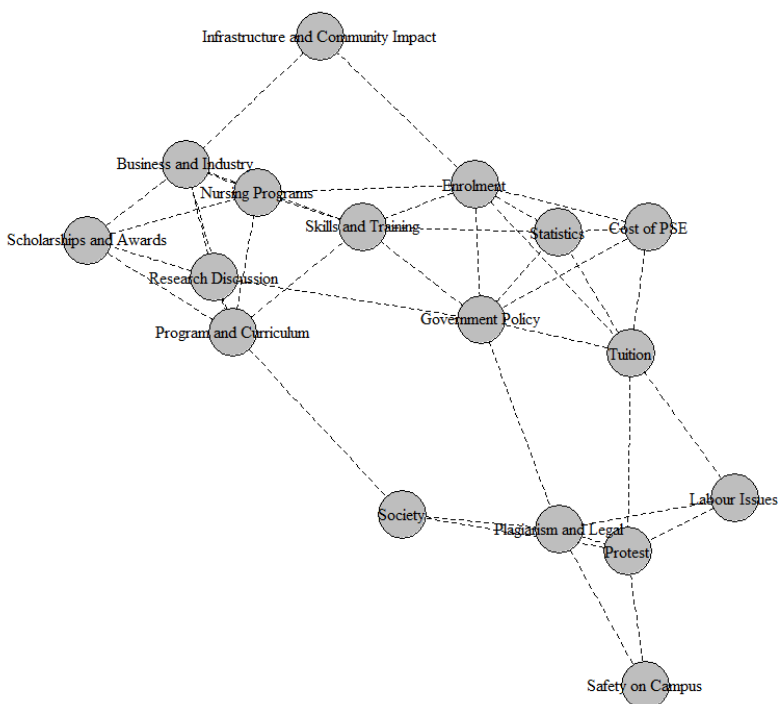
Lift: autist, dad, mom, mommi, puberti, unschool, boy

Score: eap, nsse, parl, radi, tertulia, children, parent

Appendix C: Latent Topic Analysis

The following figures extend the analysis presented in Figures 6 and 7 through the addition of the latent topics uncovered in our topic analysis, together with the original eight topics specified by our study. Notably, government policy remains the most centrally-connected topic node when additional topics are added to the network graph in Figure 35.

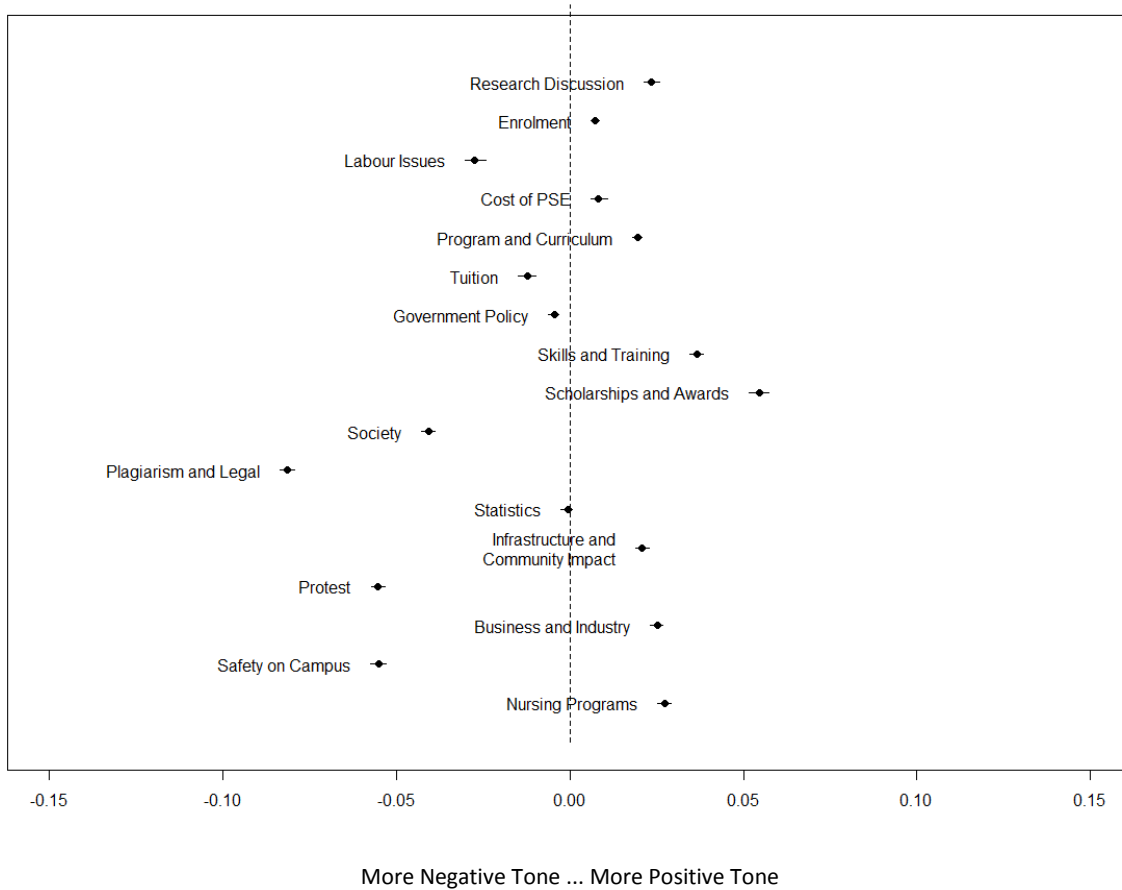
Figure 1: Network Relationships of Latent PSE Coverage Topics



This figure is a network graph of all the PSE coverage latent topics studied. Each topic is plotted as a node, represented by a grey circle. Nodes are connected with an edge (dotted line) to other nodes if the topics correlate, meaning they often appear in the same news articles together.

Figure 36 reveals that a small number of the additional topics are highly polarized in tone. Notably, Scholarships and Awards are the most positive topic of coverage, while coverage of Plagiarism and Legal issues is extremely negative in tone. Not surprisingly, coverage of Protest and Safety on Campus is also very negative.

Figure 2: Tone of Media Coverage of PSE Latent Topics



This figure shows the average difference in topic proportion by tone of all the PSE coverage latent topics studied. That is, given two randomly selected articles from our PSE corpus, one of which is coded "Positive" in tone and one "Negative" in tone, the value along the X axis represents the difference between the proportion of words in each article about that given topic, on average.



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