MANUFACTURING DISSENT:
A MIXED METHODOLOGICAL ANALYSIS
OF HUMAN THOUGHT, ALGORITHMIC MEDIATION,
AND POLITICAL ELECTIONEERING ON TWITTER

Sophia Melanson Ricciardone

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ABSTRACT

The invisible entanglements of deep learning algorithms with political communication on social media platforms like Twitter have complicated political discourse and the formation of public opinion in the digital age. Consequently, as we engage with the content distributed on social media, it is difficult to know whether we are engaging with virtual peers or political bots. At the same time, the invisible interventions of bots also conceal the electioneering processes set in motion within political discourse on social media. Evidence has shown that because our minds cannot discern between tweets posted by human peers and those posted by bots, we intuitively engage with all tweets as though they were produced by social peers. Thus, the nature of our cognitive engagement with all tweets posted on social media conforms to the same social psychological principles that we engage when interacting with other social beings. Across this dissertation, I contend that the convergence of human thought, digital mediation, and digital electioneering creates distortions in logic on Twitter, resulting in a phenomenon I call *botaganda*. As the decussation of three different modes of reasoning infiltrate discourse within online spaces, the nature of discourse within public debate becomes convoluted, rendering human thought and public opinion vulnerable to the interference and manipulation of political actors. I aim to demonstrate that *botaganda* compromises the cogency and reliability of political communication in the digital age, but it is also the driving force behind the tenor of bipartisan incivility, politically motivated expression of moral outrage, and polarization of constituencies in the digital age. This dissertation also proposes that the political instrumentalization of deep learning algorithms on social media platforms to shape political discourse violates citizens' fundamental rights to the freedom of thought, judgement, and conscience according to Section 2 the *Canadian Charter of Rights and Freedoms*.

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LIST OF ABBREVIATIONS

Abbreviation	Meaning	Page
ANT	Actor Network Theory	7
AI	Artificial Intelligence	39
API	Application Programming Interface	84
AUC	Area Under [the receiver operating characteristic] Curve	86
ASTRO	Astroturfing (bots)	9
CDA	Critical Discourse Analysis	7
CEO	Chief Executive Officer	8
CPC	Conservative Party of Canada	54
DPA	Differed Prosecution Agreement	4
LPC	Liberal Party of Canada	64
MPs	Members of Parliament	9
NDP	New Democratic Party	169
PM	Prime Minister	1
PMO	Prime Minister's Office	51
RCMP	Royal Canadian Mounted Police	8
USAS	Semantic Analysis System	88

Chapter 1: Introduction

The smart way to keep people passive and obedient is to strictly limit the spectrum of acceptable opinion, but allow very lively debate within that spectrum.
– Noam Chomsky, from *The Common Good* (1998)

1.1. Introduction

In the early spring of 2019, Canadians were informed of allegations that Prime Minister Justin Trudeau had been somehow involved in the corporate misconduct of a Québec-based engineering company, SNC Lavalin. Very quickly, a convolution of accusations against the Prime Minister (PM) erupted on Twitter and a salacious narrative framing Trudeau as corrupt, tyrannical, and unethical ensued. With near catatonic deference, Twitter users embarked on a rampant campaign of shaming the Prime Minister and his cabinet on Twitter before due process could be exacted let alone contemplated. He "…violated the law!" @IBC tweeted, to which @DB responded, "…the Liberal Caucus… have their own traditions so they do not have to follow the Law." Another Twitter user weighed in, reminding the Prime Minister that "lying is bad, [and] breaking the law [is bad]," while @W chimed in with a synecdochic platitude, "Liberals..... another day, another scandal." To this, @BB offered his perspective with ironic rhetorical force, asking "what you mean Trudeau violated the law again? So what else is new? Hope Philpott sues Trudeau and holds him accountable for his lawlessness!"

In the third decade of the twenty-first century, the framing of public opinion and the mechanics of the public sphere are often swept up into a menagerie of online processes, which unfold among human minds, digital algorithms, and political intermediaries in dialogical fashion. The consequence is contortion of the conceptual fibers that become woven into the fabric of socio-political reality, which is collaboratively contrived into existence among online communities, even when narratives contravene the cogency of evidence. The SNC Lavalin affair serves as an ideal case study to examine how these dynamics of online discourse reconstitute notions of what is true and what is not, how truth is substantiated and how it is denounced, which facets of reality are real and which are fake, how kernels of truth are assembled and what their assembly comes to signify.

This dissertation looks at how the convergence of semiosis among human minds, algorithmic computation, and political electioneering on Twitter – a phenomenon that I refer to as *botaganda* – renders human thought and public opinion susceptible to the influence of 'post-truth' schemas online, which fundamentally polarize different versions of public opinion. By examining how these schemas compromise the cogency and reliability of political communication mediated on Twitter, I contend that electioneering techniques that political intermediaries leverage in online spaces to exploit facets of human

cognition (mobilized by the computational agency of digital algorithms) fundamentally circumvent Canadian citizens' right to the freedom of thought, judgement, and conscience according to section 2 of the *Canadian Charter of Rights and Freedoms*.

Botaganda is a lexical blend that synthesizes the words *bot* and *propaganda* and is used as a 'portmanteau' term punctuating the automated and clandestine nature of bots in the ways in which they spread 'misinformation,' 'post-truths,' and 'alternative facts' to satisfy political agendas that are propagandic in their influence. This term was inspired by a whimsical discussion among myself and my supervisors, during which time one of them – Stéphanie Walsh Matthews – jestingly suggested the term *botaganda* as a 'portmanteau' term for the mental consequences of converging human thought, political algorithms, and electioneering practices on Twitter. Though the term does present as whimsical, I found it to both succinctly represent the phenomenon that I wished to describe through the term and to capture the underlying signification of the term in a memorable and accessible way. I thus opted to incorporate the term throughout this dissertation to represent political intermediaries' use of deep learning digital algorithms to psychometrically profile and micro-target constituents for electioneering purposes online.

My central thesis is that converging modes of semiosis cultivated among human minds, digital algorithms, and political intermediaries on social media generates a recursive and circuitous flow of meaning making processes that collaboratively shape the content of political communication on Twitter. Moreover, while Twitter bots are intentionally programmed to redistribute and circulate content that best aligns with the content posted by human users, the minds of human users, as asserted by Garrod and Pickering's Interactive Alignment Model, are compelled to mentally align their linguistic, conceptual, social, ideological, and political constructs with the underlying meaning represented by tweets posted by bots. I aim to substantiate this central thesis by determining whether *botaganda*, as an inter-operational phenomenon that takes place on Twitter, can be detected within instances of *interactive alignment* between human minds and the tweets posted by Twitter bots. I also delineate the cognitive conditions generated on Twitter to explore how the recursive relationship generated between Twitter bots and human minds resulted in interactive 'alignment' (as conceived by Garrod and Pickering 2004), thus strengthening the entrenchment of particular words or phrases into the recesses of human memory and influencing how humans think about important political events. The goal of this delineation is not to provide evidence of causation or to confirm correlation between the content posted by bots and those posted by humans, but rather, to render a preliminary examination to ascertain the likelihood that a relationship of some sort was generated between the two.

Finally, and more specifically to the case study examined for this dissertation, I investigate whether particular words, phrases, and expressions embedded in tweets posted by Twitter bots may have operated contagiously and whether their 'contagious' qualities help cultivate a false sense of insight

among Twitter users about important political information, thus fomenting and advancing ideological biases about Prime Minister Trudeau and the Liberal Party across the #SNCLavalin Twitter discourse.

In pursuit of these research goals, I borrow from Hjelmslev's Glossematics (1953; see also Hjelmslev and Uldall 1957; Garvin 1954; Trabant 1987; Siertsema 1955) as a macro perspective that helps synthesize and integrate several theoretical concepts lending to the examination of *botaganda* on Twitter. Under the proverbial umbrella of this macroscopic model, I explore the nature of *botoganda* through the lens of social psychology, cognitive semiotics, and cognitive linguistics to make sense of human and electioneering semiosic processes, and through the lens of computer science and a-signifying semiotics to make sense of digital algorithms. I also adapt Hjelmslev's model to illustrate how the convergence of these different logics online confounds the schematic flow of semiosis, thus convoluting political communication and public opinion in the digital age. Through this approach, I demonstrate that undergirding the inter-operational phenomenon of *botaganda* on Twitter, the social proclivity of human minds to align with representations reflecting their inherent worldviews, beliefs, and values propels the efficacy of *botaganda* in molding public opinion and the public sphere in the digital age. The socio-cognitive predisposition of human minds, I contend, is what becomes operationalized within the logic of *botaganda*, and thus within the logic of automated algorithmic computations, generating deleterious ramifications for political governance, public welfare, and intersubjective cooperation in the contemporary context.

Because language is a semiotic system invented and used by humans to organize and share representational phenomena, and because it is a unit of reference common to human thought, digital algorithms, and political intermediaries within the scope of online spaces, it is the principal target of analysis across this dissertation for examining the convergence of semiosis generated among human minds, algorithmic computations, and political electioneering. To confirm the significance of this convergence, I rely on the results of an empirical study conducted for this dissertation using the chi-square test to measure for independence between tweets posted by humans and those posted by bots. I then explore the interactive nature of *botaganda* between tweets posted by humans and those posted by Twitter bots and to statistically probe the linguistic data to calculate the likelihood that a relationship between tweets posted by bots and those posted by humans exists. A corpus analysis using computational tools and qualitative research instruments further substantiates the socio-psychological nature of *interactive alignment* between tweets posted by humans and those posted by bots in more granular detail.

1.1.1. Research Problem

To make sense of the convergence of semiosis among human minds, algorithmic computation, and political electioneering across the #SNCLavalin Twitter discourse of early 2019, some preliminary details

pertaining to the political events leading up to the production of the #SNClavalin Twitter thread at that time are necessary. In what follows in this section, I discuss the research problem in view of the case study evaluated across this dissertation.

Alignment, as framed in social psychology and social-cognitive neuroscience (Garrod and Pickering 2004), is a multi-level interactive phenomenon that manifests among human subjects as they interact, compelling interlocutors to mirror and replicate one another's verbal, gestural, and emotional expressions as they interact. These communicative values of these interactions become entrenched within the mental attitudes and representational organization of shared concepts within the recesses of human minds in the process. The term 'alignment' is not used here to suggest causal relationships between content posted by bots and humans, nor does it provide evidence of linear causation in these dynamics. Rather, *interactive alignment*, in the sense of the term as it is used within the scope of social psychology, describes "the multi-level, dynamic, and interactive mechanisms that underpin the sharing of people's mental attitudes and representations in all kinds of social interactions" (Dale, Fusaroli, & Duran, 2013).

Since the presence of digital machinations and algorithmic computations online are indistinguishable to our human minds, we are cognitively predisposed to engage with political content posted by Twitter bots 'as though' it were social (Branigan et al. 2010). We are, therefore, more likely to socially, conceptually, and ideologically align with the signification of those posts as though they were produced by social peers, especially given that their deep learning algorithmic attributes are designed to accommodate our individual tastes, interests, and worldviews.

Research has confirmed that the phenomenon of *interactional alignment* is observable within the language that we use (Branigan et al. 2010, 2011; Koulouri et al. 2016), rendering text-based representations posted on Twitter ideal specimens for the analysis of *interactive alignment* between human minds and content posted by Twitter bots. Several instances of this mode of intersubjective alignment were empirically and qualitatively analyzed across the #SNCLavalin Twitter discourse (between March 14 and April 9, 2019) sampled for this dissertation (see Chapter 4, Section 4.2.5. and Chapter 5, Section 5.2.2. for details about the results of this analysis). However, as a point of clarification, the use of the term 'alignment' here makes reference to the recursive sharing of mental attitudes within social interactions, as framed by Garod and Pickering (2004) and is not meant to suggest a causal relationship between tweets posted by bots and human thought. To help contextualize and make sense of the alignment phenomenon as it unfolded across the #SNCLavalin Twitter discourse of early 2019, some background information is required. In the following four paragraphs, I describe the contextual events leading up to the scandal as it manifested on Twitter.

SNC Lavalin is a Canadian-based engineering company that has been embroiled in several international investigations for alleged crimes since the early 2000s. More recently, in 2019, the company

was charged with, and convicted of fraud by the Federal Court of Canada. Prior to this conviction, Prime Minister Justin Trudeau had been accused of political interference with the judicial process in convicting the company by pressuring Canada's Attorney General to grant SNC Lavalin a Deferred Prosecution Agreement (DPA), which contravened the Separation of Powers and Independence of Constitutional Courts and Equivalent Bodies in Canada.

Upon completing an investigation, Canada Ethics Commissioner, Mario Dion, determined that Prime Minister Trudeau's attempt to influence Attorney General Jody Wilson-Raybould on the SNC Lavalin affair did, indeed, violate Canada's *Conflict of Interest Act*. However, Prime Minister Trudeau's involvement represents an ancillary part of a much broader international problem. Namely, the confounding of international law in globalized conditions, which enables corporations to operate within the tenuous obscurity of uncalibrated law among nation states, and, more specifically to the purposes of this dissertation, corporations' ability to sway public opinion about their conduct within online spaces through the agency of politicians that they financially endorse in the digital era.

In 2019, the significant loss of Canadian jobs and the economic consequences of dismantling of a large Canadian-based corporation occupied Prime Minister Trudeau and his cabinet's realm of political concern as SNC Lavalin's corporate misconduct was being legally scrutinized by the Supreme Court of Canada. Indeed, in 2019, SNC Lavalin employed 8,762 Canadians, half of which worked outside of Québec (Swain 2019). Responding to this reality, Prime Minister Trudeau asserted that he would "not… apologize for standing up for Canadians jobs. That's [his] job" (Trudeau quoted in Abedi, 2019).

Political scientist Tim Mau (2019) also notes that while Prime Minister Trudeau's actions may have contravened Canada's *Conflict of Interest Act*, like most countries across the globe, "Canada has a substantial history of scandal and corruption despite… various safeguards for keeping it at bay" (223), and that Trudeau is far from the first Canadian Prime Minister to be sanctioned for impropriety and significant accusations (Dangerfield 2019). For example, John A. MacDonald became embroiled in the Pacific Scandal in 1873, Brian Mulroney by the Schreiber Affair in 2010, Jean Chretien in the Shawinigate Affair in the 1990s, and more recently, Stephen Harper in the Contempt Case of 2011 (Mau 2019).

In an interview with Global News, Canada (Dangerfield 2019), Professor Atkinson adds that while the Trudeau case presents the first and only instance that a sitting Prime Minister has been found to have violated federal ethics law, it is not because his conduct is especially salacious or uniquely unprecedented. Rather, it is because federal ethics law is enforced according to the *Conflict of Interest Act*, which is a relatively new addition to Canadian legislation having only come into effect in 2006. Moreover, SNC Lavalin's lobbying efforts for a DPA began well before the Trudeau government. In fact, in his final report, Ethics Commissioner Dion notes that Harper's Conservative Government permitted SNC Lavalin to continue bidding on federal government contracts while the company was being investigated for

criminal charges; that SNC Lavalin had been lobbying Harper's conservative government for a DPA for quite some time.

1.1.2. Socio-political Significance of Research

So, why has Prime Minister Trudeau's office become the target of intense and concentrated expression of moral outrage among the Canadian public on social media? Why was Prime Minister Trudeau more deserving of moral reprisal in the public sphere than previous political leaders in Canada? What caused members of the public to tweet and retweet hyperbolized language assigning culpability for the entirety of the SNC Lavalin scandal to Trudeau, characterizing him as the leader of a "corrupt biased socialist globalist liberal… party, [who] are doing their best to sweep the #SNCLavalin scandal away…" (#SNCLavalin, 08/04/2019 15:59:54)?

The extant of the 'post-truth' era, which saturates political knowledge with 'alternative facts' and 'fake news' – not to mention their reinterpretation – has permeated the relationship between governing bodies and their publics in the digital age. Though members of the public have always held the right and prerogative to pass judgement on political leadership, as sanctioned by the *Canadian Charter of Rights and Freedoms*, the channels of expression were relatively limited and unidirectional prior to the advent of the Internet and social media, and so the expression of opinions like "Trudeau Must Go" and "Trudeau is Done" (Human Tweet, 14/03/2019 14:36:34) were typically confined to the lived spaces of our socio-material reality.

In the digital era, as we tap our fingers across the surface of polyethylene keyboards to interact with the world through online channels, the software driving our interactions connects our input to a larger network of processes unfolding on the Internet, and somewhere, out there in the digital ether, they are watching and listening. By 'they,' of course, I mean digital algorithms, and by 'watching' and 'listening,' I mean computing traces of our input data. For instance, in 2013, a team of researchers conducted a study to determine whether Facebook likes could be operationalized to automate the accurate prediction of intimate facets of personality, such as sexual orientation, religious and political views, degree of life satisfaction, age, parental separation, and gender. Using machine learning instruments programmed to automate the psychometric analysis of Facebook users' 'likes,' the researchers found that attributes of people's personality could be accurately predicted using machine learning (Kosinski et al. 2013). A few years later, the authors cautioned that this technique, if left unregulated, "could be used to covertly exploit weaknesses in their [members of the public's] character and persuade them to take action against their own best interest, highlighting the potential need for policy interventions" (Matz et al. 2017).

In our contemporary context, at the commencement of the third decade of the twenty-first century, it is becoming increasingly clear that our interactions with computers are no longer private, confined to the

intimate sphere of our personal spaces. Rather, through the omnipresence of our mobile devices, the tentacles of the public sphere reach into the recesses of our domestic spheres while, simultaneously, drawing elements of our private lives into the viscera of digitally simulated realities, blurring the boundaries between the public and private in the process. At the same time, as research has shown, the tentacles of digital media's reach extend well beyond the membrane of our domestic spaces and into the privacy of our most intimate thoughts, motivations, affectivities, beliefs, values, and fears. Perhaps even more disconcerting is the fact that our personal 'data' is acquired by political intermediaries who use digital algorithms to influence our worldviews in ways that serve prescribed outcomes according to electioneering agendas. This is especially problematic with respect to the protection of Canadians' freedom of thought, judgement, and conscience, as outlined in section 2 of the *Canadian Charter of Rights and Freedoms*, to which Chief Justice Dickson (1985) has noted:

> An emphasis on individual conscience and individual judgment… lies at the heart of our democratic political tradition. The ability of each citizen to make free and informed decisions is the absolute prerequisite for the legitimacy, acceptability, and efficacy of our system of self-government.

1.1.3. Research Scope

In what follows in this chapter, I problematize the concealed use of deep learning neural network algorithms among political intermediaries for electioneering purposes on social media. I posit that because the intervention of deep learning algorithms is concealed from human Twitter users, the unconscious recesses of human thinking are compelled to engage with the content of tweets as though they were posted by human peers, thus activating the social psychological faculties of human consciousness. I contend that the cognitive dynamic formed among human minds, algorithmic computations, and electioneering techniques on social media platforms like Twitter make human minds susceptible to the invisible machinations of digital algorithms mobilized by political intermediaries to shape political communication and public opinion in ways that best accommodate electioneering goals.

To date, communication and media studies research on political communication, public opinion, and the public sphere in the digital age has not fully investigated the cognitive dimensions of electioneering practices online. This dissertation aims to fill this gap in research by applying empirical research instruments to explore the possibility that tweets posted by Twitter bots relate in some way with tweets posted by humans, and by using qualitative research instruments that synthesize perspectives from cognitive linguistics and critical discourse analysis (CDA) to explore potential linguistic explanations for the relationship between tweets posted by humans and by bots on Twitter. Since it investigates the conflation of human and non-human functions, the research conducted for this dissertation also makes

important contributions to perspectives related to *Actor Network Theory* (ANT) and research into the cultivation of political conspiracy theories, post-truths, and alternative facts in the digital era.

Results from the empirical study conducted for this dissertation suggest that the content of tweets posted by humans relates with the content of tweets posted by bots in some way across the #SNCLavalin Twitter discourse of 2019 in half of the 12 corpus-pairs, or in 2 of the three temporal segments examined (e.g., between one set of corpora composed of tweets posted by humans and another of tweets posted by bots – see Table 5.1 in Chapter 5 for further reference). Applying approaches from cognitive linguistics and CDA, qualitative analysis of tweet content revealed that keywords and phrases frequently and consistently repeated in tweets posted by bots were replicated in tweets posted by humans. Situated within the scope of research conducted across the field of social psychology, these findings suggest that keywords and phrases contained in tweets posted by bots produced *contagion effects* that compelled human minds to interactively align – that is, the socio-cognitive predispositions of human users to unconsciously accommodate the communication style of fellow interlocutors, even virtual ones, in social contexts (Garrod and Pickering 2004) – with the concepts and ideologies represented in bot-posted tweets.

These findings also suggest that the convergence of human thought, algorithmic computation, and political electioneering on Twitter – referred to as *botaganda* across this dissertation – renders human minds vulnerable to digital campaign practices used by politicians in mobilizing deep learning digital algorithms that influence political communication and shape public opinion. Moreover, this dissertation contends that the use of digital algorithms for electioneering purposes violates citizens' fundamental rights to the freedom of thought, judgement, and conscience according to section 2 of the *Canadian Charter of Rights and Freedoms*.

1.1.4. Chapter Overview

In this chapter, I first provide some additional background about the case study chosen to explore correlation between the content of tweets posted by bots and those posted by humans in 2019. In Section 1.3, I supply a synopsis of the research problems and contributions that this dissertation offers, and in Section 1.4, I supply a rationale for the aims, scope, and research objectives pursued by this dissertation and Section 1.5 lays out the research questions that I seek to answer in accommodating this dissertation's research aims, scope, and objectives followed by a list of my hypotheses. Section 1.6 describes the conceptual framework and methodological approach used to examine Twitter content while Section 1.7 lays out the structure of the dissertation and a summary of each chapter's purpose. I conclude with a brief summary of this chapter as well as the next.

1.2. The Case Study

In 2019, public knowledge about the alleged misconduct of the Montréal-based engineering company, SNC Lavalin, catalyzed a political and legal crisis in Canada as details about the company's relationship with foreign officials entered public view online. The scandal represented the culmination of several years of allegations that the company had committed fraud, dating as far back as 2001, when SNC Lavalin is said to have invested $127 million in two shell companies allegedly used to transfer funds to foreign officials overseeing the allocation of public infrastructure contracts (Marland 2020; La Presse Canadienne 2019). Though the company's alleged violation of international law only entered Canadian public consciousness in a significant way in 2019, the corporation's profiteering campaigns had been common knowledge in other parts of the world for much longer.

For example, in 2013, prior to Prime Minister (PM) Justin Trudeau's first term, the World Bank recanted financial support bracketed for the construction of the Padma Multi-purpose Bridge in Bangladesh in response to allegations of SNC-Lavalin's illicit activity (Yeager, Shelden, and Holden 2021). The following year, high-level executives with SNC Lavalin were arrested in Switzerland for money laundering and corruption. They were then publicly condemned by the company, which attempted to distance itself from an increasingly caustic situation (Marland 2020). However, the executives plead guilty, thus evading punitive litigation in exchange for their cooperation with the Royal Canadian Mounted Police (Yeager, Shelden, and Holden 2021), exposing SNC-Lavalin to further allegations and legal complications.

In 2016, the company's Chief Executive Officer (CEO) met with Prime Minister Trudeau and expressed an inclination to negotiate an agreement. The company's CEO suggested that if the company was forced to dissolve, it would likely become acquired by a foreign multinational entity that would relocate the company's headquarters, effectively terminating thousands of Canadian jobs (Marland 2020). In response, Prime Minister Trudeau had his senior advisor review the matter to determine what could be done to mitigate this potential outcome. It was determined, under immense pressure from SNC Lavalin lobbyists, that Canada could introduce a framework for deferred prosecutorial agreements (DPAs) into existing legislation, which would effectively oblige the company to comply with the terms of the agreement or be forced to cease its operations in Canada and elsewhere. Precedence for such legislative amendments had already been established in the United Kingdom and the United States (Marland 2020).

While incorporation of a DPA into existing legislation was underway, Attorney General Jody Wilson-Raybould remained removed from the process as the Department of Justice drafted a proposal to revise Canada's Criminal Code to accommodate a DPA. By May of 2018, despite hesitation expressed among Liberal Members of Parliament (MPs), Finance Minister Bill Morneau included verbiage defining the terms for a DPA into a finance bill (Marland 2020). As the bill was being scrutinized in parliament and

the senate, SNC-Lavalin's lawyers continued lobbying the Public Prosecution Service of Canada for a DPA.

By September of 2018, the Office of the Attorney General refused to authorize a DPA for SNC Lavalin citing the severity of the company's legal offences and its long-standing history of corruption as sufficient grounds to deny the request (Fife 2020). Prime Minister Trudeau and the clerk of the Privy Council, Michael Wernick, urged Wilson-Raybould to reconsider, pressing their concerns that prosecuting SNC Lavalin could deleteriously impact Canadian jobs and the Canadian economy. Finance Minister Morneau also plead for Wilson-Raybould to re-examine her decision (Marland 2020). In a final attempt to sway Wilson-Raybould's stance, Wernick reminded her that Québec elections were in progress, and that Trudeau was a Minister of Parliament for that province. In 2019, Ethics Commissioner Mario Dion determined that Prime Minister Trudeau had overstepped the bounds of his authority by attempting to interfere with the judicial process and Jody Wilson-Raybould's role as Attorney General. These political events precipitated into a scandal of significant public interest by February of 2019, and closer analysis of the tweets posted during the same period (see Chapter 5, and Section 5.2.3.3.2 of Chapter 5, more specifically, for some examples) containing the hashtag #SNCLavalin revealed an ecology of networked posts featuring the words 'scandal,' 'corruption,' 'coverup,' 'obstruction (of justice),' and 'liar' most prevalently. More specifically, the language contained within tweets posted by astroturfing Twitter bots targeting Prime Minister Trudeau's character using the words delineated above as hashtags were replicated in tweets posted by human users, thereby networking related themes alongside prevalent and frequently recurring words and phrases (instances of *semantic contagions*) of political import in the process.

Perhaps most significantly, this line of reasoning precipitated in the contortion of political reality. For example, tweets belonging to the same chain of hashtags and keywords suggested that the political conduct of Prime Minister Trudeau and the Liberal Party equivocated the corrupt conduct of SNC Lavalin warranting criminal investigation by the RCMP. Moreover, similes were drawn between Prime Minister Trudeau and communist leadership (for example, see reference to the Prime Minster as 'Chairman Trudeau' in Table 4.22 in Section 4.4.5.1 in Chapter 4). Whereas the conduct of political leadership would have previously remained confined to the mechanics of political institutions with some degree of influence from broadcast media prior to the advent of the Internet, social media has enabled opposition leadership to operationalize human cognition, human input online, and public opinion in reconstituting the meaning and significance of political decisions made by the governing party and its leadership. Thus, the meaning and purposes of standard political activities enacted between institutions as well as the checks and balances that regulate them become subject to public scrutiny refracted through a lens calibrated by the political biases of opposition leadership (regardless of who that political leadership happens to be).

1.3. Problem Statements and Contributions

Accordingly, and in consideration of the nature of semiosis cultivated within the convergence of human thought, digital mediation, and political electioneering, the research conducted for this dissertation advances important areas of academic research related to the following three problems:

1) The convergence of semiosis among human minds, algorithmic computations, and political electioneering on Twitter, which renders human thought vulnerable to the cognitive effects of *botaganda* on Twitter.

2) The impact of this convergence on political communication, public opinion, and the public sphere, which has cultivated 'post-truth' schemas that shape the tenor of bipartisan incivility, politically motivated expressions of moral outrage, and polarization among constituents in the digital age.

3) Politicians' use of digital algorithms to indistinctly shape political communication and public opinion, which violates citizens' fundamental rights to the freedom of thought, judgement, and conscience according to section 2 of the *Canadian Charter of Rights and Freedoms*.

This dissertation fills important gaps in Communication and Media Studies research on politics, political communication, public opinion, post-truth, political conspiracy theories, and the public sphere by incorporating dimensions of semiotics, cognitive linguistics, and critical discourse analysis into existing lines of inquiry within the ambit of digital media scholarship. Second, it offers new insight into how the digital rendering of public spheres online contradicts cyber-optimists' assumptions that social media could cultivate ideal Habermasian spaces for the free expression of opposing views in rational public debate, which could, it was hoped, fundamentally bolster the efficacy of the public sphere in improving social life among a populous. Third, by synthesizing perspectives and approaches from cognitive linguistics and CDA, this dissertation introduces new techniques for conducting corpus analysis in ways that reveal underlying ideologies propagated by the linguistic content circulated online. Fourth, it contributes to a growing body of work in CDA examining the ideological force of political communication online by incorporating facets of cognitive linguistics not yet explored in CDA. Finally, it establishes precedence for amendment of the *Canada Elections Act* to curb the use of deep learning digital algorithms to psychological profile and micro-target facets of constituents' personality for electioneering purposes on social media.

1.4. Rationale for Research Aims and Objectives

This research aims to assess whether, to what extent, and in which ways the convergence of semiosis among human thought, algorithmic computation, and political electioneering on Twitter affects and shapes political communication and public opinion in the digital age. The research objectives pursued across this dissertation to accommodate this aim include:

1) An empirical analysis to examine whether, and in which ways *botaganda* on Twitter influences political thought by using the chi-square test for independence, which will help delineate whether a relationship exists between the content of tweets posted by bots and those posted by humans in instances where the null hypothesis is rejected.
2) A computational corpus analysis of words and phrases frequently assembled into the same politico-linguistic contexts of tweets posted by bots to determine whether they are replicated within tweets posted by humans.
3) A critical discourse analysis of word and phrase composites frequently assembled into the same politico-linguistic contexts using insights and principles from cognitive linguistics and CDA to ascertain whether those composites function ideologically in some way across the #SNCLavalin Twitter discourse in the spring of 2019.
4) An examination of the ways in which the use of digital algorithms for political electioneering purposes likely interferes with citizens' freedom of thought, judgement, and conscience in Canada according to section 2 of the *Canadian Charter of Rights and Freedoms*.

1.5. Research Questions and Hypotheses

This dissertation's central thesis posits that the convergence of semiosis among human thought, algorithmic computation, and political electioneering (also referred to as *botaganda* across this dissertation) on Twitter cultivates cognitive conditions that compel human minds to interdiscursively align with the ideologies, beliefs, and values represented in tweets posted by bots. Moreover, I postulate that recursive semiosic relationships cultivated between the content of tweets posted by bots and those posted by humans produces ideal cognitive conditions for interactive alignment, as framed within the scope of social psychology (Menenti et al. 2012; Branigan et al. 2010; Garrod and Pickering 2007, 2009, 2013, 2014), which I suggest further substantiates my hypothesis that the integration of human thinking, algorithmic mediation, and political electioneering on Twitter alters the nature of semiosis, meaning making, and, thus also, the nature of human political thought. Therefore, the quality of political communication and public opinion online is contingent upon the flow of semiosis generated by *botaganda* in the digital era.

Finally, my assertion that the effects of *botaganda* on human thought, politics, political communication, and public opinion on Twitter exacerbates bipartisan incivility, political expression of moral outrage, and the polarization of constituents is predicated on the idea that the use of digital algorithms by political intermediaries for digital electioneering purposes on Twitter fundamentally leverages the representational value of language in ways that fragment the public sphere and cultivate mental habits of dissent among Twitter users.

1.5.1. Summary of Research Questions

According to the assertions outlined above in the previous paragraph (Section 1.5), this dissertation aims to interrogate the linguistic content of tweets posted across the #SNCLavalin Twitter discourse of early 2019. To determine whether human minds were likely to have aligned with the ideologies, beliefs, and values represented in tweets posted by Twitter-bots; to what extent the socio-cognitive phenomenon of interactive alignment (Garrod and Pickering 2004) affected human thought and political communication; and whether these dynamics propelled bipartisan incivility, political expression of moral outrage, and polarization of constituencies, this dissertation asks:

1) Does the content embedded in tweets posted by bots relate in some way with the content of tweets posted by humans across the #SNCLavalin Twitter discourse of early 2019? If so, in what ways? This question will be explored using the chi-square test, which will determine whether:

> **H_0:** The null hypothesis is not rejected.
> **H_1:** The null hypothesis is rejected.

2) If the null hypothesis is rejected, what does that signify about the #SNCLavalin Twitter discourse of 2019?

3) Are words and phrases frequently assembled into the same politico-linguistic schemas within tweets posted by bots replicated in tweets posted by humans. What does this replication signify?

4) If words and phrases embedded in tweets posted by bots are found to be replicated in those posted by humans, do they function ideologically in some way within the #SNCLavalin Twitter discourse in the spring of 2019? If so, how?

5) If words and phrases embedded in tweets circulated by bots do function ideologically and do compel human minds to align with their political claims, can we say that the use of *botaganda* for electioneering purposes on Twitter, thus, violates Section 2 of the *Canadian Charter of Rights and Freedoms*? If so, how and in what ways?

1.5.2. Summary of Hypotheses

In responding to these questions, this dissertation examines #SNCLavalin Twitter discourse of 2019 as a virtual environment within which the convergence of human thought, algorithmic computation, and political electioneering results in the formation of *botaganda*. I explore the possibility that the formation of *botaganda* on Twitter rendered the strategic embedding of *semantic contagions* (e.g., words and phrases frequently and repeatedly situated in syntactic proximity to one another in ways that generate conceptual relations of equivalency) across political Twitter discourse possible. Attending to this line of inquiry, I used empirical research instruments to test the hypothesis that the cognitive conditions cultivated by *botaganda* on Twitter induced interactive alignment, as framed within the ambit of social psychology, between human minds and the content of tweets posted by bots, as represented by language-use across the #SNCLavalin Twitter discourse of 2019. To accomplish this, I collected tweets affixed to the #SNCLavalin Twitter discourse of 2019 and I segmented the content of those tweets into a corpus of human-generated content and another corpus of bot-generated content. Using insights and approaches from cognitive linguistics and CDA, I then conducted several 'thick analyses' of the content to examine what correlation might signify, whether particular composites of words and phrases that were frequently repeated in the content of tweets posted by bots were replicated in tweets posted by humans, and what that replication represented in more granular terms. Thus, I hypothesized that:

1) The content of tweets posted by bots would be replicated in those posted by humans, suggesting a relationship between that the kind of content posted by Twitter-bots and the kind of content that humans posted within the #SNCLavalin Twitter discourse of 2019.

2) Composites of words and phrases frequently assembled into the same politico-linguistic contexts within tweets posted by bots would be replicated by human users in their posts, suggesting that, as propounded by studies conducted in social psychology (Branigan et al. 2003, 2010, 2011; Menenti et al. 2012; Spillner et al. 2021), human Twitter users were compelled to interactively align with the content of tweets posted by bots as though they were posted by virtual social peers.

3) Composites of words and phrases embedded in the content of tweets posted by bots likely functioned ideologically within the #SNCLavalin Twitter discourse in the spring of 2019 by inducing interactive communication alignment, as conceptualized by Garrod and Pickering (2004), between human minds and the content posted by bots.

4) Since composites of words and phrases circulated by Twitter bots were likely to have functioned ideologically by socio-cognitively inciting interactive alignment among human users, *botaganda* formed within the convergence of human thinking, algorithmic computation, and political electioneering on Twitter likely rendered human thought vulnerable to political interference and manipulation.

5) The use of digital algorithms for electioneering purposes did violate section 2 of the *Canadian Charter of Rights and Freedoms*? If so, how and in what ways?

1.6. Conceptual Framework

Across this dissertation, I explore the possibility that the convergence of semiosis among human minds, algorithmic computations, and political electioneering on social media platforms like Twitter cultivates optimal cognitive conditions to influence the nature of semantic relations between linguistic signs making up political Twitter discourse, which invariably influences the meaning that Twitter users derive from the discourse itself. Specifically, I examine the implications of the decisions made by political intermediaries, such as political candidates, campaign managers, media representatives, and political campaign firms, who leverage the automated mediating forces of digital algorithms to psychologically profile and micro-target facets of constituents' personality (see further elaboration on these processes in section 3.2.2. in Chapter 3), which fundamentally determines which tweets are most likely to appear in our Twitter feeds. I also investigate the possibility that the inconspicuous curation of linguistic content on Twitter by way of digital algorithms is likely to assemble content in ways that activate moral outrage toward a targeted political candidate, thus intensifying partisan divides and political incivility among Twitter users. Because the mediating force of digital algorithms introduces new dialogical modes of communication between political intermediaries and members of the public, it has enabled politicians to manufacture intersubjective dissent among constituents around important political issues.

To make sense of the intra-discursive dynamics made possible by the mediating force of deep learning algorithms on Twitter, I examine the synthesis of three distinct modes of semiosis: the semiosis of human thought, of machinic and algorithmic computation, and digital electioneering logic. Throughout the document, I make use of three compatible theoretical models to illuminate the nature of each mode of semiosis. Specifically, I use concepts belonging to social psychology and cognitive semiotics to qualify human thought, I draw from several principles from computer science and a-signifying semiotics to describe the nature of algorithmic semiosis, and I use cognitive linguistics and CDA to characterize the ideological tenor of the language used in political tweets underlying the semiosis of digital electioneering practices. The complexity of the dynamics that unfold among human minds, digital algorithms, and political electioneering (as represented by linguistic representations on Twitter) is made more intelligible by synthesizing the compatibility of these theoretical perspectives. Thus, for this purpose, I use a macro or 'umbrella' semiotic model to help consolidate analysis of *botaganda* as a three-dimensional phenomenon that unfolds on Twitter. Table 1.1 below offers a schematic representation of the concepts that belong to each respective theory used to examine the convergence of human thought, algorithmic computation, and digital electioneering, which are synthesized using Hjelmslev's *Glossemantics.*

Hjelmselv's semiotic framework, which he termed *Glossematics* (Trabant 1987), is employed across the dissertation to examine the structures, processes, and constituent parts involved in the production of meaning among human minds, digital algorithms, and electioneering practices online. For Hjelmslev, within these kinds of semiosic conditions, signs are articulated twice since, as individual units, they represent a single meaning, but as components embedded in an assemblage of signs, the constitution of the sign's meaning is articulated a second time in relation with other signs belonging to the same sign system. In other words, one derives one level of interpretation when confronted with a single word (e.g., corruption), whose meaning is further qualified a second time in relation with other words belonging to a common sentence (e.g., the corruption of the data file was a disappointing revelation unanticipated by the author).

Hjelmslev's *Glossematics* is also used as a synthesizing semiotic model that provides a macroscopic perspective on the nature of semiosis within the convergence of three modes of semiosis related to human thought, algorithmic computation, and political electioneering on Twitter. To expand upon the inter-mediational dynamic of semiosis within the flow of logic of *botaganda* on Twitter, I also enlist Posner's (1987) conception of *mediation* – which he defines as any system of communication that constitutes the modality of sign behaviours (e.g., the behaviour of software code as a string of signs, whose meaning is constituted by a system of algebraic computation, which differs from the behaviour of linguistic signs, whose meaning is constituted by the conventions of a given language) – to describe the flow of semiosis across the planes of human thought, algorithmic computation, and political electioneering. I then expand on how the convergence of human thought, algorithmic mediation, and political electioneering generates a dialogical circuit that impel the inter-mediational dynamics that impact human cognition.

Since the convergence of the three modes of semiosis (previously outlined in this section) manifest through language as a conjunctive conduit for intra-semiosic mediation, I also integrate several compatible perspectives related to human thought, algorithmic computation, and political electioneering. For example, I examine the nature of human thought and behaviour within the scope of social psychology, including *priming theory*, which is used to examine the cognitive influence of symbolic 'prompts' in our environments (including digital environments), and *alignment theory*, according to Garrod and Pickering's (2004) iteration, which is applied to study the calibration of social-affective phenomena among interlocutors as they interact. Additionally, I incorporate concepts belonging to cognitive linguistics and cognitive semiotics, including *conceptual blends*, *idealized cognitive models*, *semantic frames*, *mental frames*, and *prototypes* to make sense of the ways in which human minds operate using language.

I examine the automated and digital nature of deep learning algorithms that mobilize the linguistic content posted by bots using theories and concepts gleaned from a-signifying semiotics and

computer science. To unpack the political logic of digital electioneering, I draw from cognitive linguistics and CDA to describe the ways in which the assembly of words and phrases into collocations operates ideologically. For example, frequently repeated collocations posted in the same syntactic sequence within a common political-linguistic context of tweets (e.g., tweets affixed to the same hashtag) affects their meaning in the process – a phenomenon that James Ross (1992) terms *semantic contagion*. Conceived according to the idea that when certain words and phrases are combined in the same context repeatedly and prevalently, words and phrases gradually culminate into a single conceptual unit that signifies as a consummate whole.

In articulating the more ideological dimensions of *semantic contagions,* I draw from Charteris-Black's (2006) framing of the term, which he describes as (conceptual) relationships of equivalency that are cultivated as words and phrases become positioned in syntactic proximity to one another in such a way that draws them into a metonymic conceptual construct.

---------- GLOSSEMATICS ----------		
HUMAN THOUGHT	**ALGORITHMIC COMPUTATION**	**DIGITAL ELECTIONEERING**
Social Psychology • *Priming Theory* • *Alignment Theory* • *Mental Schemas* • *Heuristic Reasoning* • *Gestalt*	**Computer Science** • *Twitter Bots* • *Software & Code* • *Algorithms* • *Deep Learning* • *Virtual Neural Networks* • *Backpropagation*	**Critical Discourse Analysis** • *conceptualization* • *construals* • *Power Relations* • *Ideologies* • *Agenda-setting* • *Discourse Coalitions* • *mobilisation of bias*
Cognitive Linguistics & Cognitive Semiotics • *Semantic Frames* • *Mental Frames* • *Prototypes* • *Conceptual Blends* • *Idealized Cognitive Models* • *Fuzzy Boundaries* • *Semantic Contagions* • *Prototypicality* • *Cognitive Grammar* • *Viewpointing* • *Cognitive semantics and frame semantics*	**Semiotics** • *A-signifying semiotics* • *Part-signs* • *Signaletic Properties*	

Table 1.1 Distribution of theoretical models and related concepts

1.6.1. Botaganda: The Ideological Impact of Converging Logics

Central to the purpose of this dissertation, I use the term *Botaganda* to represent the convergence of human cognitive input online (e.g., through languages and virtual gestures such as likes, shares, retweets, etc.) and other abstract processes – such as algorithmic computation and political electioneering for example – that take place within the invisible operations of online spaces.

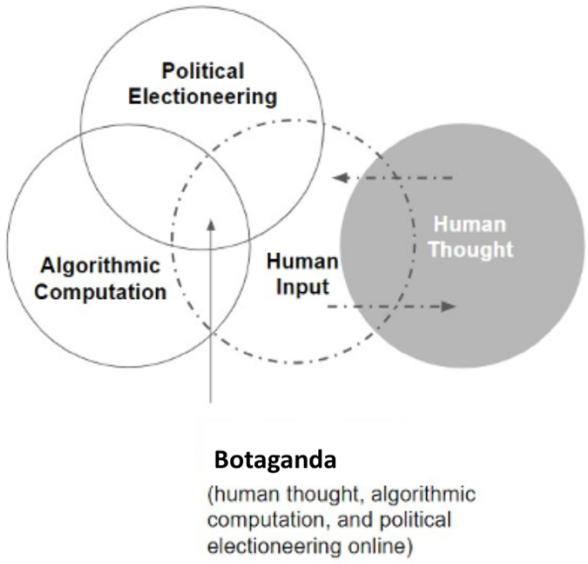


Figure 1.1 The convergence of human thought, algorithmic computation, and political electioneering within the ambit of botaganda

Figure 1.1 above illustrates how I frame the folding of human input into the operational flow of disembodied abstractions within online processes (*botaganda*). Though my example includes algorithmic computation and political electioneering to delineate the online dynamic that I wish to evaluate, several other human and non-human processes (e.g., economics, marketing, advertising, demographic statistics, etc.) are likely also swept up into the dynamics of *botaganda* by virtue of the Internet's ubiquity in everyday life in the digital age. However, for the purposes of this dissertation, we will focus on the convergence of human thought, algorithmic computation, and political electioneering within the *botaganda* generated online specifically.

Inspired by Guattari's (1995) conception of *a-signifying semiotics*, I also use the term *botaganda* to represent the 'part-sign' signaling quality of code and programming language that actuate deep learning algorithms, which are fundamentally designed to simulate the neural networks of human cognition, though in ways that are limited to deductive, inductive, and reductive modes of reasoning and solely based on statistical formulations. The term is compatible with Guattari's sense of *a-signification*,

which he understands as involving the transmission and assemblage of information through signals and 'part-signs' (Genosko 2014). However, I am especially interested in exploring both the transmission of human input online through language and virtual gestures and the impact of the digitally mediated *a-signifying* output on human cognition.

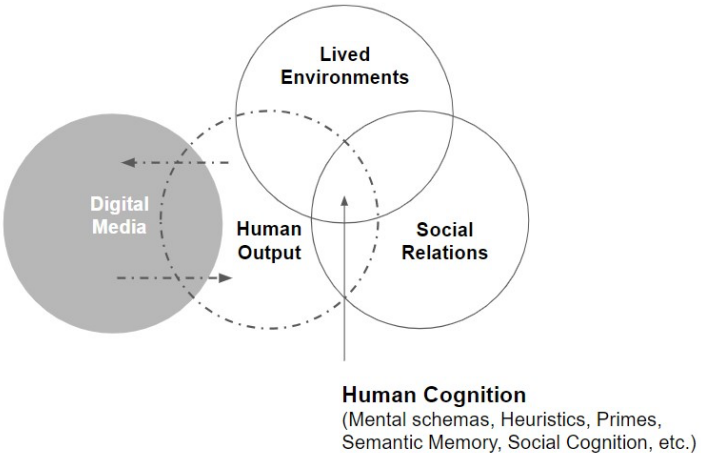


Figure 1.2 The flow of information from digital media to human cognition

Though articulating the dynamics of online processes is imperative to the substantiation of my thesis that tweets posted by bots (especially astroturfing bots) function ideologically and induce interactive alignment, as conceptualized by Garrod and Pickering (2004), among human users, I also emphasize the significance of human thought to the propulsion of *botaganda* since without human input, digital algorithms would cease to have the input data necessary to compute and make statistical calculations in the first place. In Figure 1.2 above, I account for the influence of social cognition, biological and socially constructed environments, and the fundamental and biologically contingent nature of human cognition, which underpins the mobility of human input within the workings of *botaganda*.

Accordingly, I contend that while the convergence of human thought, digital algorithms, and political electioneering influences political thought, our social and natural environments, as well as our human relationships also contribute to how we interpret political content mediated online. The recursive flow of information, data, and semiosis across the abstract and conceptually permeable membrane between human cognition and online environments is perpetuated by our engagement with digital media. In Section 1.6.2 below, I use Hjelmslev's model of *Glossematics* to map out the constitution of meaning within this dynamic.

1.6.2. Hjelmslev Glossematics

The logistics in the ways in which I conceptualize the convergence of semiosis among human thought, algorithmic mediation, and political electioneering (thus producing ideal conditions for the manifestation of *botaganda*) is inspired by Hjelmslev's *Glossematics*, which he applied according to the premise that "all meaning is contextual meaning" (Siertsema 1955: 158). Across this dissertation, I use Hjelmslev's model to macroscopically frame how I examine the inter-mediational flow of semiosis via language embedded in tweets. Language-use is conceived as representing the modes of semiosis and *a-signifying* processes formed among human thought, algorithmic computation, and political electioneering on Twitter. What I mean by this is that the reticulation of human thinking, digital computation, and electioneering techniques on Twitter forms a system of semiosis that constitutes meaning across the planes of what Hjelmslev calls *expression* (the perceivable parameters for representationally assembling pieces into coherent wholes) and *content* (the abstract parameters for the assembly of conceptual pieces into coherent thoughts, ideas, and experiences).

Unlike Saussure's configuration of the sign, which construes it as the cultivation of meaning as semiosis emanates from a *signifier* toward a *signified*, Hjelmslev is more interested in exploring the modes and means of producing recursive flows of semiosis as meaning becomes shaped within the stratified functions of *matter*, *form*, and *substance*. Thus, the functions of *matter*, *form*, and *substance* mobilize meaning making processes across planes of *expression* and *content* (see Figure 1.3 below and Section 3.3 in Chapter 3 for further description of this process).

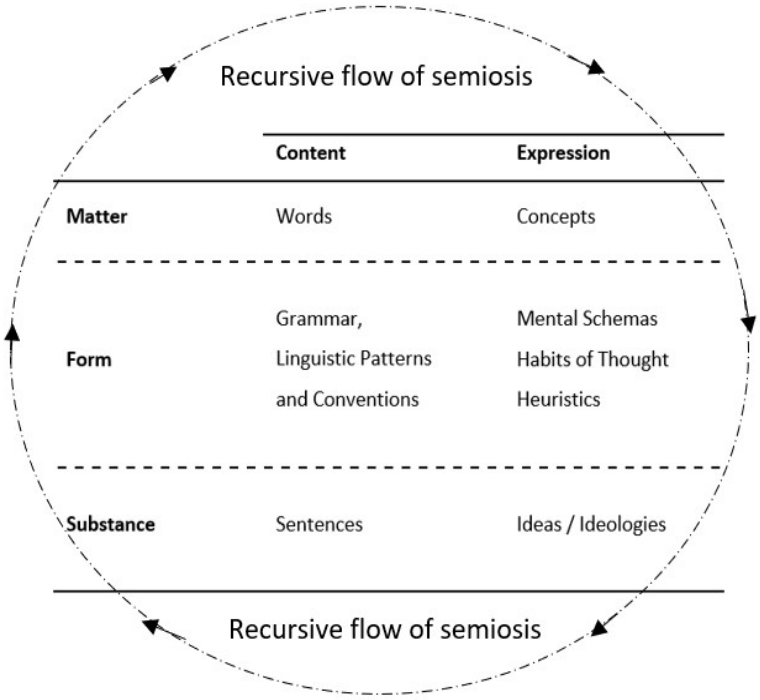


Figure 1.3 Hjelmslev's Glossematics

To make sense of Hjemslev's model (see Figure 1.3 above), we might consider the process of making of a sandcastle as an analogy for how meaning is formed across the planes of *expression* and *content.* In making a sandcastle, for instance, grains of sand (matter) are pressed into a plastic bucket (form), which gives the sand its shape as a sandcastle (substance). If we apply this analogy to language use on Twitter, we might say that on the plane of *expression*, the words making up a tweet (*expression matter* or the grains of sand) are assembled into a communication event on Twitter through the convergence of the human thought, algorithmic computation, and political electioneering (*expression form* or the bucket), resulting in a tweet (*expression substance* or sandcastle).

The interactive parameters of Twitter's interface design also contribute to how a dialogical circuit forms among human minds, digital algorithms, and political intermediaries on Twitter (*expression form* or the bucket), thus producing a tweet (*expression substance*) whose composition carries a particular sociopolitical cache (*content form* or the bucket) and comes to manifest visually on Twitter like this:

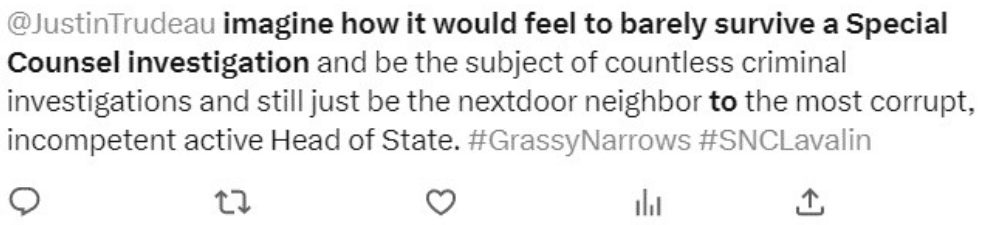


Image 1.1 Tweet extracted from the #SNCLavalin Twitter discourse of 2019 (Posted by human user: 03/28/2019 18:01; Retweeted by bots twice)

Image 1.1 is a screenshot of a tweet posted within the #SNCLavalin Twitter discourse of 2019 offering a visual example of how content is represented by the platform's user interface. This screenshot represents an example of how the convergence of human thought, algorithmic mediation, and political electioneering within the parameters of Twitter's user interface manifests in the convergence of words, concepts, sentences, ideas, and ideologies into an assemblage whose construction is determined by the conventions of grammar, mental schemas, habits of thought, heuristics, and digital computations (as a few examples among others). On the *content* plane, the lexical units making up a tweet (*content matter*) are assembled according to grammatically and interactionally familiar patterns and conventions into semantic and syntactic linguistic constructions (*content form*), which are strung together into a novel but cohesive vessel of meaning (*content substance*).

Therefore, on plane of *expression*, the dialogical strata between *form* (the forming schematic structures), *matter* (sedimented pieces), and *substance* (amalgamation of *form* and *matter* into a composite whole) constitutes the formation of intermedial signification (mediation as conceived by Posner 1986 – see Section 1.6.3. below for further description) on Twitter. As semiosis flows across the plane of *content* (signifier) into the plane *expression* (signified), the meaning of texts posted on Twitter becomes substantiated within the context of language used across the thread of #SNCLavalin Twitter discourse posted. The formation of *botaganda* through the convergence of human thought, algorithmic computations, and political electioneering on Twitter generates a distributed mode of *cognition* because perception, abstraction, and interpretation unfold within human minds as they engage with external phenomena (*matter*) mediated and assembled by digital algorithms according to the political agendas that mobilize electioneering practices (*form*) in constituting meaning (*substance*).

Importantly, when analyzing meaning-making processes according to Hjelmselv's *Glossematics*, he compels us to pay particular attention to the transactions, transitions, and transmissions of information between *matter* and *form* (e.g., the act of scooping up grains of sand and pressing them into a bucket) and between *form* and *substance* (e.g., the act of tipping the bucket upside down and lifting it to reveal a sandcastle) across the planes of *content* and *expression*. Or, for the purposes of this dissertation, it is important to pay attention to the transactions, transitions, and transmissions of information between

inputted data (e.g., grains of sand) and the deep learning digital code of neural network algorithms (e.g., bucket) as well as between the output generated by the deep learning digital code of neural network algorithms (e.g., bucket) and the automated posting of algorithmically curated astroturfing political tweets (e.g., sand castle) within a thread of politically polarizing Twitter discourse.

Though the formation of *botaganda* through the convergence of human thought, algorithmic computation, and political electioneering can be understood according to its impact on any of the three modes of semiosis making up the political Twitter posts studied for this dissertation (e.g., the impact of human thinking, on digital mediation, or on politics), this research is fundamentally concerned with its influences as a composite on the constitution of political meaning within human thought as it engages with digitally curated content on Twitter.

1.6.3. Posner's Definition of Mediation

Roland Posner's (1986) iteration of media broadens our conception of how the convergence of human thought, algorithmic computation, and political electioneering influences the assemblage of signs and thus the nature of signification online. According to Poser's definition of mediation, a medium is any "system that makes a certain type of communication possible: a system of means for production, distribution, and reception of signs which imposes certain constraints on sign behaviours" (Posner 1986: 293, 302, as translated and paraphrased by Threadgold 1997: 393). Posner's account of media expands our understanding beyond mainstream conceptions in the context of mass communication. For Posner (1986), the mediation of communication is not limited to the activities made possible by technology, but rather mediation is a process that unfolds across sensorial inputs, codes, channels, texts, networks, systems, discourse, cultural conventions, social norms, values, and customs, as well as structures. Thus, according to Posner's definition of media, human minds may be constituted as *biological media*, which is animated by the sensorial modalities through which signs and meanings are produced in human thought; as *social media* (not to be confused with 'social media' of digital environments), which, according to Posner, are the social institutions that we invent by way of cultural conventions, norms, values, and customs that make up political and legal order, economic structures, educational systems, and legislative regulation to organize and systematize social life; and as *technical media*, which are the instruments that we invent to enhance communication and produce, externalize, circulate, and exchange representations, such as pencils, paper, telescopes, computers, telephones, televisions, telescopes etc., as well as systems, such as digital algorithms, networks, infrastructure, the Internet, and software (to name but a few examples).

The confluence of *biological* (human thought), *technical* (algorithmic computation, software, networks, infrastructures, etc.), and *social mediation* (politics, legislation, the law, charters, bills, etc.) results in the stratification of meaning-making across three separate but interrelated systems of semiosis

involving sensorial inputs and outputs, codes, channels, texts, and structures, etc. that converge into the manifestation of *botaganda* online. In other words, according to Posner's iteration of *mediation*, it entails the recursive conversion of signification among 'intermedial' channels of semiosis that shape meaning by imposing certain schematic constraints on sign-behaviours within systems of meaning-making processes.

1.6.4. Cognition

In this dissertation, I use the term *cognition* in a way that expands upon Posner's framing of mediation by focusing on the cognitive consequence of intersecting channels of semiosis within the convergence of human thought, algorithmic computation, and political electioneering on Twitter. According to Posner's framing of mediation, this convergence results in the constraining of semiosis, signification, and sign behaviours on social media, but on Twitter more specifically.

I use the term *cognitive* to refer to the ways in which human minds work as "a system that directly reflects conceptual organization" of embodied and perceived meaning represented in the world and in the mind (Evans and Green 2006: 16) and as the "semiotic sharing of meaning in communication" through the "semiotic mental constructions given by the signs of the medium" (Age Brandt 2020: 139). I hypothesize that the convergence of systems through which semiosis emanates impacts human thought, algorithmic computation, and political electioneering on Twitter by mobilizing the recursive constitution, reconstitution, as well as the distortion of political meaning (I elaborate on this definition of cognition further in Chapter 3). In the process, the sematic relativity of meaning within the flow of semiosis on Twitter enables politicians to target, distort, and misrepresent the character of competing politicians to attack their integrity as competent candidates for office.

Ultimately, the convergence of human thought, algorithmic computation, and political electioneering on Twitter has equipped campaigning candidates with the ability to discretely shape political discourse in ways that disadvantage and even mischaracterize their opponents, thus affording the political perpetrator a competitive edge. Moreover, the automated circulation of political content informed by Big Data can be used to create the false impression that a given political opinion is widespread, unanimous, and legitimate.

The semiotic effect of this dynamic on human thinking is apparent when contrasting the following tweets posted by Twitter bots with those posted by humans in which the word 'corruption' is frequently attributed to the Liberal Party and to Prime Minister Trudeau:

> *@**JustinTrudeau** imagine how it would feel to barely survive a Special Counsel investigation and be the subject of countless criminal investigations and still just be the nextdoor neighbor to the most **corrupt,** incompetent active Head of State. (Posted by human user: 03/28/2019 18:01; Retweeted by bot: 03/28/2019 22:01)*

The Mark Norman Trial is far worse than #LAVScam #SNCLavalin in its scope of ***Liberal corruption****, and @Puglaas knows where the skeletons are! I wonder when the whole thing explodes how many liberals will be implicated? (Retweeted by bot: 03/28/2019 22:14; Retweeted by human user 03/29/2019: 11:03)*

*@quagmiiller: @liberal_party @cathmckenna Liberal party is the biggest joke on the planet.You guys relying on Nicolas Maduro to create policy? #****TrudeauMustGo*** *#lies #****corruption*** *#Venezuela #cdnpoli #SNCLavalin @JustinTrudeau (Posted by human user: 04/04/2019 12:39; Retweeted by bot: 04/09/2019 10:39)*

In these tweets, we can see that the words *Justin Trudeau* and the *Liberal Party* are frequently referenced in tandem with the words *corrupt / corruption*, and alongside several other derogatory inferences, such as *criminal investigations*, *incompetent head of state*, *implicated*, *biggest joke*, *Trudeau must go*, *lies*, etc. Consider the juxtaposition of the word *corruption* with the words *Trudeau* and *Liberal Party*, which are replicated in the following tweets posted by humans:

If only this company had some ***corrupt execs*** *with ties to the* ***Trudeau government*** *(Posted by human user: 03/29/2019 01:56:18)*

Canada's biggest problem was the 2015 foreign funded election of ***Turdeau & his band of unaccomplished trolls****. We have to correct this in 2019, get our country back on track! Control debt! Shed the Corrupt UN! Just dump that mf! That will be Step 1! (Retweeted by human: 04/08/2019 16:27; Retweeted by bot: 04/08/2019 20:59)*

So ***corrupt*** *#SNCLavalin @****JustinTrudeau*** *#lavascam #lpc #canpoli (Posted by human user: 04/08/2019 20:18; Retweeted by human users twice: 04/09/2019: 00:18 & 02:43)*

Liberals *love* ***corrupt*** *companies #SNCLavalin (Posted by Conservative politician: 04/08/2019 16:10; Retweeted by human users between 04/08/2019 21:10, 21:11 & 04/09/2019 14:43)*

*@****JustinTrudeau*** *Putting a price on* ***#corruption*** *would be even BETTER! #SNCLavalin #SNCLavalinScandal (Posted by human user: 04/09/2019 03:37; Retweeted by human user: 04/09/2019 08:37:25)*

Take a moment to savour the fact ***Trudeau's Liberals*** *actually thought a good way to stop people talking about a* ***corporate corruption scandal*** *was to hold a press conference announcing millions of dollars in handouts to the 2nd richest family in Canada. #cdnpoli #Loblaws #SNCLavalin (Posted by human user: 04/09/2019 05:30; Retweeted by human users: 04/09/2019 05:30 & 04/10/2019 00:00 [+ 38 other instances between 03/09-03/10/2019]; Retweeted by bots twice: 04/09/2019 06:43 & 14:02)*

As we can see, similar linguistic patterns and schemas in the use of the word 'corrupt' around concepts related to the 'scandal' gradually come to create relationships of equivalency between the word *corrupt* and the words *Trudeau* and *Liberal Party* when positioned in syntactic proximity to one another. These patterns and schemas are replicated in tweets posted by humans across the #SNCLavalin Twitter discourse. Human tweets appear to also replicate the inclusion of these words alongside paradigmatically compatible terms and phrases of derogative connotation, such as *lavscam* (the scam deriving from the SNC Lavalin scandal), *Canada's biggest problem*, *corporate corruption scandal*, *the globalist puppet*, and *corrupt execs*. Across these examples, the signifying force of tweets posted by *astroturfing*[1] Twitter-bots on the conceptual organization of political information becomes clearer, as does the constitution of meaning within the semiosis of intermedial communication, which shapes the mental and social construction of political knowledge and public opinion.

1.6.5. Semantic Priming

To discern the cognitive effect of *interactive alignment* within communications that manifest between human minds and the content of tweets posted by bots on human thought, I expound the general nature of human thought and behaviour by drawing from social psychology. More specifically, I turn to *priming theory* explored within the discipline of social psychology to account for the alignment phenomenon that takes place between human minds and the content of tweets posted by Twitter bots. According to social psychology scholar John Bargh (2021), the phenomenon of *social priming* is based on Higgins et al.'s (1977) and Segal's (1966) *memory-word* paradigm studies, which established that *stimulus words* (e.g., words presented to subjects in certain ways) affect human subjects' subsequent response to those words.

According to Bargh (2017), *social priming* research is most concerned with "how cultural ideologies and values operate unconsciously to influence a person's judgement and behaviour" through our "everyday experiences [that] activate ideas and desires and even ways of thinking about the world" (78, 79). However, it is important to note that "outside primes can only activate what is already inside of you" (Bargh 2017: 283) and so, in this sense, the activation of *social primes* is not a matter of *agenda setting*, but rather, they are dependent on the mental goals, interests, desires, beliefs, values, worldviews, and motivations that we already possess.

---

[1] Digital astroturfing, according to Kovic et al. (2018), is "a form of manufactured, deceptive and strategic top-down activity on the Internet initiated by political actors that mimic bottom-up activity by autonomous individuals" (69), helps complete the cognitive dialectic circuit among human minds, digital algorithms, and political intermediaries on Twitter since their presence denotes the inconspicuous involvement of political actors within the thread of #SNCLavalin Twitter discourse.

According to Bargh, *primes* are like mental reminders of the meanings, feelings, and experiences that we have imprinted in long-term memory while we were engaged with the content of our shared social realities with others in the past. These mental reminders become activated by the associations and connections between the things we perceive in the world (e.g., words, ideas, representations, contexts, etc.) and the contents of our individual memories as they relate to our mental goals, desires, values, beliefs, biases, worldviews, and interests, even when we are unaware that the reminders are being activated (Bargh 2017). *Priming* phenomena support our minds in their effort to make sense of the world and to navigate it successfully with minimal demand of our cognitive faculties, which is why our individual concerns, interests, values, beliefs, biases, worldviews, priorities, etc. play such a significant role in guiding our interpretations of the world without having to expend invaluable cognitive resources. Thus, Bargh notes that "social priming studies are essentially implicit memory studies" (Bargh 2021: 3).

Priming research has found that *semantic priming effects* – the association of a word or phrase with a semantic set, class, or category (such as word collocates) within the mind of language users can generate an 'aha' sensation among text readers. This mental effect, also known as the *Eureka Heuristic* (Laukkonen et al. 2018), can be activated by *prime lures* (associative cues) within perceptually familiar conditions. Studies have also shown that *semantic priming* can activate the *eureka heuristic* among text readers in ways that engender the propagation of *false insights*, which are activated by the *eureka heuristic* in response to *prime lures* in our social environments. This activation can then imprint false memories related to *prime lures* in long term memory (Grimmer et al. 2022). These findings suggests that semantically priming constituents using *prime lures* within a thread of Twitter discourse may incite *discovery misattribution* effects (Dougal Schooler 2007), thus activating false feelings of insight, which then becomes committed to memory (see Chapter 3, Section 3.2.1.2 for more detail).

To summarize, frequent and prolonged exposure to *prime lures* embedded in Twitter discourse can, thus, generate *discovery misattribution* and *false insights* about important political information posted on Twitter. Additionally, the activation of *discovery misattribution* and *false insight* by inciting 'aha-moment' sensations within individuals can "operate as a heuristic – [as] a mental shortcut for deciding which ideas to trust" (Laukkonen et al. 2020). Understanding how the *eureka heuristic* produces *false insight* and *discovery misattributions* related to important political information among Twitter users is supported by Bargh's explanation of *priming effects* given that "central to [the eureka heuristic] is the idea that feelings of insight are driven by past knowledge." Thus, "if past knowledge is incorrect, then so too will be the insight" (Laukkonen et al. 2020) activated by a prime lure on Twitter.

1.6.6. Semantic Contagion

Semantic contagions may serve as linguistic cues or *prime lures* in language, which may augment the efficacy of *semantic priming effects*. *Semantic contagions*, according to Salas's description of the term, are "words [that] adapt in meaning to others by combining… them or [situating them as] belonging to the same semantic unit" (Salas 2003: 321). According to James Ross (2009), *semantic contagions* affect our interpretation of linguistic meaning because human cognition's conceptual abilities are enmeshed with linguistic aptitudes. Thus, we can understand a good deal about what words 'mean' to their users by analyzing "the engagement of talk with action, that, for instance, generate symbolic distinctions," which he calls *pragmatic traction* (Ross 2009: 144). Ross further explains that the lexical organization of words into *semantic fields*, or lexical sets of words grouped together according to semantic commonality, reflects the relativity of words' meaning as they are combined in context, which has two dimensions according to Ross: *semantic contagions* (the relative adaptation of meanings words that are used in a particular context) and *pragmatic traction* (the symbolic distinction of word combinations as they are used in talk in action).

The term *semantic contagion* is also used within the purview of critical discourse analysis to uncover instances of ideological influence within language use. The ideological framing of meaning, according to Christopher Hart (2011), arises when the semantic combination of words activates our cognitive proclivity to organize and classify the world into metonymic blocks within the mind. Hart describes categories as "radial structures with more or less prototypical instantiations" and notes that because conceptual categories have *fuzzy boundaries* – that is, the variability of "experiential categories with networked interrelationships" (Pelkey 2023: 8) when situated across multiple contexts – they are prone to *prototype effects* and *stereotyping*, thus operating as *semantic contagions* according to CharterisBlack's (2006: 574) definition.

Discrete (fuzzy) boundaries, as conceptually applied within the scope of cognitive linguistics, refers to "a sense that designates a continuum between categories of literal vs. figurative, a blended nature of features where the boundaries are not clear-cut and thus do not form a dichotomy in the investigated phenomenon" (Schnell et al. 2019: 182). Within the crux of this definition, Charteris-Black describes *semantic contagions* as relationships of equivalency cultivated between two conceptual categories represented by words assembled or situated in syntactic proximity to one another (Charteris-Black 2006).

For example, in the tweets cited below, the word *corruption* and the words *Justin Trudeau* and the *Liberal Party* represent two conceptual categories that are repeatedly and frequently assembled or situated in syntactic proximity to one another across the #SNCLavalin discourse of 2019, thus generating relationships of equivalency between conceptual categories with *fuzzy* or *discrete boundaries*, and this fuzziness / discretion enables the meaning of word combinations to adapt to the contextual conditions

within which *semantic contagions* are situated through *pragmatic traction*. Take, for example, the following tweets that, once again, feature the words 'corruption,' 'Trudeau,' and 'Liberal:'

> *@CBCNews it's sad, but I get it. when you see a lot of* ***#corruption*** *going on and nothing happening to the ppl involved, you kinda lose hope. the current state of affairs in #Canada makes me sad now. #NO****Trudeau*** *#SNCLavalin #IllegalImmigration #hijabhoax #AgaKhan #Khadr #JoshuaBoyle #cdnpoli (Retweeted by bot: 03/14/2019 03:20)*
>
> *#SNCLavalin gets secret deal 4 days after* ***Trudeau*** *took power...this explains everything: #LavScam, #ObstructionOfJustince, firing Jody @Puglaas, & the cover-up!* ***Trudeau Liberals*** *are* ***corrupted to the core****! #TrudeauIsDone #TrudeauMustGo #SaveCanada #cdnpoli (Retweeted by human user: 03/14/2019 13:46)*
>
> *So is the fact BOTH Global Elitist Parties,* ***Liberal*** *& CPC have a history of collusion,* ***corruption & interference****. but hey it doesn't matter that they're both still in bed with #SNCLavalin Important thing is that one of them got caught We'll elect the other #LavScam (Posted by human user: 03/14/2019 13:51; Retweeted by human users: 03/14/2019 13:32:39, 13:32:48, 13:42; 13:51)*
>
> *Just when non-blindly-loyal #****TeamTrudeau*** *folk were impressed with how fairly @AHousefather 'seemed to be' handling the #JusticeCommittee #SNCLavalin scandal that has the @OECD* ***corruption team*** *is looking at HARD, THIS pile of 💩% tactic (Posted by human user: 03/14/2019 10:17; Reposted by human user: 03/14/2019 14:17)*
>
> *I have been waiting for this to start.* ***Liberal*** *partisans will have no rest on Twitter. The story of the* ***Trudeau*** *government's* ***corruption*** *& incompetence is writing itself. #MarkNorman #SNCLavalin #ThankYouForYourDonation (Posted by human user: 03/28/2019 12:30; Retweeted 8 times by human users 03/28/2019 16:30, 16:35, 17:49, 18:02, 18:21, 19:14 & 03/29/2019 04:04; Retweeted by bots twice: 03/28/2019 16:50, 17:19)*
>
> *@****JustinTrudeau*** *imagine how it would feel to barely survive a Special Counsel investigation and be the subject of countless criminal investigations and still just be the nextdoor neighbor to the most* ***corrupt,*** *incompetent active Head of State(Posted by human user: 04/09/2019 03:37; Retweeted by human user: 04/09/2019 08:37:25)*
>
> *The Mark Norman Trial is far worse that #LAVScam #SNCLavalin in its scope of* ***Liberal corruption****, and @Puglaas knows where the skeletons are! I wonder when the whole thing explodes how many liberals will be implicated? (Retweeted by human users three times 03/28/2019 21:58, 21:59, and 22:03: Retweeted by Twitter bot: 03/28/2019 22:14)*
>
> ***Trudeau****'s apology, his campaign promises, his cheerleading —all of his words mean nothing. His actions are utterly disconnected from his siren song.* ***Corrupt*** *like*

*Conservatives. #GrassyNarrows #ProportionalRepresentation #SNCLavalin #pipelines @**liberal_party** @PnPCBC @Star_Politics (Posted by human user: 03/29/2019 11:19)*

***@liberal_party** @cathmckenna **Liberal party** is the biggest joke on the planet. You guys relying on Nicolas Maduro to create policy? #**Trudeau**MustGo #lies **#corruption** #Venezuela #cdnpoli #SNCLavalin @**JustinTrudeau** (Posted by human user: 04/04/2019 12:39; Retweeted by bot: 04/09/2019 10:39)*

***#Trudeau** libel threat against Scheer hints at new levels of desperation - The Globe and Mail #cdnpoli #snclavalin #**corruption** #lavscam #construction #whitecollarcrime (Posted by human user: 04/09/2023 06:35; Retweeted by human user 04/09/2019 22:31)*

In the sample of tweets presented above, we can see that the repetition of the words *corrupt*, *Trudeau*, and *Liberal* (Party) are embedded in contextual conditions that position these words alongside other words and expressions such as *the current state of affairs in #Canada, #IllegalImmigration #hijabhoax #AgaKhan #Khadr, Special Counsel investigation, incompetent active Head of State, will be implicated, the biggest joke on the planet,* which are mirrored in human tweets featuring words and expressions such as *a history of collusion, in bed with #SNCLavalin, got caught, looking at HARD, THIS pile of* 💩 *tactic, secret deal, Obstruction of Justice, the cover-up, Trudeau is Done Trudeau Must Go, incompetence is writing itself, his words mean nothing, utterly disconnected from his siren song, Grassy Narrows, white collar crime, new levels of desperation* alongside the semantically contagious words *corruption*, *Trudeau*, and *Liberal Party.* In this way, the meaning of *semantic contagions* (e.g., *corruption*, *Trudeau*, and *Liberal Party*) collate with the contextual conditions within which they are situated through *pragmatic traction*, which fundamentally generate relationships of equivalency between the conceptual categories produced by these tweets.

Both Ross' and Charteris-Black's definitions of *semantic contagion*, as well as Hart's adaptation of the term are used within the cognitive linguistic analysis of tweets posted across the #SNCLavalin Twitter discourse in early 2019. I examine how *pragmatic traction* and the lexical assembly of concepts (Ross 2009) as well as relationships of equivalency (Charteris-Black 2006) generated within the formation of *semantic contagions* as conceptual categories with *fuzzy boundaries* across the #SNCLavalin Twitter discourse. I further explore how *semantic contagions* operate as *prime lures* within tweets posted by Twitter bots and how the convergence of semantic schemas formed among human minds, digital algorithms, and political intermediaries within the #SNCLavalin Twitter discourse of 2019 enhances the mental entrenchment of *semantic contagions*, *false insights,* and *misattributions* incited by tweets posted by Twitter bots and by humans.

1.7. Dissertation Structure

In this chapter, I have provided an overview of my dissertation's research scope, I have summarized the case study examined, I have articulated the research problem and this dissertation's contributions to communication and media studies, cognitive linguistics and CDA, as well as to interpretations of section 2 of the *Canadian Charter of Rights and Freedoms*. It has also described my rationale for the aims and objectives pursued across the dissertation as well as the research questions and hypotheses guiding both empirical and qualitative analyses in accommodating those goals and objectives. Finally, I have defined the key terms, concepts, and theoretical approaches that I adopted while conducting the research for this dissertation.

In the next chapter, I supply an overview of literature belonging to communication and media studies research into politics, political communication, public opinion, and the public sphere in the digital age and I situate my discussion within current posthuman debates in the discipline. I then position my research alongside existing bodies of work belonging to cognitive linguistics and CDA that examine the formation of ideologies within language use. In Chapter 3, I expand upon the theoretical paradigms and approaches summarized above in Section 1.6 of this chapter and Chapter 4 lays out the methodological framework employed to conduct the empirical and qualitative research for this dissertation. Chapter 5 articulates this dissertation's findings and supplies an analysis of those findings while Chapter 6 offers a discussion of the significance of these findings. Chapter 7 closes the dissertation by revisiting the aims and objectives pursued, the research questions and hypothesis explored, the findings, interpretations of those findings, limitations of the study, and recommendations for future research.

Chapter 2: Literature Review – The Enduring Significance of Human Thought in the Digital Era

2.1. Introduction

Across this chapter, I contextualize my investigation into the effects of *botaganda* on political thought by situating my approach within existing communication and media studies research on politics, political communication, public opinion, and the public sphere in the digital age. This line of inquiry aims to determine whether the content of tweets posted by Twitter bots related in some way with the kind of content that humans posted within the #SNCLavalin discourse thread in 2019. By using empirical research instruments to test for independence between the two (the null hypothesis), I endeavour to establish whether human Twitter users were inclined to interactively align their linguistic constructs with those embedded in tweets posted by bots according to Garrod and Pickering's Interactive Alignment Model (2004).

I also explore trends, themes, and patters in the language used within the content of tweets posted by bots and humans to qualify the nature of the relationship between the two. I also undertook to perform a 'thick' granular examination of frequently recurring word and phrase composites embedded in tweets posted by Twitter bots to establish whether they were replicated within the content of tweets posted by humans. To explore the ideological nature of word and phrase composites in tweets posted by Twitter bots across the #SNCLavalin discourse, I use cognitive linguistics and CDA to determine their facility as *semantic contagions* (functioning as *prime lures*) that incite human minds to interactively align with the ideological language contained in tweets posted by bots. Finally, I strive to address the possibility that the use of digital algorithms for electioneering purposes on social media platforms like Twitter constitutes a violation of Canadians' right to the freedom of thought, judgement, conscience according to section 2 of the *Canadian Charter of Rights and Freedoms*.

This chapter situates these research aims and objectives within the ambit of existing canons and debates about the nature of politics, political communication, public opinion, and the public sphere in the digital age among other scholars of communication and media studies. I also draw from literature produced by political scientists and social scientists on the same subject since epistemological approaches and perspectives from these disciplines are frequently referenced in research conducted across communication and media studies scholarship.

2.1.1. Chapter Outline

Accordingly, what follows in section 2.2 explores the various ways that communication and media studies frame political communication, public opinion, and the public sphere within existing debates about the

influence of technological forces on society, the influence of social forces on technology, and perspectives most closely related to *cultivation* perspectives defined by Slack and Wise (2015) as *technological culture.* Subsections 2.2.3 to 2.2.5 examine the *posthuman* turn in communication and media studies scholarship and situates it within the *canon debates* of the 1980s and 90s in North America. I offer a critical analysis of *posthuman* perspectives that reject anthropological dimensions of technology and linguistic research in the broader context of post-structuralism and cannon debates that took place at the end of the last century.

To demonstrate the persisting value of both anthropological and linguistic inquiry to the examination of political communication, public opinion, and the public sphere in the digital age, section 2.3 explores CDA literature dedicated to the study of ideologically salient conceptual structures embedded in publicly accessible texts with a critical eye on communication processes that operate in discourse to produce and reproduce power relations, inequality, and injustice. I then supply an overview of literature that integrates facets of cognitive linguistics and CDA to study political communication, public opinion, and the public sphere in the digital age and section 2.3.1 looks specifically at literature produced within the scope of cognitive linguistics. Section 2.4 identifies existing gaps in research and offers a summary of this chapter's discussion as well as a few closing comments.

2.2. Technological Forces, Social Forces, and Cultivation Theory

In line with Slack and Wise's (2015) view of *technological culture*, this dissertation does away with more *cause-and-effect* models for framing the relationship between society and technology, and in its place, I propose an intra-semiosis model of recursive mediation, which I define as the systems of semiosis that are formed within the convergence of human thought, algorithmic computations, and political electioneering on social media (see Section 1.6, Subsection 1.6.1 in Chapter 1 for further elaboration). This perspective aligns well with insights from media studies' *cultivation theory*, which posits that the time an individual spends engaging with content broadcast via media technologies, the more likely an individual is to adopt the views about reality reflected in the mediated content (Morgan, Shanahan, and Signorelli 2014).

A consummate debate in communication and media studies revolves around the question as to whether technology and media shape social life, whether social life shapes technology, or whether the shaping of technology and social life is a matter of recursive cultivation between the two (Slack and Wise 2015). Proponents of *technological determinism* adopt a model of *cause-and-effect* by framing the relationship between technology and social life as a unidirectional channel from the technological to the social, while proponents of *social* (cultural) *determinism* perceive the influence in reverse. Langdon

Weiner (1978: 75) described two premises on which technological determinism stands as asserting that:

a) Technology is the basis of all human expression, which affects all patterns of social life.

b) Technological change is the most significant force in social change.

This approach is understandable since the impulse to make sense of the world according to the logic of cause-and-effect is "most used by people to organize their cultural and physical realities" (Slack and Wise 2015: 69, paraphrasing Lakoff and Johnson 1980). However, a *technological deterministic* view of digital media's effect on politics, political communication, public opinion, and the public sphere 'mystifies' the so-called autonomy of digital networks by failing to describe that autonomy in concrete terms. Moreover, it overlooks the decision-making agency of politicians and sympathizers who use digital algorithms for specific electioneering purposes in contemporary life. It also obfuscates the inherent contributions of human thought to the cultivation of political communication, public opinion, and the public sphere.

Social deterministic perspectives are no more successful at qualifying the dynamic between technology and society since they assume that:

a) Social values, feelings, beliefs, and practices influence developments in technology.

b) Changes in technologies reflect changes in society and culture. (Slack and Wise 2015: 54).

This perspective neglects to account for technological affordances and contributions to the circulation of signs and the production of meaning, especially in the contemporary context of an Internet governed inconspicuously by machine learning algorithms. In effort to overcome the limitations of *cause-and-effect* approaches to studying technology, media, and society, Slack and Wise (2015) propose a *technological culture* approach, which eliminates distinction between the two in favour of "an understanding that culture has always been technological, and technologies have always been cultural" and that "technologies are integral to culture and not separate from it" (9).

While not explicitly ascribing to *technological* and *social deterministic* perspectives, the influence of these perspectives is evident in contemporary communication and media studies scholarship on the *digital public sphere*. For example, proponents of a *participatory public sphere* place emphasis on the power of socio-political stakeholders as do proponents of *constructionists* or *agonistic* perspectives, who privilege the influence of narrative, affective, and confrontational modes of communication in shaping the public sphere (Schäfer 2015). Research into search engine algorithms and other content curating algorithms emphasize digital technology's fragmentation of Internet users into small communities of like-minded people – often referred to as *filter bubbles* and *echo chambers* – by determining what

information to conceal or repress and which to make visible (Pariser 2011; Sunstein 2001, 2009). In this dissertation, I build upon Slack and Wise's *technological culture* approach by proposing an intra-semiosis perspective in effort to resolve the dichotomy between *technological* and *social* determinism.

2.2.1. The Public Sphere

The *Public Sphere*, as conceived by Habermas, is "made up of private people gathered together as a public and articulating the needs of society with the state" (Habermas 1989). In stressing the importance of a stable public sphere to the functioning of a modern democracy, Hannah Arendt (1998 [1958]) once described participation in civil life and the public sphere as the collective stepping into shared space and time held commonly with others. In line with Habermas and Arendt's observations, Van Dijck (2013) notes that given the Internet's expansive capacity for connectivity, social media offers citizens a means of participating in civil life and shaping the public sphere as never before. It should thus, in theory, enable people to engage in rational public debate about society's pressing needs and interests, and to participate in civil life held in common with others. These features, Casero-Ripollés et al. (2020) explain, are what initially made Twitter such an appealing space for political debate, rendering it a potential virtual locus for the formation of a digitized public sphere.

Conceivably, from the perspective of cyber-optimists, social media should have introduced a space for the free expression and discussion of social and political issues in a common space occupied by equals (Shirky 2011). Indeed, social media has enabled everyone and anyone to participate in some form of public debate, especially in contemporary digitally mediated contexts. Thus, Twitter and other social media platforms can be said to have cultivated the possibility of broadening public debate and including new voices into public discussion (Coleman 2017). We could even say that social media has rendered Habermas' vision for an open and transparent public sphere through which we collectively define our civic existence increasingly possible. However, reality has fallen short of bearing Habermas' vision out.

The invisible and intervening use of digital algorithms for political electioneering purposes contributes significantly to the formation of the digital public sphere, which renders Twitter a digital locus within which the public has become fragmented, where staunch political boundaries are drawn, where competing political systems and ideologies are in perpetual competition, and where populism, unstable political order, and post-public spheres are cultivated (Schlesinger 2020).

Contemporary discussion about 'fake news' and 'misinformation' (Ball 2017; Corner 2017; D'Ancona 2017), for example, suggest that social interaction via social media has resulted in the foreshortening of argumentation, the emergence of political philosophies based on affectively charged modes of reasoning, a prolonged neglect of our capacity for understanding, and ultimately, our collective flight into irrationality (Nussbaum 2018: 11). Similarly, De Blasio and Viviana (2020) argue that digital

communication ecosystems are central to political communication and have thus transformed the public sphere and affected democracy in deleterious ways.

Christian Fuchs (2022) does not identify digital technology as the cause of foreshortened argumentation, affective political philosophies, and our flight into irrationality, but rather, he isolates the problem in digital capitalism, which he claims has colonised and commodified the *digital public sphere* and the *digital commons*. He defines the *digital public sphere* as a space "of public political communication that mediates between the other subsystems of society, namely the economy, politics, culture, and the private life" (Fuchs 2021). Thus, cause is attributed to 'digital capitalism' and the effect is the 'fake news, post-truth' realities that shape the public sphere in the digital context.

Likewise, Schlesinger (2020) argues that "the development of the public sphere is best understood as taking place in a globally competitive context. An historical perspective underlines key continuities in how communication orders have been, and continue to be, antagonistically classified." (Schlesinger 2020: 1546). Thus, fragmentation of the public sphere is attributable to the advent of digital mediation, globalization, and the political economy.

These are arguments that have been in motion among scholars since the 1970s. Richard Sennett (1978), for example, had already conveyed his concern that within the context of industrialized society, the distinction between our public and private personae has been eliminated along with our sense of public and private identities (Sennett 1978). This disappearance of distinctions between a private individual within the domestic sphere and the public-self cohabiting the public sphere among others, Sennett lamented, had created conditions within which "individuals seem unable to think and talk in meaningful ways that transcend the impulses and needs within their own skins" (Hauser 2022: 37). The individualistic culture emanating from an industrialized capitalist system, according to Sennett, has conditioned us to regress "into ritual relations with strangers" within which "we seek out not a principle but a reflection, that of what our psyches are, what is authentic in our feelings" (Richard Sennett 1978: 4).

Through the epistemological lens supplied by Slack and Wise (2015), more focus on the interconnections, interrelationships, threads, patterns, and sequences generated in our *culture of technology* supplies more fulsome understanding of how and why misinformation has come to dominate the ethos of the *digital public sphere*. Moreover, assigning the agency of 'cause' to capitalism, globalization, neoliberalism, or the political economy indirectly exonerates human agency from the responsibility of having made choices and decisions that have produced our online reality. As Slack and Wise (2015) have noted, technological devices do not have to:

> Save data the way they do (or at all). They don't have to save information to the cloud. The cloud doesn't have to be a for-profit off-site storage site that can mine your data. The technologies do not have to have the capacity to track your locations. These are all choices and

> decisions that were made, and continue to be made, justified by commitments to progress, convenience, and control, as well as by the desire for security, efficiency, and profit. (228)

Though many contemporary scholars agree that digital media has introduced new challenges for the democratic governance of civic life, there is no consensus as to how or why. Some identify the digital curation of information, which results in the cultivation of unbridled power over speech and expression – power that Baer and Chin (2021) note has been unrivalled across human history. Other scholars fault globalization and the transnational reach of big tech companies, which make them difficult to regulate (Lago 2021). Still others attribute it to the political economy and digital capitalism (Chandler and Fuchs 2019). This dissertation makes the claim that it is not the social institutions (e.g., politics, society, digital media, capitalism, etc.) nor is it our technologies (e.g., mediation, economics, bureaucracy, industrialization) that have caused the public sphere to become fragmented in contemporary life, but rather, it is the convergence of semiosis among human minds, technological affordances, and political institutionalization – or *botaganda* more specifically – that accounts for these consequences.

2.2.2. Public Opinion

A review of *public opinion* literature suggests that scholars have used and continue to use the term to signify a variety of different things. In fact, definitions of *public opinion* can be so elusive that political scientist, Vladimir Orlando Key, once wrote, "to speak with precision of public opinion is a task not unlike coming to grips with the Holy Ghost" (1961: 8). However, what remains consistent across the various interpretations of *public* and *opinion* is the intrinsic relationship between a group's collective dependence on group consciousness (a group's psychology) and governance of the people. Professor at the Sanford School of Public Policy at Duke University, Vincent Price (1992), notes that conjoining the concepts *public* and *opinion* also reflects a long-standing philosophical endeavour to unite the voice of 'one' with 'the many.' Such unity, he asserts, makes *public opinion* a holistic viewpoint of the collective on one hand and as reductionist specificities imposed on individuals on the other. Baker (1990) observed that Enlightenment paradigms characterized the *public* as a universal, objective, and rational mass, whereas the concept of *opinion* implied individuality, subjectivity, and intuition, pointing to a degree of antithesis in the very binominal pairing of '*public*' and '*opinion.*'

2.2.3. Posthuman Turn

Contemporary approaches to understanding the public sphere, public opinion, and political ideology within communication and media studies tend to place emphasis on the scientific and technological functions of digital platforms, infrastructure, and algorithms, which have supplanted epistemological and

ontological focus on anthropological considerations of human thought and behaviour and its corollaries (e.g., language) as viable objects of study. Part of this, I surmise, is related to the recent *posthuman* turn in cultural studies as well as communication and media studies research or, perhaps more specifically, misconceptions of what *posthuman* research entails. *Post-anthropocentric* paradigm shifts in *posthuman* research decenters the human altogether and prioritizes focus on objects, materials, and processes that, as some permutations of *posthuman* logic would have it, "transcend or subvert human intervention and case as a direct response to materialist concerns of 'traditional'... practice" (Sterling 2020).

The popularity of posthumanism and more 'cyborg' related lines of inquiry infiltrated the humanities in the 1990s, subsuming anthropo-oriented research within the *digital humanities* in the process. However, in line with posthuman-scholars like J. J. Silvia (2020), Michael Hauskeller (2015), Thomas Philbeck and Curtis Carbonell (2015), I contend that unseating the human from central theoretical focus should not necessarily entail the absolute termination of inquiry into human thought and behaviour. J. J. Sylvia notes that rather than subverting human intervention altogether, posthumanism "embraces the [human] relation to non-human forces and focuses on the gradual co-creation of qualitative change based on the ontology of relationality" (Sylvia 2020: 139, 140).

Sylvia's observation that posthuman scholarship involves the study of human subjects 'in relation with' non-human forces echoes Hauskeller, Philbeck and Carbonell's (2015: 3) assertion that posthumanism, rather than abolishing humanity to the recesses of insignificance, offers an approach to "investigating the outcomes of science and tech via the discourse of critical and philosophical posthumanism," and that through posthuman inquiry, "the ontological frameworks for the constitution of technology and human beings have been foregrounded through a dissection of the natural vs. cultural (artifactual) world."

However, posthuman paradigm shifts did not manifest in vacuity from other epistemological and ontological trends in the Academy. *Posthumanism*'s impetus to "overcome[e] the human condition" (Hauskeller, Philbeck and Carbonell 2015), or at the very least, to overcome the limitations of the human condition culminated within the broader context of a cultural struggle between traditional and progressive values both in the Academy and in North American society, more generally.

2.2.4. Resistance to *French Theory* in North America

Thus, I propose that *posthumanism* and the *digital humanities* are situated within the broader context of *culture wars* and *canon debates* of the 1980s and 90s. This was a period characterized by recalibration of canonical foci across 'the curriculum' among North American academic circles. These recalibrations of the curriculum were motivated by more progressive attempts to reconfigure our reading practices as academics. In some respects, a paradigm shift was necessary to create space in the Academy for the voices

of those who have been traditionally neglected, oppressed, or marginalized. However, as Associate Professor of comparative literature, Bill Readings (1996) observed, the culture wars and canon debates of the late-twentieth century were "not so much a revision of the canon as a crisis in the *function* of the canon." What Readings meant to convey with his statement was that it is not the philosophical extrapolations, methodological approaches, epistemologies, ontologies, and theories that have been inherently problematic, but rather, it is the ethnocentric and non-representative grounds from which canonical foundations stemmed within the humanities that needed serious reconsideration.

Professor of history, Roger Chapman (2010), extends the reach of *culture wars* and *canon debates* beyond literary studies and into other institutional enclaves, describing the phenomenon in North America as the coalescing of many societal divisions within public debates about politics, legislation, religion, partisan media, and (of course) academic discourse. American literary scholar, Mary Jo Bona, adds that the popularization of tenets from the culture wars within academic circles has assumed nominalist undertones leading to oversimplifications of complex concepts, theories, and ideas that have become parceled into 'canonical' versus 'noncanonical' binaries (Bona 2017). While Bona recognizes that rigid revisionist aims of the *culture wars* were galvanized by the rejection of the traditional literary canon as "a centralized source of cultural authority," she cautions against the oversimplifications that binary thinking makes possible.

Catalyzed by a rejection of French theory, these noncanonical trends infiltrated the very way American society and culture were studied, generating several intellectual polemics that forwarded a "recovery and revisioning of American history" (West 1992). This is not to suggest that the very events making up the temporal fabric of history should be reinvented, but rather, that colonial narration of history required significant modification to remedy the erasure of histories, events, and voices belonging to those who remained absent within traditional literary and historical canons (Bona 2017). Clearly, this does not suggest a complete overhaul of traditional epistemological and ontological approaches, but rather, a modification to some approaches while building upon others.

Though the culture wars picked up momentum in the late-twentieth century, tenets of the canon debates reach back to the 1960s when backlash against French theory began. In literary circles, 'French theory' became shorthand for a body of work ascribing to traditional literary approaches. Structuralist approaches to cultural studies and social science became caught up in this backlash, which was initiated by Jacques Derrida's (1966) deconstructionist critique of structuralism. However, in many respects, Derrida's conception of 'deconstructionist critique' has become distorted given that it was never meant to promote poststructuralism as a replacement of structuralism. Rather, it was meant to build upon structuralism, not oppose it. In the 1990s, Derrida noted that:

Deconstruction is also, at least, the act of taking a position, in the very work it does, regarding the politico-institutional structures that constitute and regulate our practices, our competencies and our performances. Precisely because it has never simply been concerned with signified content, deconstruction should be inseparable from this politico-institutional problematic and should require a new interrogation of responsibility, and interrogation which should not necessarily trust inherited codes of politics or ethics (Derrida 1990: 424).

Resistance to French theory also questioned theory's significance in cultural studies and promoted the abandonment of structuralist traditions to reading texts. Anti-theory sensibilities of the 1980s and into the 1990s brought about a resurgence of historicisms that lead to what Readings (1996) called the 'posthistorical university.' Readings' concern reflects Jean-François Lyotard's (1984 [1979]) cautioning that the "very postmodern moment that finds the University nearing what may be its end" (xxv). What Lyotard is trying to convey with this statement is that the validation of what constitutes knowledge in contemporary post-historicisms can no longer be established by responding to critical questions, but according to "intellectuals denounce[ing] the world for failing to live up to their expectations" (Readings 1996: 6).

It is from this intellectual atmosphere that *posthumanities* emerged. In similar fashion to Bona's recognition that binary revisionist approaches pitting canonical scholars against those ascribing to noncanonical doctrines may be more problematic than useful, I wish to propose here that *posthuman* perspectives using nominalist reasoning that denies the relevance of human intervention and of humanist perspectives in *posthuman* studies is not conducive to asking the critical questions that need to be asked in the twenty-first century: questions about human contributions to cultural of political incivility and its responsibility to reconsider the socio-political dystopias that it has created for itself in *dialogical* relation with digital media, which has brought the various political crises we now endure to fruition. Just as Derrida proposed that we deconstruct structuralism in order to build upon it once more, I suggest here that we use humanism and the human condition as a point of departure from which to create a critical *posthumanism* that remains self-aware and inclusive – a *posthumanism* that remains concerned with humanity as one of several phenomenological parts of a greater whole (in relation with a system or network).

2.2.5. Posthuman Trends in Digital Humanities Scholarship

For the duration of the late-nineteenth and early-twentieth centuries, communication and media studies examined *media effects* on *public opinion* as ontological and phenomenological miens of *group psychology*. During this period, psychological facets of the human condition had remained of academic import within the disciple. However, by the turn of the twenty-first century, as the *culture wars* and *canon*

debates generated ideal conditions for *posthuman* paradigms to gain intellectual cache, anthropological factors became of tertiary concern in favour of more 'thing-oriented' (e.g., ANT and Object-Oriented Ontologies) subject matter. As *posthuman* ethics gradually infiltrated communication and media studies, it laid the foundations for the *digital humanities*. These initiatives were also bolstered by the work of Bruno Latour (2007), who advanced ANT as the optimal approach to studying social forces, as well as *Object Oriented Ontologies* (OOOs), which are theoretical approaches influenced by Martin Heidegger's (1927) rejection of what he viewed as the anthropocentric privileging of human perception over nonhuman objects promoted by the Cartesian view of the human.

Posthuman scholars like Rosi Braidotti (2013, 2011), Katherine Hayles (2017), and Donna Haraway (2016) have forged paths for critical inquiry into questions about the human condition and its intervention in non-human domains of existence while remaining critical of the anthropocentric assumptions of traditional humanist approaches. These *posthuman* scholars offer communication and media studies a way through popularized interpretations of the *posthumanities* as the complete removal of anthropological deliberation from the realm of inquiry altogether. This anti-human trend misconstrues *posthumanism* as the denial of humanity's relevance in academic inquiry, which promotes the assumption that, to be taken seriously, *posthuman* scholarship must decenter the human and prioritize anything except the human as though the human no longer existed.

Certainly, more can be said about the value of *posthumanism* beyond the mere rejection of humanity and humanism. To move discussion beyond the nominalist binarism of *posthumanism's* misconceptions (beyond paradigms that can only imagine a world 'with humans' or 'without humans' as being important), *posthumanism* would be better served, I contend, by assuming what Sylvia refers to as an 'ontology of relationality' (2021) – a compatible approach with the semiotic inquiry into the convergence of schemas of semiosis enacted among human minds, digital algorithms, and political intermediaries that I propose to use in this dissertation.

Anti-human interpretations of the *posthuman turn* among some communication and media studies scholars likely explain the prevalence of work dedicated to examining the technological forces of digital infrastructure, platforms, networks, digital algorithms, meta-data, and systems as though they were autonomous entities from human agency. However, nowhere in Briadoti's, Haraway's, Hayles' or Ferrando's (2013) framing of *posthumanism* do they qualify it as the absolute denial of anthropological considerations. In fact, Ferrando notes that:

> Although posthumanism investigates the realms of science and technology, it does not recognize them as its main axes of reflection, nor does it limit itself to their technical endeavours, but it expands its reflection to the technologies of existence. (32)

As Ferrando (2013) explains, though *posthuman* inquiry involves a good deal of reflection on various facets of science and technology, it does not exalt science and technology as more deserving of intellectual deliberation. Sylvia's *ontology of relationality* implies a *posthuman* approach to inquiry that considers facets of science and technology 'in relation with' humans and vice versa – as also captured by Slack and Wise's *technological culture* – rather than as a post-anthropocentric exercise in excising the human from inquiry.

In line with Ferrando's substantiation of what *posthuman* inquiry entails, I wish to challenge the misconception that *posthuman* research requires doing away with the human altogether within the *digital humanities*. To do this, I propose folding the human back into the *posthuman* equation by situating humanity within an ecology of mediated *meaning-making* processes and forces of its (humanity's) own making. In doing so, this chapter challenges the notion that artificial intelligence (AI) is something separate from human cognition that can, thus, supersede it. More specifically, I contend that communication and media technologies are progenies of human psychology that were designed to extend human cognition, not replace it.

To this end, I depend on philosopher Herman Dooyeweerd's (1953) *cosmonomic philosophical theory* prioritizing *meaning-making* as a universal force governing all human and non-human existence like a cardinal law that shapes several networked spheres of existence at once. Describing this rule-creating quality of *meaning-making*, Dooyeweerd (1953) defines it as "the being of all that has been created and the nature even of our selfhood." The *meaningfulness* of anything, he contends, "has the character of referring [and] constantly points without and beyond itself toward an origin, which itself is no longer meaning" (Dooyerweerd 1953: 4, 9, 110). In this sense, Dooyeweerd's perspective is in line with what nineteenth century scholars, such as Gustav LeBon and Gabriele Tarde, were already saying about crowd psychology. *Meaning*, within the mentality of the crowd, is no longer guided by the governance of an individual's consciousness, but rather, it is formed by the thinking of a *collective consciousness* (Durkheim 1983) – a sense of security and solidarity that humans, as social beings, experience when they perceive themselves as part of a coherent collective whole.

The canon debates of the late twentieth century also rejected facets of structural linguistic analysis, which includes a rejection of structuralism altogether. For example, Deleuze proposed a philosophy of language in its stead, through which he critiqued what he perceived to be the tyrannical characteristics of the linguistic sign, and along with it, the tyranny of the signifier. We can detect symptoms of the canon debates in Deleuze and Guattari's critique of linguistics in their claim that:

> Minorities are objectively definable states, states of language, ethnicity, or sex with their own… territorialities, but they must also be thought of as seeds, crystals of becoming whose value is to trigger uncontrollable movements and de-territorialization of the… majority (106).

Proposing the term *order-word*, Deleuze and Guattari frame linguistics as:

> The all-embracing but narrow opposition of signifier and signified [which] is permeated by the imperialism of the signifier that emerges with the writing-machine. Everything comes to turn on the letter. That's the very principle of despotic overcoding. What we're suggesting is this: it's the sign of the great Despot (in the age of writing) that, as it withdraws, leaves in its wake a uniform expanse that can be broken down into minimal elements and ordered relations between those elements. The suggestion does at least account for the tyrannical, territorializing, castrating character of the signifier.

Rejecting Saussure and Lacan's structuralist approach to semiotics, Deleuze and Guattari embraced Hjelmslev's *Glossematics* as a viable post-structuralist alternative accounting for relations of reciprocity and relativity between signs, and permitting what they conceived as analysis of shifts and changes in the constitution of meaning across the planes of *expression* and *content*. Inspired by Hjelmselev's conception of *Glossematics*, Deleuze and Guattari developed what they called an *a-signifying semiotic model*, which emphasized the importance of part-signs and the semantic dimensions of their signals in constituting meaning (Genosko 2008). Guattari (1995) was especially concerned with framing the management of our perceptions by technological means in semiotic terms, exploring 'signaletic matter' while borrowing from Hjelmslev's (1961) *Glossematics* typology among *matter*, *form*, and *substance* across the planes of *content* and *expression*, but reversing Saussure and Hjelmslev's prioritization of matter over form (Genosko 2008).

Guattari, promoting his analytical emphasis on *signaletic matter*, observed that "it was a grave error on the part of the structuralist school to try to put everything connected with the psyche under the control of the linguistic signifier" (Guattari 1995: 5). However, I contend that this critique is more appropriate to generative grammar approaches to language than it is to structuralist approaches to linguistics embracing functionalist principles. Just as it is unwise to eliminate the human from posthumanism inquiry, it is equally unwise, I conjecture, to reject the tenets of mid-twentieth century structuralist contributions to linguistic inquiry.

Trends rejecting structuralist approaches to linguistic and semiotic inquiry are evident in more recent communication and media studies scholarship, which assert that "traditionally, text-focused methodologies deal with content in its linguistic and social aspects rather than with the technological or material context that enables the production and circulation of signs" (Langlois 2011: 9). Though I agree with this observation's inferred premise that non-linguistic (and non-human) phenomena contribute significantly to the circulation of signs and the production of meaning, which is also a concept central to Latour's (2005) thesis in *Reassembling the Social*, I am at odds with nominalist grounds for supplanting

one dimension of signification and meaning while exalting another. More specifically, I contend that neglecting linguistic dimensions of signs and meaning represents a missed opportunity to understand how signs and language are instrumentalized by the 'tyranny of human agency' making use of technologies in classifying and segmenting human representations, as demonstrated in recent time by the profiling and microtargeting force of digital algorithms.

Indeed, word-pattern analysis "can reveal significant insights about psychological functioning" as can "subtle patterns in word choice… [which] reveal[s] underlying cognitive and emotional processes, largely because of the automatic and non-conscious operation of language production that is tightly coupled with basic psychological states and dynamics" (Hancock et al. 2013). Moreover, word-pattern analysis of texts produced by machine learning algorithms reveals a good deal about the ways in which language usage within non-linguistic facets of social media can uncover preeminent ideologies, beliefs, and values propagated online, as confirmed by Caliskan and Bryson's (2017) study of machine learning's ability to replicate human-like semantic biases. Thus, throughout this dissertation, I proverbially 'push back' against posthuman nominalism and anti-linguistic epistemologies in favour of more structural-functionalist perspectives that makes sense of abstract cultural objects used in the social construction of reality online through signs, systems, processes and structures within the convergence of semiosis formed among human minds, digital algorithms, and political intermediaries on Twitter.

2.3. Critical Discourse Analysis and Cognitive Linguistics

Cognitive linguistics and CDA are highly compatible theoretical approaches to analyzing language use as a social, cultural, and cognitive phenomenon. Cognitive linguistics understands language use as representative of distributed cognitive functions as they relate to the structuring and organization of thoughts and ideas, which therefore provides insight into how we use language to represent, shape, and define our social realities. In this way, cognitive linguistics is applied to the study of language as an interactive and functional component of cognition as it engages with the outside world. Informed by critical social theory, CDA aims to examine language use in discourse as a social practice that comes to define underlying social dynamics and relations of power distributed across a given population (van Leeuwen 2006). Both CDA and cognitive linguistics are conceptual paradigms rather than individual disciplines and both are concerned with investigating language-use in social conditions and how meaning is constituted through discourse and social practice, which make them exceedingly compatible models (Hart 2011).

Both cognitive linguistics and CDA were conceived at around the same time in the 1970s. CDA's journey began with Fowler et al.'s (1979) book introducing CDA, *Language and Control*, which spurred further development of CDA approaches among scholars like Fairclough (1995), Wodak (2015),

van Dijk (1997, 2001, 2002), Kress (1993), and van Leeuwen (2009). Cognitive linguistic analysis was first proposed in Lakoff and Johnson's book introducing cognitive linguistics, (1980) *Metaphors we Live By*, followed by seminal works by Langacker (1987), Talmy (1986), Taylor (1987), Fillmore (1985), and Fauconnier and Sweetser (1996). Cognitive linguistics explicitly examines relationships between language structures and cognition while CDA examines the formation of power structures and ideological constructs within language-use through text analysis. O'Halloran (2003: 14) has noted that CDA approaches to discourse analysis tend to lack an appreciation for the cognitive dimensions of language, and thus cognitive linguistics offers invaluable insight toward filling this gap.

American philosopher and critical theorist, Nancy Fraser, recognized that the public sphere is a social construction constituted through language and ideas attached to linguistic expression, defining the public sphere as "a theatre in modern societies in which political participation is enacted through the medium of talk" (Fraser 1999: 519). This way of qualifying the public sphere is consistent with critical discourse analysis, which is an interdisciplinary approach "composed on multiple distinct theoretical and methodological approaches to the study of language" which "commonly view language as a form of social practice and are concerned with systematically investigating hidden power relations and ideologies embedded in discourse" (Johnson and McLean 2020: 379).

According to Hart (2011), cognitive linguistics investigates processes of conceptualization within linguistic patterns and is thus an ideal model for making sense of mental representations of ideological significance at the interpretation-stage of CDA. Proposing the integration of the two paradigms, he qualifies cognitive linguistic approaches to CDA as the investigation of "ideological patterns in text *and conceptualization*" (Hart 2011: 270). Thus, this synthesis of CDA and cognitive linguistics is especially apt for the purposes of this dissertation.

2.3.1. Synthesis of Critical Discourse Analysis and Cognitive Linguistics

Christopher Hart (2015) has recognized and explored the compatibility of CDA and cognitive linguistics and has identified productive ways in which the two approaches might fruitfully imbricate one another, creating a more effusive analytical tool for studying the formation of ideology in political discourse. He notes that intersecting critical discourse analysis and cognitive linguistics "represents both a 'social,' or more specifically a 'critical' turn in cognitive linguistics as well as a 'cognitive' turn in critical discourse analysis, which has traditionally adopted more social science-based methodologies" (Hart 2015: 322).

Paraphrasing Van Dijk and Wodak (2001), Hart (2019) describes *critical discourse analysis* as a text-analysis tradition applied to researching how ideologies are encoded within language usage, which uncovers instances where social power, dominance, and inequality are produced, reproduced, and enacted. Moreover, Hart asserts that this synergy has been especially fruitful for ideology research into "media and

political discourse to show how language can, through the patterns of conceptualization it invokes, function ideologically" (Hart 2019: 81). Thus, in Hart's estimation, (2011) "cognitive linguistics… is useful for CDA because in its theory of conceptualisation, a dynamic cognitive process that takes place 'online' at either end of a communicative event and involves the recruitment of existing knowledge structures to construe experience" while at the same time, CDA "takes linguistic and psychological approaches one step further by analysing data from a decidedly critical stance" (Williamson et al. 2018).

This dissertation's conception of *botaganda* as the convergence of semiosis among human minds, digital algorithms, and political intermediaries on Twitter works well with CDA's approach to social analysis from the premise that "there are no social events or practices without representations, construals, conceptualizations or theories of the events and practices" (Fairclough 2012: 9). In this sense, "the objects of critical social analysis are… 'material-semiotic' (Jessop 2004), that is, simultaneously material and semiotic (or 'discourse'), which I would see as discursive relations" (Fairclough 2006).

2.3.2. Hybridization of Cognitive Linguistics and Critical Discourse Analysis

The hybridity of cognitive linguistic adaptations within CDA research could broaden our understanding of the cognitive dimensions of social media texts and their ideological significance to the constitution of power and hierarchical relations within digitally mediated political discourse. More specifically, cognitive linguistic analysis helps reveal the ways in which participation in political discourse mediated on social media platforms like Twitter facilitates the mental organization of political information into semantic categorical parcels and *mental spaces* based on *gestalt* or 'fill in the blank' modes of heuristic reasoning (see Section 3.4, Subsection 3.4.1. in Chapter 3 for further elaboration). As Twitter users engage with linguistic representations of political significance posted by Twitter bots, I surmise that the convergence of semiosis among human minds, digital algorithms, and political intermediaries on Twitter results in the formation of public opinion and the public sphere in the digital age. Cognitive linguistic analysis of *botaganda* on Twitter reveals the representational and conceptual structures of language-use within political discourse across the #SNCLavalin discourse of 2019, but more particularly, it reveals how underlying associations generated between language and thought intersect within *botaganda* formed on Twitter, thus influencing human interpretations of representations, construals, and conceptualizations of political meaning.

From the perspective of CDA, the ways in which human minds parcel representations, construals, and conceptualizations into categories of *prototypicality* (see Section 3.4., Subsection 3.4.1. in Chapter 3 for further elaboration) while engaging with political content circulated by Twitter bots according to the convergence of human thought, algorithmic computation, and political electioneering shapes power relations, hierarchical stratifications, and ideological worldviews among Twitter users.

2.4. Critical Analysis of Ideology in Social Media Content

As noted by Hart, the importance of semiotic representation, construals, and conceptualization in CDA makes it highly compatible with cognitive linguistic approaches. As an integrative paradigm that blends research of variation and function in language-use, cognitive linguistics is considered a 'movement' or an 'enterprise' rather than a theory because it does not comprise one single theory. Rather, it is an empirical approach guided by common principles, assumptions, and perspectives that have been synthesized into a consortium of compatible theories (Evans and Green 2006). As observed above in section 2.3 above, CDA is a compatible theory with cognitive linguistics (Hart 2011) as are theories belonging to cognitive sciences and social psychology, particularly as they relate to the study of mental categorization and *gestalt psychology* (Evans and Green 2006 – see also Section 3.4, Subsection 3.4.1 in Chapter 3 for further elaboration). Accordingly, cognitive linguistics looks at "the representation of conceptual structure in language" (Talmy 2006) and how those representations affect cognition, which is understood within the ambit of cognitive linguistics as "the mental action or process of acquiring knowledge and understanding through thought, experience, and the senses" (Zohuri and McDaniel 2022).

For example, using corpus linguistic techniques to study tweets posted by politicians in the UK, Ruth Breeze (2020) examined words embedded in tweets that fall into the semantic domain of 'emotion' and 'anger' to understand the rise of populism and its affect within online political discourse. Breeze argues that:

> Discourses are articulatory practices that organize social relations, and emotions are an integral part of these practices and relations. In the long term, repeated experience of specific emotions in connection with particular events may lead to the consolidation of affective dispositions and, on a broader, societal scale, affective practices." (Breeze 2020: 4)

2.4.1. Critical Approaches to Discourse Analysis

Amalgamating analysis of political discourse, social practices, language use, and mediation on social media using critical discourse analysis is especially useful to understanding how the convergence of semiosis among human minds, digital algorithms, and political intermediaries online contributes to the social construction of public opinion and the fragmentation of the public sphere in the digital crevasses of contemporary life. Moreover, since critical discourse analysis "brings the critical tradition of social analysis into language studies and contributes to critical social analysis a particular focus on discourse and on relations between discourse and other social elements (power relations, ideologies, social identities, and so forth)" (Fairclough 2012: 9), it is an ideal framework through which to frame the pejorative

attributes assigned to politicians within the ambit of online electioneering in the digital age and how politicians, in turn, become political targets around which staunch partisan divides are drawn.

2.4.2. Social construction and Semiotic Hybridity

CDA, as proposed by Weiss and Wodak (2003), brings several theoretical perspectives on discourse into dialogue with social and linguistic theory in ways that account for the "social construction of semiotic hybridity (interdiscursivity)" (Chouliaraki and Fairclough 1999: 16, as quoted in Weiss and Wodak 2003: 6). Acknowledging the necessity for hybridity in social science research, Weiss and Wodak (2003) observe that the foundations of CDA are grounded in classical rhetoric, text-linguistics, sociolinguistics, applied linguistics, and pragmatics toward the analysis of ideology, power, hierarchy within gender and race relations, media discourses, political discourses, and organizational discourses as they relate to the formation of worldviews and identity.

For example, in their study of housing policy, Jacobs and Manzi (2012) use critical discourse analysis to examine what they call 'the argumentative turn' in public policy and the construction of public policy 'narratives' through the lens of *agenda-setting*, which manifests within the orbit of established ways of thinking, speaking, and writing. Jacobs and Manzi contend that political rhetoric is used in discourse to mobilize social action rather than as transparent means of public communication in social and political practice. The practice of *agenda-setting* in political discourse, Jacob and Manzi (2012) add, reinforces hegemonic relationships, conduct, and meaning within existing political structures.

Similarly, Maarten Hajer's (2003) study of public policy as a 'discursive construct' pays special attention to the constitution of meaning within political argumentation and the *mobilisation of bias* through the cultivation of *discourse coalitions*, which produce and reproduce certain relations of dominance. Hajer defines *discourse coalitions* as "a group of actors who share a social construct" whose discourse narratives "come to dominate a society's conventional ways of reasoning and the practices of its dominant social and political institutions" (Hajer 2003: 47; Forester 2003: 9). An example of a social construct might be a social issue pursued by political "actors [who] try to impose their views of reality on others, sometimes through debate and persuasion, but also through manipulation and exercise of power" (Hajer 2003: 47).

2.4.3. Computational and Corpus Linguistics

Congruent with cognitive linguistic approaches, Breeze's study attempts to understand the representational and conceptual structures of language and affect in political discourse that influence our thoughts, experiences, and sensibilities toward political reality. More specifically, Breeze's study demonstrates how Twitter, as a space where populist modes of communication are most likely to transpire (Breeze 2020),

enlists Internet users to participate in political discourse using linguistic modes of communication, which encourages "…popular engagement on different levels with politicians' personality, opinions and feelings, and blurring the boundaries between 'political' and 'celebrity' performance" (Breeze 2020: 2, paraphrasing Marsh, Hart, and Tindall 2010 and Wheeler 2011).

2.5. Concluding Remarks

The *posthuman* turn in communication and media studies research has resulted in an onslaught of inquiry into social media centered around technological affordances, software, networks, infrastructures, and computer systems while overlooking the contributions of human thought and behaviour to the digital processes that unfold online. Research conducted within communication and media studies examining language, human thought, and behaviour specifically appears to be most prevalently represented by a body of research conducted among Jeff Hancock and his academic associates at the *Social Media Lab* at Stanford University, which examines psycholinguistic dynamics represented in language-use employing computational text tools like WMatrix5 (see, for example, Jakesch, Hancock, and Naaman 2023; Hohenstein et al. 2023; Ho, Hancock, Booth, and Liu 2016; Hancock, Woodworth and Porter 2013).

However, similar work has also been emerging from the University of Amsterdam's *Digital Methods Initiative* and independent research labs dedicated to the study of multimodal communication, such as *Red Hen Lab* and Australia's *MetaNet Labs*. My dissertation contributes to this body of research by drawing upon similar research techniques to analyze political communication, public opinion, and the public sphere on Twitter while paying close attention to the convergence of semiosis formed among human minds, digital algorithms, and political electioneering on Twitter. This is an approach yet to be explored using corpus analysis research in communication and media studies scholarship.

Cognitive linguistic research analyzing online texts and social media discourse is in its nascency (see, for example, López-Varela 2015; Stefanowitsch 2019; Hartmann 2020; and Schmid, Würschinger, and Lenker 2020; Danesi 2023), and several studies reference cognitive linguistics indirectly in substantiating observations made about the cognitive impact of language-use on social media. For example, psychologists Kern et al. (2016) note that social media sites like Facebook and Twitter produce massive amounts of linguistic information that reveal aspects of our individual personality and social behaviour (Anderson et al. 2017; Gill 2004; Kern et al. 2014). Language used on these social media platforms can, therefore, extend our understanding of cognitive, behavioural, and affective practices cultivated within these kinds of online environments (Kern et al. 2016).

As mentioned above, some research conducted within the bounds of CDA research has been dedicated to the analysis of ideology and affect in political communications on social media (for example, see Breeze 2020; Bouvier 2018; Khosravinik 2017; Khosravinik and Unger 2016; Törnberg and Törnberg

2016). However, very little of this research has integrated cognitive linguistics or perspectives from ANT and *posthumanism*. Within the small body of work synthesizing cognitive linguistics and CDA, Wodak (2006) noted that "most of the on-going research in Cognitive Linguistics related to CDA is restricted to a small field" (181) and this appears to still be true today. To date, very little research has been conducted examining social media texts by synthesizing cognitive linguistics and critical discourse analysis.

In this chapter, I explored congruity between technology and culture as a human enterprise and proposed that this being the case, one cannot make sense of technology or culture without studying human thought and behaviour. I posited this assertion in contrast with *posthuman* perspectives within communication and media studies research that promote removing humans and language from inquiry into science and technology within the ambit of the *digital humanities*. I also conjectured that because politics, political communication, public opinion and the public sphere are all consequences of human thought undergirding the social construction of reality, they are inherently hardwired into the networked activities, technological and otherwise, of human cognition.

I also observed that language is a structured system of communication that is common to, and thus used universally among human thought, digital algorithms, and political intermediaries online, and is therefore the optimal specimen for analysis in describing the flow of semiosis within the convergence of human thought, algorithmic computation, and political electioneering on Twitter, and how all three sites of sign production contribute to the formation of politics, political communication, public opinion, and the public sphere. I closed the chapter with an outline of existing gaps in literature that this dissertation fills.

In the next chapter, I will go into more detail about how I integrate a cognitive linguistic approach to CDA with paradigms belonging to social psychology, and how I use Hjelslev's Glossematics to map the flow of semiosis through language as it is operationalized among human minds, digital algorithms, and political intermediaries on Twitter.

Chapter 3: Theoretical Framework – The Semiosis of Human Minds, Digital Algorithms, and Political Electioneering

3.1. Introduction

In this chapter, I outline the theoretical framework that informs the methods employed to investigate how semiosis flows across the convergence of human thought, algorithmic computation, and political electioneering culminates into *botaganda* on Twitter. To conceptually frame the flow of semiosis that manifests as *botaganda* online, Section 3.2 describes the three systems of semiosis involved in shaping political knowledge on Twitter by exploring human thought and behaviour according to the tenets of social psychology as they relate to the functions of deep learning neural network algorithms and political electioneering. I then evaluate human thought within these conditions according to observations made within political and social science in greater detail.

Section 3.3 expounds Hjelmslev's *Glossematics* semiotic model in more granular detail. In Section 3.3.1., I use the *Glossematics* model to outline the flow of semiosis among human minds, digital algorithms, and political intermediaries, and Section 3.3.2. focuses on delineating the kinds of *schematics* that result from the inter-mediational systems of semiosis created in the process. Section 3.3.3. describe how the assembly of words and phrases into composites frequently and consistently repeated across a particular thread of Twitter discourse cultivates *semantic contagions*, and how those composites assembled in syntactic proximity with one another draw conceptual categories into relationships of equivalency. Section 3.4. then looks at cognitive linguistic concepts that describe the formation of *idealized cognitive models*, *prototypes*, and *stereotypes* through the flow of semiosis within the convergence of human thought, algorithmic mediation, and political electioneering on Twitter in more granular detail.

3.2. Human Thought, Algorithmic Computation, and Political Electioneering

To begin exploring the *dialogical* flow of semiosis within the convergence of human thought, algorithmic computation, and political electioneering on Twitter, what follows in this section first offers some insight into the nature of human minds, digital algorithms, and political electioneering practices. These insights are also framed according to Posner's iteration of mediation as any "system that makes a certain type of communication possible: a system of means for production, distribution, and reception of signs which imposes certain constraints on sign behaviours" (Posner 1986: 293, 302, as paraphrased by Threadgold 1997: 393).

3.2.1. Human Minds

Because social psychology is the study of human thought, experiences, and behaviours in the context of social situations, it is an important theoretical dimension to the analysis of meaning-making within the convergence of semiosis among human minds, digital algorithms, and political intermediaries on Twitter. Social psychology helps us understand how social circumstances influence the ways that human minds mentally organize political knowledge into categorical classifications and into the *mental schemas* involved in synthesizing new information with known information. Moreover, concepts belonging to social psychology, such as *social alignment theory*, *priming theory*, *heuristics*, and *word-frequency effects*, help us understand how the convergence of semiosis among human minds, digital algorithms, and political intermediaries shapes political communication, public opinion, and the public sphere in the digital age.

3.2.1.1. Interactive Alignment Theory

Interactive alignment involves interpersonal synchronicity in communication, which refers to how "the behaviour of two or more individuals is brought into alignment" (Schmidt and Fitzpatrick 2016: 17) while interacting with one another according to the social circumstances that they are engaged in. *Interactive alignment* is part of *grounding theory*, which "suggests that all interactions are collaborations between the speaker and listener" (Riordan, Kreuz, and Olney 2014: 466). Successful synchronization of our behaviours, affective experiences, and interpersonal expressions on both verbal and non-verbal levels is contingent on our ability to socially calibrate our mental models and frame our social situations in ways that facilitate our collaborative participation in the constitution of shared social realities. Within the context of shared social realities resulting from *interactive alignment*, we use verbal and non-verbal cues to express our inner thoughts and experiences to one another by exploiting representations that are commonly known among members of a given social group. Expression of these cues allows others to socially synchronize with us, to form social bonds and to create a common sense of social cohesion.

Interactive alignment through our linguistic and non-linguistic behaviours is, thus, a prominent though unconscious interpersonal phenomenon that transpires in discourse and is intrinsic to our species' success in communicating effectively with one another (Pickering and Garrod 2004). Moreover, *interactive alignment* at some levels of linguistic structure most certainly corresponds with interpersonal synchronization of worldviews, beliefs, and values (Branigan et al. 2010).

Initially, *interactive alignment* was believed to take place exclusively in face-to-face interactions, but recent research reveals that online forms of socialization using instant messaging, posts, emails, and social networking sites like Twitter also induce *interactive alignment* (Brenner and Smith 2013; Lenhart, Purcel, Smith, and Zickuhr 2010). In fact, Branigan, Pickering, Pearson, and Mclean (2010) found:

> strong evidence that interactive alignment occurs in human-computer interactions, but that it differs in important ways from that found in interactions between humans: It is generally stronger and has a larger mediated component that is concerned with enhancing communicative success. (1)

Research has also demonstrated that interlocutors even align their linguistic behaviours in spoken and written dialogue using Internet technologies (Hartsuiker et al. 2008), including the syntactic structure of their utterances (Branigan et al. 2000) and the categorical structuring of conceptualizations (Garrod and Anderson 1987). Gandolfi, Pickering, and Garrod (2023) recently established that these modes of *interactive alignment* are inherent to human behaviour and thus help us create abstract concepts as a collaborative endeavour. Dialogue and discourse, Gandolfi et al. (2023) claim, is an important instrument that human interlocutors use to conceptualize shared perspectives of the world and socially construct shared representations and abstract concepts in shaping a common sense of reality.

For this reason, *social alignment* in discourse leads to the replication of lexical expression and word choice (at times referred to as *lexical entrainment*) between interlocutors engaged in dialogue with one another. Garrod and Anderson (1987) even found that human participants not only repeatedly used the same expressions in dialogue with one another, but they also confirmed that subjects began to interpret shared words and expressions in similar ways.

The research conducted for this dissertation found several instances where *social alignment* is likely to have occurred across the #SNCLavalin Twitter discourse. In the tweets cited below, for instance, we can see that the expression 'PMO [Prime Minister's Office] Cover Up,' is included in several tweets posted by Senator Denise Batters, Astroturfing Twitter bots, and humans within the #SNCLavalin discourse in 2019. Related concepts and expressions to 'PMO Cover Up' are replicated in tweets posted by humans in the same discourse thread on Twitter, alongside, themes, expressions, and conceptual representations corresponding with notions of 'scandal,' 'obstruction of justice,' 'unlawful conduct,' and 'corruption:'

Tweets posted by Astroturfing Twitter Bots:

> *Despicable, shameful, anti-democratic behaviour by #Trudeau-whipped Liberal MPs at Justice committee! They don't want to #LetHerSpeak, and they use their majority to force* ***#PMOCoverUp*** *on #SNCLavalin to continue. (Posted by Senator Denise Batters 03/14/2019 13:31; Retweeted by Astroturfing Twitter bot: 03/14/2019 04:40:51)*

> *#SNCLavalin* ***#PMOCoverUp****: "The irony is suffocating. Concentration of power is very much at the root of this scandal....And yet the same concentration of power makes*

it all but impossible to get to the bottom of it." (Posted by Senator Denise Batters 03/14/2019 16:59; Retweeted by Twitter bots: 03/14/2019 11:50, 14:39)

*Canadians Deserve Answers on #SNCLavalin **#PMOCoverUp!** My #SenCA speech about **#LavScam** and the Senate Legal committee's unique interest in getting to the bottom of this **#Trudeau Govt scandal**. When did PMO pressure start on Jody Wilson-Raybould? (Posted by Senator Denise Batters 03/03/2019 19:48; Retweeted by a Twitter bot: 04/08/2019 16:12)*

Tweets posted by Humans:

*There's no doubt left among Canadians... But if there were, there definitely isn't anymore. THIS IS A **COVER-UP**! #SNCLavalin #**JustinCommitee #Coverup** (Posted by human user: 03/14/2019 00:06; Retweeted by human users: 03/14/2019 00:03 plus 19 times; Retweeted by bots: 03/14/2019 6 times)*

*Wow... They're not even faking it anymore. They're just straight-up telling Canadians to vaffanculo! 👉 *+ #SNCLavalin **#JustinCommittee #Coverup** (Retweeted by human users: 03/14/2019 00:06 plus 27 times)*

*Not only sad but UNACCEPTABLE. Canadians deserve better & must stop the Trudeau Government. Time to vote Liberals out. #LetHerSpeak #TruthMatters #**TrudeauCoverUp** #Cdnpoli #SNCLavalin (Posted by human user: 03/14/2019 07:07; Retweeted by human user: 03/14/2019 11:07)*

*We must stop ppl with power like the Trudeau Government from silencing Jody WilsonRaybould. Canadians deserve to hear @Puglaas full story. #LetHerSpeak #TruthMatters #SNCLavalin #Cdnpoli **#TrudeauCoverUp** (Posted by human user: 03/14/2019 11:02; Retweeted by human users: 03/14/2019 10:54, 11:02)*

*Scheer says **PM's** lawyer threatened him with libel suit over #SNCLavalin affair! Go for it @**JustinTrudeau**! Nothing screams #**COVERUP**, louder than a lawsuit! Guess #BoyBlunder needs a different tactic with Scheer, since he can't kick him out of cabinet! (Posted by human user: 04/07/2019 16:58; Retweeted by Twitter bot: 04/08/2019 14:44; Retweeted by human user 04/08/2019 22:30)*

*The Senate CAN deal with #LavScam! Trudeau's "Independent" senators just need to be ACTUALLY independent, and support our #CPC #SenCA motion to get the real answers on #SNCLavalin #**PMOCoverUp** Canadians are demanding. Here's my Senate speech (Retweeted by human users: 04/08/2019 15:02, 15:26, 15:46, 15:54)*

*Putin would be proud of ur attempts to **silence the opposition**. What are you going to do next? **Send dissenters to Siberia** or Rankin Inlet? Canadians want to live in a country with strong democratic institutions not an authoritarian **PMO** that tries to silence dissent #JWR #SNCLavalin (Retweeted by human user: 04/09/2019 02:19)*

3.2.1.2. Priming Effects

Priming effects involve the mental activation of thoughts, feelings, and experiences associated with representational cues that we are exposed to in the outside world. *Priming* research is most concerned with "the ways that internal mental states mediate, in a passive and hidden manner, the effects of the social environment on psychological processes and responses" (Bargh and Chartrand 2014). Conceptual *priming* involves the activation of internal mental representations as stimuli from a given situation or task compels the mind to draw upon conceptual associations between the stimuli perceived in our surroundings and the conceptual representations stored in long-term memory and organized across the recesses of our mental spaces.

Priming effects are also part of memory retrieval processes, and thus *priming* research is essentially *implicit memory research* (Bargh 2021: 3). For this reason, we tend to mentally organize social information into semantically salient categories as they relate to our most pressing interests, concerns, goals, and values. The activation of *primes* is, accordingly, dependent on our individual predilections.

At the same time, because we are social beings, we are likely to share several interests, concerns, goals, and values in common with others. Consequently, *prime lures* are more likely to facilitate *interactive alignment* among subjects when they represent the interests, perspectives, goals, and values shared among 'like-minded' people.

For example, evidence that images depicting human disconnection weakens people's sense of moral conviviality supports the idea that some *prime lures* are universally shared among a group of 'like-minded' people. Chris Macdonald (2020) explored whether lexical representations could produce similar results and found that exposing human subjects to lexical representations of human disconnect did, indeed, influence moral abandon among human subjects, while at the same time, exposing subjects to lexical representations of human connectivity activated more ethical and pro-social decision making. Reflecting on these results, Macdonald observes that "in a time of widespread polarization and decisive rhetoric, it is incredibly important to remember the power of words and the dangers of feeling less connected to one another" (Macdonald 2020: 6).

Another study employing *priming effects* examined 'fake news' discourse on the Internet and found that while the priming effects of 'fake news' discourse differed between individuals according to pre-existing ideological assumptions and worldviews, political discourse about 'fake news' consistently affected the public's ability to differentiate between what was 'fake news' and what was not (Van Duyn and Collier 2019).

Linguistic alignment in interactions between humans also plays an important role in successful communication between people and manifests in automatic *priming processes* that become entrenched in

language use, in affective embodied experiences, and communicative habits in exchanging information (Branigan et al. 2010). For this reason, *priming effects* contribute greatly to interpersonal interactive alignment at different levels of representation (e.g., syntax, semantics, conceptualization, etc.), and is possible because interlocutors socially coexist according to shared productions and comprehension of cultural representations (Menenti, Garrod, and Pickering 2012).

Empirical research has confirmed the cogency of *linguistic priming effects* by exposing subjects to picture/sentence matching tests. Researchers found that these tests created "a strong bias toward one of the two types of readings" tested for (Maldonado, Chemla, and Spector 2017), thus establishing that the use of representations to *prime* readers' minds had influenced how they read and interpreted the language they were exposed to thenceforth.

For example, if mediated content and conditions have already persuaded a constituent to believe that Prime Minister Trudeau's conduct has been corrupt and immoral, or if a constituent is an existing proponent of the 'official opposition' (e.g., the Conservative Party of Canada), then concepts associated with those ideas have likely already been categorically organized and entrenched within existing mental structures. If the same constituent encounters Denise Batters' tweets (cited above and referenced once again below) on Twitter, even if it is retweeted by an Astroturfing Twitter bot, the constituent is more likely to accept the premise proposed by the tweet:

> *@denisebatters: Canadians Deserve Answers on #SNCLavalin* ***#PMOCoverUp!*** *My #SenCA speech about* ***#LavScam*** *and the Senate Legal committee's unique interest in getting to the bottom of this* ***#Trudeau Govt scandal****. When did PMO pressure start on Jody WilsonRaybould? (Posted by Senator Denise Batters 03/03/2019 19:48; Retweeted by a Twitter bot: 04/08/2019 16:12)*

If a constituent with right-leaning political worldviews becomes exposed to this tweet containing the words *PMO Cover Up*, and *Trudeau's Liberal Party SNC Lavalin Scandal*, they are likely predisposed to accept those words as *prime lures* according to existing *mental representations* and *schemas* about the Prime Minister, the Liberal Party, and the SNC Lavalin scandal as mutually inclusive. Moreover, that constituent is likely to retweet the tweet posted by a Twitter bot or to compose and post a unique tweet replicating similar conceptual frames, linguistic structure, words and phrases. Words are, thus, powerful mediating forces in activating *priming effects*.

3.2.1.3. Heuristics

Priming effects and *intersubjective interactive alignment* may also be amplified within online contexts because the Internet produces conditions that circulate an unprecedented abundance of information that

floods the distributed faculties of human cognition all at once while, at the same time, placing incredible demand on the executive faculties responsible for higher order cognition. These are ideal cognitive conditions for *heuristic* or 'fill-in-the-blanks' modes of reasoning in human cognition. In social psychology, *heuristic* modes of reasoning refer to the mental shortcuts that we use unconsciously to make the complexity of information more cognitively manageable, to render the formation of judgements more efficient, and to reduce cognitive load and noise. While human minds do use *heuristics* to make accurate and spontaneous determinations quickly (e.g., the decision to swerve around a pothole while driving), some conditions induce heuristic modes of reasoning that create or reinforce our biases and entrench false insights.

Image 3.1 Example of visual gestalt principle [2]

Gestalt psychology is a theoretical perspective related to *heuristics* that examines how human minds make sense of the world by interpreting pieces as parts of larger and broader systems or 'wholes.' Human cognition's proclivity to categorize and classify material objects and abstract phenomena is an example of the *gestalt* principle. Take, for instance, Image 3.1 above. Though in reality this image is merely composed of a series of similarly rendered dots positioned in proximity to one another, their arrangement creates a pattern that compels the mind to perceive them as belonging to the same composite whole, allowing our minds to see the dog represented. Human minds perform the same cognitive task with abstract concepts by filling in the blanks where information is missing, by detecting patterns of association between elements when information is either too vast to process efficiently or too sparse to be complete, and when concepts are repeatedly positioned in proximity to one another. In other words, according to *gestalt principles*, human minds detect patterns in information and use these patterns to anticipate or

[2] https://medium.muz.li/gestalt-principles-in-ui-design-6b75a41e9965

predict what might be missing within the sequence or composition. We are naturally inclined to "perceive individual sensory stimuli as meaningful wholes" (Kim et al. 2019).

For example, our minds may be compelled to fill in the proverbial conceptual blanks as we detect a thematic pattern evolving across the following words:

SNC Lavalin
PMO (Prime Minister's Office)
Coverup
Concentration of power
Scandal

Belonging to the following tweet:

> *#**SNCLavalin** #**PMOCoverUp**: "The irony is suffocating. **Concentration of power** is very much at the root of this **scandal**....And yet the same concentration of power makes it all but impossible to get to the bottom of it." (Posted by journalist with the Globe and Mail: 03/13/2019 21:34; Retweeted by Senator Denise Batters: 03/14/2019 16:59; Retweeted by a Twitter bot: 03/14/2019 14:39)*

In this way, *gestalt effects* also contribute to our understanding of how *heuristic reasoning* functions since both are mental shortcuts deployed by the mind to resolve gaps in information by detecting patterns or by categorizing and classifying vast amounts of information by unconsciously selecting only what is relevant to our cognitive goals while eliminating what is not.

Because *gestalts* and *heuristic* modes of reasoning involve the same mental faculties that we recruit to solve puzzles, *heuristic gestalts* tend to stimulate the 'reward centres' of human cognition, thus also potentially activating the *discovery misattribution effect* (also known as the 'eureka heuristic') in the process. *Discovery misattribution effect* is the mental sensation created by 'aha-moments' that compel feelings of insight, even when interpretations of information are incorrect or biased (Laukkonen et al. 2020).

Thus, the assembly of words and phrases in proximity to one another within linguistic structures that also contain gaps in information may compel human minds to deploy *heuristic* modes of *gestalt* reasoning to conceptually resolve the composite whole. Stimulation of 'aha moment' sensations within cognition can also lead to the entrenchment of false political insights and bias into the structures of mental spaces within long-term memory, consequently shaping the *mental schemas* recruited to interpret

future encounters with words and phrases operating as *prime lures* in similar conditions and circumstances.

The use of digital algorithms to psychologically profile and micro-target constituents online enables political intermediaries to identify social media users who are likely to share common political interests, worldviews, values, goals, and concerns and to mobilize content curating algorithms that distribute information containing *prime lures* and *semantic contagions* that appeal to constituents' particular personality traits in ways that are most likely to induce *gestalt* 'fill-in-the-gaps' modes of *heuristic* reasoning. Likewise, political intermediaries' ability to use digital algorithms to psychologically profile and micro-target facets of social media users' personality enhances the effect of *prime lures* and *semantic contagions* embedded in social media, inciting human minds to *align* with the underlying of meaning of tweets posted by bots since targeted users are likely to share similar personality profiles.

In the next section, I explore how *frequency effects* enhance the cognitive efficacy of *prime lures*, *semantic contagions*, and *heuristic* reasoning in ways that potentially augment the entrenchment of false insights and biases that fundamentally amplify sensations of moral outrage, bipartisan incivility, and political polarization among social media users.

3.2.1.4. Word Frequency Effects

Word frequency effect theory posits that high frequency words are more memorable and thus more easily recalled than low frequency words (Monsell, Doyle, and Haggard 1989), which may enhance the efficacy of *lexical priming* and the entrenchment of *lexical primes* into mental structures and *schemas*. The impact of *word frequency* on memory has been examined at the organizational level of meaning and semantics (Glanc and Greene 2007, Hargreaves, Pexman, Johnson, and Zdrazilova 2012), and research has also explored the influence of lexical (e.g., word level and frequency - Glanzer and Adams 1985; MacLeod and Kampe 1996) and semantic properties (Hamilton and Rajaram 2001) on memory performance. Through this body of work, the influence of lexical and semantic properties on cognitive tasks like word recognition, naming, and semantic categorization has been well established (Yap and Balota 2015 offer an overview of related studies and literature). *Word frequency* is also "an important determinant of how quickly listeners and readers are able to access the meaning of a word and integrate it into a sentence or discourse context" (Kretzschmar, Schlesewsky, and Staub 2015: 1648).

A good deal of research on *word frequency* within the discipline of computer science has contributed to improving the algorithmic organization of information online (see, for example, Georgakopoulos et al. 2018 and Dimitrova 2003). This body of work established that leveraging *word frequency* improves algorithmic organization of information online and enhances online computational

processes, such as text classification, web searching, information filtering, and topic categorization, which all determine what kind of content appears in our individual mediascapes online.

High frequency words appearing across the #SNCLavalin Twitter discourse of 2019 (see Tables 3.1-3.5 below) point to areas of interest for this dissertation.

Word	Semtag	Frequency	Relative Frequency
scandal	G2.2-	10	0.27
judge	G2.1	9	0.24
court	G2.1	6	0.16
justice	G2.1+	6	0.16
legal	G2.1	6	0.16
PM	G1.1	5	0.13
mps	G1.1	5	0.13
lawyer	G2.1	4	0.11
testimony	G2.1	4	0.11
government	G1.1	4	0.11
wrongful	G2.2-	4	0.11
prosecutor	G2.1	4	0.11

Table 3.1 Astroturfing Bots

Word	Semtag	Frequency	Relative Frequency
scandal	G2.2-	39	0.50
corruption	G2.2-	24	0.31
justice	G2.1+	17	0.22
government	G1.1	16	0.20
PM	G1.1	14	0.18
political	G1.2	11	0.14
testimony	G2.1	11	0.14
judge	G2.1	11	0.14
politics	G1.2	10	0.13
lawyer	G2.1	9	0.12
legal	G2.1	9	0.12
sue	G2.1	7	0.09

Table 3.2 Twitter Bots

Word	Semtag	Frequency	Relative Frequency
justice	G2.1+	204	0.53
scandal	G2.2-	199	0.52
mps	G1.1	55	0.14
government	G1.1	48	0.13
parliament	G1.1	45	0.12
protocol	G2.1	43	0.11
testimony	G2.1	42	0.11
vote	G1.2	38	0.10
corruption	G2.2-	34	0.09
shameful	G2.2-	33	0.09
anti-democratic	G1.2	33	0.09

Table 3.3 Human 1 (March 14)

Word	Semtag	Frequency	Relative Frequency
scandal	G2.2-	72	0.20
judge	G2.1	72	0.20
legal	G2.1	64	0.17
political	G1.2	51	0.14
prosecutors	G2.1	50	0.14
scandals	G2.2-	47	0.13
wrongful	G2.2-	46	0.12
prosecutor	G2.1	46	0.12
justice	G2.1+	35	0.10

Table 3.4 Human 2 (March 28-29)

Word	Semtag	Frequency	Relative Frequency
scandal	G2.2-	168	0.35
suing	G2.1	163	0.34
PM	G1.1	150	0.32
defamation	G2.1-	95	0.20
corruption	G2.2-	92	0.19
crimes	G2.1-	80	0.17
election	G1.2	77	0.16
sue	G2.1	66	0.14
prime_minister	G1.1	62	0.13
political	G1.2	60	0.13

Table 3.5 Human 3 (April 8-9)

Take, for example, the word 'scandal,' which appears across all 5 corpora studied for this research (see Tables 3.1-3.5 above). The prevalence of the word suggests that it likely serves an important role both in the organization of linguistic and representational information across the #SNCLavalin Twitter discourse and in shaping political knowledge in that same context. We may also observe frequently corresponding words and themes with the word 'scandal' across the corpora of tweets posted by humans and those posted by bots, such as the words *justice*, *investigate*, *coverup*, *mps*, *government*, *testimony*, *judge*, *wrongful*, *justice*, *prosecutor, PM*, *corruption*, *political*, and *sue* (see Tables 3.1-3.5 above). Looking at the tweets containing high frequency words posted by astroturfing bots and humans on March 14, 2019, reveals the context within which these words were embedded across the #SNCLavalin Twitter discourse:

> *Despicable, shameful, anti-democratic behaviour by #**Trudeau-whipped** Liberal **MPs** at **Justice** committee! They don't want to #LetHerSpeak, and they use their majority to force #**PMOCoverUp** on #SNCLavalin [scandal] to continue. (Posted by Senator*

Denise Batters: 03/13/2019 13:31; Retweeted by human users 33 times 03/14/2019; Retweeted 8 times by bots)

*Liberal **MPs** at #**Justice**Committee today who voted to #**CoverUp** the #SNCLavalin **scandal**: Ali Ehsassi, Francis Drouin, Linda Lapointe, Mark Gerretsen & all the way from BC to vote "yes" to **cover up** after 24-minute meeting: Ron McKinnon. **Liberal ringmaster** chair: Anthony Housefather. (Posted by Senator Denise Batters 03/13/2019 18:56; Retweeted by human user: 03/14/2019 00:23:16; Retweeted by bots twice)*

*RT @TheRebelTV: Please RT! The RCMP must **investigate** Justin Trudeau's #SNCLavalin **scandal** now. If you agree, please SHARE and SIGN our petition #cdnpoli #hw #ONpoli #ABpoli (Retweeted by human user 03/14/2019 00:04; Retweeted by human users 110 times: 03/14/2019; Retweeted by bots 31 times)*

*Blatant **abuse of** their majority **power**. I'm thoroughly disgusted by this **government**. They are incorrigible... Every last one of them. 😡. 0 #SNCLavalin [scandal] #JustinCommittee #**Coverup** (Retweeted by human user: 03/14/2019 00:05; Retweeted by human users 29 times: 03/14/2019; Retweeted by bots 12 times)*

*RT @mattfurze: Do you believe that @Puglaas should be afforded the opportunity to reappear before the **justice** committee for further **testimony**? #cdnpoli #LetHerSpeak #SNCLavalin [scandal] #**LavScam**. (Retweeted by human user: 03/14/2019 00:39; Retweeted by human users 32 times: 03/14/2019; Retweeted by bots 8 times)*

*Gee, now JWR tells us she sought outside **legal** advice from a former SCC **judge** on **wrongful** conviction claims. And we'd been told she was such an experienced former **prosecutor** she didn't need such advice on #SNCLavalin [scandal] (Posted by human user: 03/28/2019 08:17; Retweeted by human users 46 times: 03/28 – 03/29/2019; Retweeted by bots 10 times)*

Closer examination of the tweets posted by astroturfing and regular Twitter bots and those posted by humans reveals that several of the most frequently recurring words appearing in tweets posted by bots are reproduced in tweets posted by humans:

***MPs** from @liberal_party **exploit** their majority on the **justice** committee to prevent the former **Justice** Minister @Puglaas from responding to the **testimony** of Gerald Butts - @gmbutts #cdnpoli #SNCLavalin #SNCLavalin**Scandal** (Posted by human user:*

03/13/2019; Retweeted by human users: 03/14/2019 00:21:05, 00:48:32, 02:32:14, 03:40:31, and 05:11:58)

*Andrew Coyne on #SNCLavalin #**PMOCoverUp**: "The irony is suffocating. **Concentration of power** is very much at the root of this **scandal**....And yet the same*

> ***concentration of power*** *makes it all but impossible to get to the bottom of it." (Posted by human user: 03/14/2019 09:22:23)*
>
> *🚨 LIBERAL* ***SCANDAL*** *ALERT 🚨 This is taken from a hidden camera within Justyn's new residence. Apparently, he hold his secret meetings here and even tried to get a meeting with Andrew @AndrewScheer WATCH W/VOLUME #Slothinati #cdnpoli #ableg #SNCLavalin #JWR #TrudeauIsDone (Posted by human user: 04/08/2019 14:11:53)*
>
> *🤣🤣🤣... Justin Trudeau* ***Threatens*** *To* ***Sue*** *The Conservative Opposition... Andrew Scheer Says "Bring It On" & Lets Have Full Disclosure In The Courts...#SNCLavalin #SNCLavalin****Scandal*** *#cdnpoli (Posted by human user: 04/08/2019 14:12:14)*
>
> *Is Canada's PM @JustinTrudeau's political future in jeopardy? @AJStream explores how the #SNCLavalin* ***scandal*** *could possibly* ***threaten*** *his bid for re-election. Join the conversation live on YouTube (Posted by human user: 04/09/2019 21:47:44)*

3.2.1.5. Semantic Contagion

Semantic contagion is another important concept that I use to describe the ways in which the meaning of one word combined with other words becomes semantically constituted according to the meaning of the composite whole appearing in a given context. James Ross (2009) refers to *semantic contagion* as the lexical organization of words into a common associative context or *semantic field* in such a way that the contextual amalgamation of words conventionalizes their union as customary and connate. For example, the 'right' and 'left' distinction between 'conservative' and 'liberal' parties was formulated in the context of the French Revolution in 1789 when pro-royalist politicians sat to the right of the presiding officer and anti-royalists to the left during the French National Assembly. The terms 'left-wing' and 'right-wing' politics can be distinguished as *semantic contagions* because their *pragmatic traction* – the contextual fastening together of words – within their cultural and social significance has been reinforced by their protracted use in political discourse over the course of two centuries.

The term *semantic contagion* is also used in *critical discourse analysis* to examine the formation of political ideologies through language use. As summarized in Chapter 1, Jonathan Charteris-Black's (2006) use of *semantic contagion* refers to the *prototype effects* that semantically consolidated words create when strung closely together, which cultivates relationships of equivalency between the concepts represented among the words being consolidated. For example, the consolidation of the words 'Justin Trudeau's SNC Lavalin scandal' in the following tweet:

> *Please RT! The RCMP must investigate* ***Justin Trudeau's #SNCLavalin scandal*** *now. If you agree, please SHARE and SIGN our petition ABpoli (Retweeted by human user*

03/14/2019 00:04; Retweeted by human users 110 times: 03/14/2019; Retweeted by bots 31 times)

conceptually constitutes the meaning of the ideas represented by the words assembled into a single tweet, leading to the construal of Prime Minister Justin Trudeau and the SNC Lavalin scandal as belonging to the same superordinate conceptual category constituted by themes of 'corruption' and 'scandal.' Protracted and repeated collocation of these words in the same political communication, within the same political conditions, and within the same mediated context transforms their consolidation into a *semantic contagion* of ideological import. Because *semantic contagions* are fundamentally defined by categories of prototypicality in both Ross' and Charteris-Black's use of the term, they conceptually *frame* common political worldviews. The significance of *contagion effects* cannot be understood outside of the cognitive linguistic theoretical discourse from which it originated.

To facilitate our understanding of how semiosis that unfolds among human minds, digital algorithms, and political intermediaries on social media platforms like Twitter contribute to the creation and spread of ideologically salient, and morally provoking *semantic contagions* across the #SNCLavalin Twitter discourse, we must first understand the machinic schematics of deep learning neural network algorithms across the next section.

3.2.2. Digital Algorithms

While early designs of Twitter-bots were motivated by an ambition to automate how and when content was posted, contemporary Twitter-bots can execute a sweeping arsenal of complex interactions. Animated by well-defined, deep (machine) learning algorithms, and informed by artificial neural networks (Smith 2002), Twitter-bots are programmed to interact with users in a variety of ways, simulating conversation, commenting on posts, and responding to queries (Hwang et al. 2012). Earlier models of artificial intelligence (AI) relied on rules-based logic and statistical techniques to calculate probability and were designed according to fledgling neural network models that attempted to simulate the way neurons work within human brains. However, this approach fell out of favour in 1969 when Marvin Minsky and Seymour Papert presented a detailed account of the limitations of the neural network model within the scope of technological capabilities at the time. For this reason, AI was abandoned in favour of the expert systems approach throughout the 1980s and early 1990s, which necessitated the manual programming of specific knowledge and sets of rules into software. Expert systems involved the integration of networks, the creation of unwieldly databases, and the development of information retrieval processes that could only perform narrow, specialized tasks (Hosanagar 2019: 90).

During the Big Data revolution of the early 2000s, the Internet began to supply large dynamic datasets required to increase the acuity of machine learning. In addition to the expanded availability of

large amounts of data, the development of progressively more efficient computer processors supplied the power and speed needed to computationally manage large datasets. The capacity of contemporary neural network machine learning algorithms extends well beyond the limitations of the expert systems approach (Hosanagar 2019).

The efficacy of machine learning has improved significantly over the last few decades. Fueled by deep learning artificial neural networks (Smith 2002), digital algorithms currently regulate the flow of content on our Twitter feeds and adapt to new situations and fluctuating data in real time. When a digital algorithm is first programmed, its artificial neural network (e.g., its 'machine learning') is first 'trained' on curated datasets to develop a multitude of operations for pattern detection and statistical computations. These patterns and computations are then committed to a virtual 'memory' within several 'hidden layers,' which consist of nodes that are computationally modelled to mimic biological neurons. These hidden layers and their nodes are nested between a visible input layer containing input data and an output layer, which produces computational predictions based on the activity of artificial neural networks nested within the hidden layers (see figure 3.2 below). Nodes belonging to the input layer are static and passive, and do not modify data, whereas the hidden and output layers are active and modify data according to detected patterns, which inform the output layer's predictions. The flow of information from the input layer to the output layer is not unidirectional in the case of all algorithms – some algorithms are designed to learn omnidirectionally so as to improve the algorithm's ability to refine its predictions, and in some cases, the input layer contains the output data of another algorithm (Smith 2002).

With machine learning algorithms, programmers are not required to manually code rules that specify which patterns to detect. Rather, algorithms generate their own rules for data processing as they detect patterns within the data and develop a 'virtual memory.' According to the results of an algorithm's 'deep learning,' output layers produce predictions about detected patterns within data based on neural networks that evolve within an algorithm's hidden layers (Hosanagar 2019: 93). The value of deep learning algorithms is not simply that they can accommodate large amounts of data, but that they become increasingly adept at detecting subtle patterns and making mathematically accurate predictions as the volume of the data increases (Hosanagar 2019: 95).

Evidence that neural network machine learning algorithms that animate bots have infiltrated social media platforms like Twitter using neural network models is mounting (Tappin et al. 2023; Varol et al. 2017; Woolley and Howard 2017; Ferrara et al. 2016; Aiello et al. 2012). While some Twitter-bots are scripted to expand their influence by soliciting additional followers, connecting with influential twitter users, and generating activity within trending Twitter discourse, others are animated by natural language processing algorithms to circulate and amplify targeted content using common key words and supplementary information from other online sources (Ferreira et al. 2016).

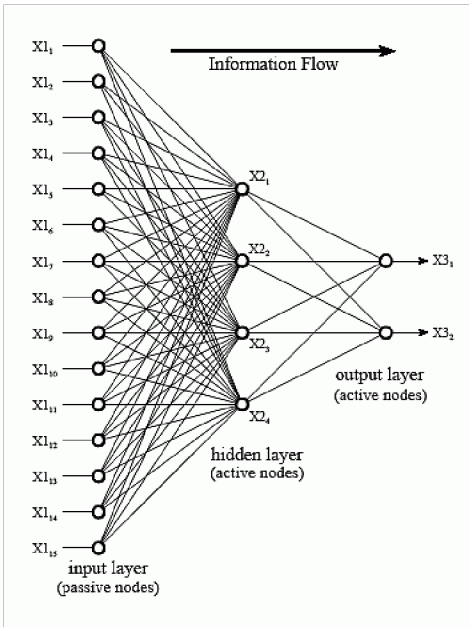


Figure 3.2 Diagram of Digital Neural Networks[3]

In outsourcing supplementary material from the Internet, and with the support of artificial neural networks, AI encodes virtual representations of the world into a meditated 'meaning space, automating the creation of linguistic content using natural language algorithms (Mugan 2018). In this way, artificial neural networks confer Twitter-bots with the capacity to interact directly with human users. In short, Twitter-bots detect patterns within human-generated linguistic constructions embedded within tweets and map those patterns within a virtual meaning space in order to assemble a viable linguistic response in the form of a unique tweet or an appropriate retweet that is relevant to a given discourse network on Twitter (Mugan 2018).

3.2.3. Political Electioneering

Fundamentally, political parties in Canada as elsewhere operate according to the objective of winning public support between elections, which has become popularly referred to as the *permanent campaign*. Across the history of Canadian politics, presiding political parties routinely develop policies and change election rules to bolster their chances at re-election, they seek the support of financing partners, and they leverage digital communication technologies to gain a competitive advantage (Marland and Delacourt 2020). Conditions created by the *permanent campaign* incite political tensions and competitiveness in the

[3] Smith, Steven D. (2002). Digital Signal Processing: A Practical Guide for Engineers and Scientists. Burlington (MA): Elsevier Science.

everyday operations of political governance at the executive and legislative branches of government, which leads to campaign-style interactions between party lines. This combative mentality motivates the ethos of polarization and divisiveness that leads to allegation politics and contention (Marland and Delacourt 2020) that the Canadian public is regularly exposed to on social media in the digital age.

Digital transformations to advertising and consumer culture on the Internet have influenced the marketing techniques adopted by political parties. Data-driven campaigning is a political logic that informs the political decisions made by political parties (Munroe 2016), leading to increasingly more computational modes of managing political work (McKelvey and Piebiak 2019). Though data-driven campaigning has been used since the advent of computers, the kind of voter profiling and microtargeting that our interactive data on social media make possible has enabled political parties to focus their communications in increasingly intimate and targeted ways (See Tappin et al. 2023). Unlike private corporations, political parties have access to the private data of potential voters across Canada, and access to that data is extended to data analytics firms who enter into strict contractual agreement, terms, and conditions for data access, use, and disclosure. These data analytics firms supply political parties with detailed profile information about patterns in people's online data, shifts in their opinions, and the names of swing voters who may yet be persuaded and brought into the party's fold.

Use of data driven campaigning is ubiquitous and it is "now widely supposed in many democracies that the modern political campaign needs to be 'data driven' to consolidate existing support and to find potential new voters and doners" (Bennett 2019: 277). In Canada, it is known that the Liberal Party of Canada (LPC) commissions the services of a data analytics firm called Data Science Inc. (Kingston 2017) and the Conservative Party of Canada has used the data analytics firms Torch Agencies and the Responsive Marketing Group (Curry 2012). Thus, it has now become common knowledge that "the capture of these data can permit the construction of profiles on individual voters and the 'microtargeting' of increasingly precise messages to increasingly refined segments of the electorate" (Bennett 2019: 277).

Moreover, in the context of the digital age, political brokers recognize that "targeted social media advertising based on psychometric user profiling has emerged as an effective way of reaching individuals who are predisposed to accept and be persuaded by the advertising message" (Bay 2018: 1722). And yet, the question as to whether the use of psychometrics on social media is ethical or not has not been the subject of much academic exploration.

3.3. Interpretation of Hjelmslev's Glossematics

As outlined in Section 1.6.2. in Chapter 1 and touched upon in Section 2.2.3. in Chapter 2, this dissertation's conception of the flow of semiosis through the *convergence* of human thought, algorithmic

computation, and political electioneering on Twitter is informed by Hjelmslev's *Glossematics*, which is a semiotic model often classified as belonging to the tradition of structural linguistics (though Hjelmslev himself may not have classified his work in this way). *Glossematics* is not a science of language, but rather, according to Hjelmslev, a 'science of signs' and 'semiotic structure' (Trabant 1987: 90). Thus, the object of interest for *Glossematics* is not only the 'linguistics' of language nor is it only what Saussure identified as *parole* (speech acts of utterances in communication). Rather, Hjemslev was most concerned with analyzing *langue* or the schematic rule-like systems and conventions that humans create and employ when threading concepts together using linguistic representations and expressions, stressing that "if the *parole* is the manifestation of *langue*, then a *langue*, in turn, is the manifestation of the typological class to which it belongs" (Hjelmslev 1944: 31).

What for Saussure is "a more general faculty, the faculty which governs signs and which would be the linguistic faculty par excellence" was for Hjelmslev a semiotic faculty, which was never explicit in his description of *Glossematics*, but as Trabant notes, "he appears to be implying that glossematics can, at the same time, be both a general theory of signs and a theory of language" (Trabant 1987: 92). Thus, for Hjelmslev, *langue* is sign-governing faculty, which is defined by a general semiotic structure.

Hjelmslev's conception of *Glossematics* was influenced in part by Ferdinand de Saussure's formulation of the 'the sign' as a "double entity, one formed by the associating of two terms" and that these two sides of the double entity – the *signifier* and the *signified* – make up the "linguistic sign and are psychological and are united in the brain by an associative bond" (de Saussure 1998 [1916]: 832-835). The *signifier* (*signans*) is a representation of vocalized or graphic content (e.g., written word, speech sound uttered vocally, icons, drawings) and the *signified* (*signatum*) is the idea that composites of ideas are associated with the representation (Stawarska 2020: 10). According to Saussure, association between the *signifier* and *signified* is 'arbitrarily' determined by conventions in their expression, and "every means of expression used in society is based, in principle, on collective behavior, or – what amounts to the same thing – on convention." Thus, for Saussure, the amorphous range of speech emanating from thought shapes language, and recursively, the linguistic shape of thought lends structure to the amorphous breadth of thought.

Saussure focused on the role that systems and structures (of language and thought) serve in linguistic expression and communication (Siertsema 1955), and while Hjelmslev's (1963) *Glossematics* draws from Saussure's belief that thought systems are essential to language, he altered Saussure's semiology between the *signifier* and the *signified* into what he called the planes of *content* and *expression*. For Hjelmslev, the association between *content* and *expression* is one of equivalency, in that there is no *content* without *expression*, and vice versa. This is a delicately nuanced distinction between Saussurean

and Hjelmslevian framing of the sign, but it is a distinction that bears significant implications for conceptually framing the sign.

3.3.1. Glossematics and Schemas

Building upon Saussure's conception of *form* and *substance*, for example, Hjelmslev substitutes *purport* with unformed *matter* to represent unformed thought or sub-representative dimension of potential signification beneath its articulation through language (Eby 2020: 119). Moreover, rather than defining association between the *signifier* and the *signified* in terms of correspondence, Hjelmslev interprets the association between the two as a transformative force or process that unfolds spontaneously across *content* and *expression* as *planes of stratification* (Eby 2020: 119). For example, to use the analogy of building a sandcastle, one takes sand (matter) and presses it into the shape of a bucket (form) to create a sandcastle (substance). Based on this analogy, then, unformed matter (unformed thought) is pressed into the confluence of *mental schemas* (form) on the plane of *content* to articulate an idea or thought (substance). On the plane of *expression*, words (matter) are assembled according to the schematic conventions of grammar (form), which thread words into coherent sentences (substance).

However, for Hjelmslev, the processes – the filling of the bucket (form) with sand (matter) and the flipping and lifting of the bucket to make the sandcastle (substance), and potentially even the destruction of the castle – are equal in importance to the elements themselves (see Figure 3.3).

	Expression	Content	
Matter	Words	Unformed Thoughts	Assembly of concepts
Form	Grammar	Schemas	Coherence of ideas
Substance	Sentences	Thoughts	

Figure 3.3 Interpretation of Hjelmslev's Model of General Semiotic Structure – Glossematics

Content substance is often mistaken to represent 'meaning' in Saussurean parlance, but for Hjelmslev, *content substance* is a 'referent,' more closely related to Peirce's conception of *referent* or the pointing to something else related to the sign-vehicle. Language, he asserts, is used to speak about things (referents) that are not necessarily part of language, but rather, are part of thought (Hejelmslev 1971: 44-76). This observation is congruent with cognitive linguistic approaches to language as "an instrument for organizing, processing, and conveying information" to analyze "the conceptual and experiential basis of linguistic categories" as coterminous with related cognitive processes involved in the "general conceptual organization, categorization principles, processing mechanisms, and experiential and environmental influences" (Geeraerts and Cuyckens 2007: 3).

3.3.2. Hjelmslev's Glossematics and Cognitive Linguistics

Hjelmslev's glossematics is a consonant semiotic model for cognitive linguistic analysis of the semantic relationships between signs, linguistic or otherwise, since it is predominantly concerned with the processes that transpire as individual words and thoughts are assembled according to grammatical *schemas*, but also, according to mental *schemas* that form according to those cognitive faculties responsible for conceptual organization, categorization, and classification of concepts as we engage with the outside world. Take, for example, the words 'corruption' and 'scandal' in the following tweet:

> *Nobody is investigating the SNC Lavalin corruption obstruction matter, not the justice committee, not the RCMP and now not the ethics watchdog probing SNC Lavalin scandal"*
> *(Posted by human user: 03/14/2019 04:40; Retweeted by human users 3 times: 03/14/2019)*

posted in the context of the highly politicized #SNCLavalin Twitter discourse in 2019. According to Hjelmslev's semiotic model, we first examine the words 'corruption' and 'scandal' assembled in the context of other words serving various grammatical functions in the construction of a sentence on the plane of *expression*. Then, we examine unformed thoughts associated with those words assembled into a sentence, which are conceptually organized, classified, and arranged by the distributed cognitive faculties of human minds – according to the *mental schemas* guiding interpretations and resulting in coherent thoughts. These thoughts are conceptually entrenched alongside associated thoughts in long-term memory, which is why Hjelmslev makes the distinction between *meaning* and his conception of *content substance* given that ideas and thoughts are circuitous and, thus, continuously reaching out for other associations to draw from in the process of constituting meaning (see Figure 3.4).

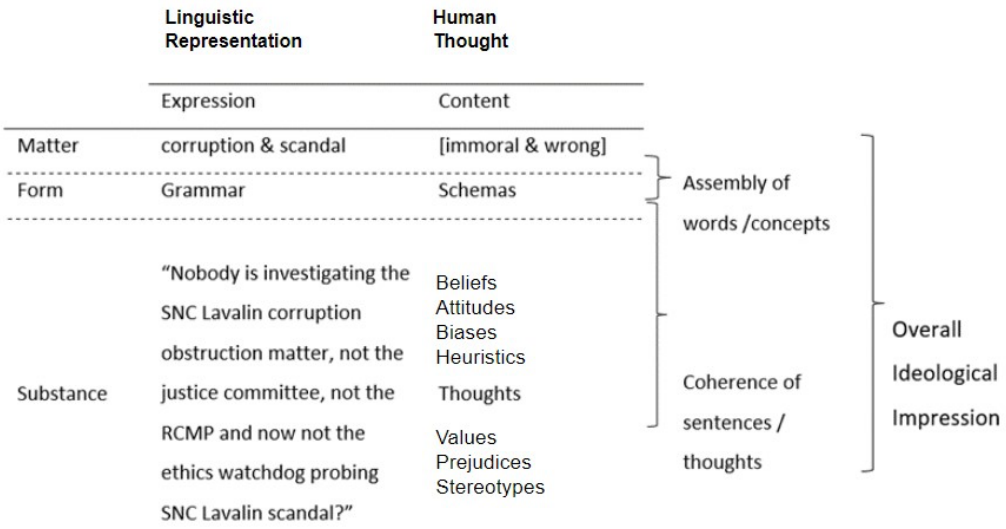


Figure 3.4 Adaptation of Glossematics for analysis of ideological conceptualization in tweets

In Figure 3.4 above, we can see that words and phrases making up the tweet also cited above, such as *investigation*, *SNC Lavalin*, *corruption*, *obstruction*, *justice committee*, *RCMP*, *ethics watchdog*, and *probing scandal* represent the component pieces of *matter* that are assembled into a composite whole or *substance* according to the conventions of grammar or *form* on the plane of *expression* – the representational dimension of semiosis. The concepts or *meanings* associated with the component words and phrases are subject to *pragmatic traction* within the context of the tweet manifested on the Twitter platform, which means that the context facilitates the determination of each word and phrase's meaning in relation to one another within the composite whole. Thus, each individual abstract conceptualization of each word's meaning represents *matter* on the plane of *content*, which is cognitively assembled within the mind according to *heuristic* modes of reasoning and the *mental schemas* (*content form*), or the internal rules or scripts that we mentally form for ourselves to guide how we interpret the world around us. On the plane of *content*, the mental composition of meaning according to the ways that concepts (*matter*) are assembled according to *mental schemas* (*form*) results in the thoughts, beliefs, values, ideas, notions, prejudices, stereotypes, attitudes, etc. (*substance*) that we derive from reading a tweet.

3.3.3. Glossematics and Semantic Contagions

We can also adapt Hjelmslev's *Glossematics* to articulate the flow of semiosis within the convergence of human thought, algorithmic computations, and political electioneering on Twitter:

	Representation		Human Thought	
	Expression (AI)	**Expression (Politics)**	**Content (Thought)**	
Matter	Data	Words	Concepts	**Assembly of words and concepts into composites**
Form	Code Deep Learning Virtual Neural Networks Statistical Deduction Psychological Profiling Micro-targeting	Grammar Campaign Conventions Power Relations Ideologies Legislation	Mental Schemas Heuristic Thinking Semantic Memory Distributed Cognition Memories Primes	**Convergence of algorithmic mediation, political communication, & human thought**
Substance	Curated Content	Political Communication & Expression	Thoughts, Ideas, Beliefs, Values, Biases, Prejudices, Stereotypes, Attitudes	

Figure 3.5 Adaptation of Hjelmslev's Glossematics to illustrate the flow of semiosis within the convergence of human thought, algorithmic computation, and political electioneering on Twitter

In Figure 3.5 above, I include two levels of representational expression to account for the contributions of digital algorithms and political electioneering to the formation of *botaganda* on Twitter. On the plane of *expression*, the AI of digital algorithms uses the data inputted by humans to create related data (*matter*) that is assembled according to code, deep learning principles, virtual neural networks (see Figure 3.5), statistical deduction, psychological profiling and microtargeting activities (*form*) to curate content on social media (*substance*). Also, on the plane of *expression*, the keywords making up political communication (*matter*) are assembled according to grammatical conventions, but also campaigning conventions and strategies, power relations, ideologies, and legislation (*form*) to construct strategically conceptualized political communication (*substance*).

Finally, on the plane of *content*, concepts and meanings (*matter*) constituted by human minds as they engage with algorithmically curated political content (*expression substance*) and form ideas, beliefs, values, attitudes, stereotypes, prejudices, and biases according to the script-like internal processes of *mental schemas* that unfold across the distributed cognition of human thought. In the process, protracted relationships of equivalency are drawn between frequently recurring words in the same linguistic contexts on the plane of *expression*, thus producing conceptual relationships of equivalency between the ideas represented by those words on the plane of *content*, thus cultivating *semantic contagions* that behave as *prime lures* activating prescribed interpretations within the minds of human readers.

In section 3.4 below, I offer further elaboration of how *prototypes* and stereotypes culminate into *idealized cognitive models* within human thought as human minds engage with the meaning of political communication composed by political intermediaries who use digital algorithms for political electioneering purposes on Twitter.

3.4. Cognitive Linguistics & Critical Discourse Analysis

Cognitive linguistics, like critical discourse analysis, is not a single discipline, but rather it is a consortium of guiding principles, assumptions, and perspectives on the nature of language use and cognition in the social, cultural, and physical states and conditions of our environments (Evans and Greene 2006). Unlike generative grammar (Chomsky 1978), which assumes that humans are cognitively predisposed for language acquisition, cognitive linguistics assumes more functionalist and usage-based construction grammar perspectives that account for the domain-general processes of language as a human behaviour. Domain-general processes are "those that can be shown to operate in areas of human cognition other than language" that "operate in multiple instances of language use" (Bybee 2010: 1). Accordingly, rather than

being seated in a designated cognitive system in the human brain, language is understood as being distributive and "one of the most systematic and complex forms of human behaviour" (Bybee 2010: 6).

3.4.1. The Cognitive Linguistics of Gestalts, Prototypes, and Stereotypes

Semantics and *gestalts* are two dynamics that cognitive linguists are particularly interested in studying because both relate to the distributed cognitive processes involved in categorization. Categorization is important to the study of language use because "it underlies the use of words and the use of language in general" (Ungerer and Schmidt 2013: 40). Charles Fillmore (1975) and George Lakoff (1987) were early proponents of cognitive linguistics to recognize the significance of categorization in human psychology and its relationship with language, cognition, and socio-physical experience (Evans and Zinken 2007: 2). Lakoff (1987) extended our understanding of categorization with his work on *cognitive semantics* and his conception of *idealized cognitive models*, which he defines as "relatively stable background knowledge structures with respect to which lexical concepts are relativized" (Evans and Zinken 2007: 12) and "represent 'theories' about the world" that "guide cognitive processes like categorization and reasoning" (13).

For example, returning to the notion of 'left' and 'right' wing politics as categories of prototypicality related to institutions of governance, elections, and democracy, their idealized prototypicality can also point to other metonymically related ideas belonging to the same conceptual category within the mental spaces of human minds – what Lakoff terms *metonymic idealized cognitive models* (Lakoff 1987). For instance, stereotypes are examples of *metonymic idealized cognitive models*. Thus, the combination of the words 'left-wing socialist' can give rise to the effects of *prototypicality*, which then mentally activates associated expectations around the categorical constitution of the word 'socialism.' Depending on the political position that an individual ascribes to, *metonymic idealized models* that function as *stereotypes* will draw other associated classifications into the categorical constitution of 'left' and 'right' wing political representations, which are not directly referenced in the following tweet, but are activated (*primed*) in the mind, nonetheless:

> *The corrupt biased* ***socialist globalist liberal*** *owned & run mainstream media, mouthpiece for the liberal party, are doing their best to sweep the* ***#SNCLavalin scandal*** *away & it's not working Canadians are now awake the globalist puppet is history on October 19th #JustinTrudeau (Posted by bots: 04/08/2019 15:59:54 and 16:04)*

Cognitive lexical semantics is a branch of cognitive linguistics that emerged from Lakoff's work on *idealized cognitive models*, which he applied based on the premise that *lexical items* are

conceptual categories since "a word represents a category of distinct yet related meanings that exhibit typicality effects" (Evans and Zinken 2007: 15). Lakoff calls words that represent complex categories *radial categories*, because they are structured in the mind according to conventions of interpretation that a *prototypical conceptual category* elicits.

Consider the tweet cited above once again. Deliberate use of the lexical items 'socialist' and 'globalist' draw related concepts into *metonymic idealized cognitive models* since both words represent concepts that have conventionally become associated with 'left-wing' politics. Thus, inclusion of the words 'socialist' and 'globalist' in the tweet cited above represents ideas and interpretations about the world in relatively stable ways within the ambit of existing 'background knowledge' (Evans and Zinken 2007: 12). Moreover, the binary dichotomization of 'left' and 'right' wing politics within prototypical lexical representations entrenched in 'background knowledge' guides how we mentally categorize the two lexical items. The use and combination of the words assembled in this tweet, thus, tells us a lot about the person who first wrote the tweet's intentions and political leanings, as well as the political leanings of the proponent who mobilized the astroturfing Twitter bot that retweeted the tweet.

For instance, the lexical item 'socialism' is conventionally used by proponents of more conservative 'right-wing' politics as a *prototypical* slur meant to discredit the democratic character of more liberal 'left-wing' politics and politicians. At the same time, the word 'socialism' or 'socialist' also activate other associated metonymic categories like 'communism,' 'autocracies,' 'Bolshevism,' and 'Stalinism.' Moreover, the word 'globalism' has recently become an attributive lexical item used to reference 'right-wing' conceptual categories that discredit liberal agendas by promoting perceptions that 'left-wing' elites harbour anti-national and pro-globalist political and economic values, which threatens the livelihood and security of ordinary people. Consider former U.S. president, Donald Trump's battle cry "we will no longer surrender this country, or its people, to the false song of globalism" while delivering a speech on foreign policy in April of 2016.

The *cognitive lexical semantics* of the words 'socialist globalist liberal' drawn together alongside other words and word phrases like 'SNC Lavalin scandal' and 'the globalist puppet is history,' and 'Justin Trudeau' in the tweet cited above provides an example of *prototypicality* effects in political discourse that create *metonymic idealized cognitive models* and, thus, fundamentally shape political stereotypes. Take the following tweet, as another example from the #SNCLavalin Twitter discourse of 2019:

> *Despicable, shameful, anti-democratic behaviour by #**Trudeau-whipped** Liberal **MPs** at **Justice** committee! They don't want to #LetHerSpeak, and they use their majority to force #**PMOCoverUp** on #SNCLavalin [scandal] to continue. (Posted by Senator Denise Batters: 03/13/2019 13:31; Retweeted by human users 33 times: 03/14/2019; Retweeted by bots 8 times)*

Though the word 'scandal' is not included in this example, it is implied by the words making up the hashtag '#SNCLavalin,' which activates cognitive semantic reference to the word 'scandal' since the lexical amalgamation of the phrase 'SNC Lavalin Scandal' is poignantly repeated across the #SNCLavalin Twitter discourse, and thus comes to represent "a category of distinct yet related meanings that exhibit typicality effects" (Evans and Zinken 2007: 15).

3.4.2. Categories and Fuzzy / Discrete Boundaries

It is also worth noting that the formation of stereotypes through the creation of *metonymic idealized cognitive models* is possible because the abstract boundaries between conceptual categories are said to be 'fuzzy' and discrete – 'fuzzy' and discrete in the sense that boundaries between categories are not uniform and concrete, but rather are established by cognitive classifications whose conceptual boundaries are unclear and left to the mind to resolve (Ungerer and Schmidt 2013).

The conception of *fuzzy and discrete boundaries* is also relevant to the cognitive dynamics of *gestalts* produced across distributed cognitive processes involved in mental categorizations since it is the very *fuzziness* of boundaries that compels the mind to mentally 'fill in the blanks' while perceiving a single word as belonging to a composite categorical whole. The significance of *gestalt* psychology to the mental function of categorization in human cognition was recognized by Leonard Talmy (2000) and Ronald Langacker (1987), who established that categorization, in some instances, involves the construction of 'wholes' – *gestalts* – out of incomplete perceptual inputs. What we perceive as *gestalts*, however, is part representational construction that we perceive in our environments and part cognitive construction in the mind since mental representations are constrained by the mental faculties responsible for processing what we perceive (Evans and Greene 2006: 67-68).

3.4.3. Linguistic Gestalt

From the departure of semantics, a *linguistic gestalt* is "a net of semantically determinative relations between concepts, a conceptual network" which is defined as an "expression network, so that all sentences in the expression network are interpreted statements or meaning postulates between concepts" (Baecker 1994: 1574). In this sense, *gestalts* can contribute to the formation of *prototypical stereotypes* when the boundaries between conceptual categories are especially *fuzzy* or discrete. This *fuzziness* between the boundaries of categories, thus, activates judgements that make use of *prototypically* or *stereotypically* stabilized knowledge *metonymically* organized into *idealized cognitive models* within the mind. Forming a category by way of *gestalt* can help the mind resolve the *fuzziness* or discretion between lexical items and categories represented in language.

As mentioned earlier in Section 3.2.1.3. of this chapter, in social psychology, resolving the *fuzziness* between conceptual boundaries is referred to as *heuristic reasoning*, which is essentially a mental shortcut that we use unconsciously to form judgements based on limited or missing information while perceiving elements in the world. It is a form of 'fill-in-the-gap' *gestalt*-like thinking. Taking the above-cited tweet again as an example:

> *The **corrupt biased socialist globalist liberal owned & run mainstream media**, mouthpiece for the liberal party, are doing their best to sweep the #SNCLavalin scandal away & it's not working Canadians are now awake the globalist puppet is history on October 19th #JustinTrudeau (Posted by bots: 04/08/2019 15:59:54 and 16:04)*

we can see that the Twitter user responsible for composing this tweet does not explicitly claim that "Prime Minister Justin Trudeau and the Liberal Party are corrupt, biased, socialist, globalist crooks responsible for the SNC Lavalin scandal." Rather, the words making up the tweet are strung together in such a way that compels the mind to mentally draw the concepts associated with the words represented in the tweet into a relationship of equivalency, thus activating known *prototypical categories* whose boundaries are *fuzzy* and discrete enough to compel the mind to *heuristically* 'fill-in-the-blanks.' In this way, this tweet serves as a *linguistic gestalt* because its lexical items are stitched together into net of semantically interrelated concepts that are assembled into an *expression network* whose overall meaning is left discrete enough to require being assembled *heuristically*.

Fillmore's *frame semantics* is part of empirical semantic traditions that examines the protraction of language and experience from the premise that a word's meaning cannot be understood removed from the context of other words that belong to the same coherent *frame*. In *frame semantics*, a *frame* is an aggregation of concepts that are brought into association in the mind through conventionalized, repeated use. When a *semantic frame* is successfully entrenched in the mind, reference to one concept in the assemblage invariably activates reference to the entirety of the *semantic frame*. In this sense, a single word can come to represent an entire aggregate of associated concepts.

Part of the research enterprise pursued by *frame semantics* involves uncovering the underlying motivations held by a *speech community* (e.g., right-wing or left-wing political sympathizers on Twitter) for creating and framing a category of concepts and representing it by use of a particular word (Petruck 1996). This approach to understanding the meaning of language in use implies that there is no separation between knowledge about the world and knowledge about linguistic meanings (Geeraerts 2006). Thus,

frames also work referentially by aggregating conceptual categories as well as words, and are thus similarly constructed through our experiences in, and interactions with the outside world.

From the perspective of *semantic frames*, given that the semantic role of language is situation specific, and because s*emantic frames* are a means of consolidating information into coherent categories within cognition, the study of political *speech communities* on Twitter is a good strategy for revealing the underlying motivations and ideological agendas of Twitter users who posted and retweeted content within the #SNCLavalin Twitter discourse in 2019.

In the following sample of tweets posted across the #SNCLavalin Twitter discourse by regular Twitter bots, astroturfing bots, and human users between March 14 and April 9, 2019, we can observe several instances of lexical items becoming aggregated into conceptual categorical wholes across the language used within the tweets. They become *radial* categories as they are frequently repeated and reused within the same political and mediational context, thus normalizing the *prototypicality* of the conceptual categories in the mind according to conventions in interpretation cognitively habituated over time:

> *@denisebatters: Canadians Deserve Answers on #SNCLavalin* ***#PMOCoverUp!*** *My #SenCA speech about* ***#LavScam*** *and the Senate Legal committee's unique interest in getting to the bottom of this* ***#Trudeau Govt scandal****. When did PMO pressure start on Jody WilsonRaybould? (Posted by Senator Denise Batters: 03/10/2019 11:03; Retweeted by human user: 04/08/2019 16:12)*
>
> *Despicable, shameful, anti-democratic behaviour by #Trudeau-whipped Liberal MPs at Justice committee! They don't want to* ***#LetHerSpeak****, and they use their majority to force* ***#PMOCoverUp*** *on #SNCLavalin to continue. (Posted by Senator Denise Batters: 03/13/2019 13:31; Retweeted by human users 33 times: 03/14/2019; Retweeted by bots 8 times)*
>
> *Andrew Coyne on* ***#SNCLavalin #PMOCoverUp****: "The irony is suffocating.* ***Concentration of power*** *is very much* ***at the root of this scandal****....And yet the same concentration of power makes it all but impossible to get to the bottom of it. Watch @lraitt SPELL IT OUT to #CTV about why #SCC leak by? (Posted by Senator Denise Batters: 03/14/2019 16:59; Retweeted by human users 16 times: 03/14/2019; Retweeted by bots 5 times)*
>
> *@JustinTrudeau MUST be investigated! Yet* ***another whisper campaign*** *to discredit @Puglaas so we will forget #Trudeau @liberal_party* ***#SNCLavalinScandal*** *-IT WONT WORK.* ***#LetHerSpeak #coverup*** *#SNCLavalin (Posted by human user: 03/28/2019 00:53; retweeted by human user: 03/28/2019 04:53)*
>
> *RT @denisebatters: The Senate CAN deal with* ***#LavScam! Trudeau****'s "Independent" senators just need to be ACTUALLY independent, and support our #CPC #SenCA motion to get the real answers on #SNCLavalin Canadians are demanding. (Posted by*

Senator Denise Batters: 04/07/2019 17:03; Retweeted by human users 4 times: 04/08/2019)

Making use of Hjelmslev's *Glossematics* model once again helps illustrate how the same aggregation of collocated words into coherent *frames* is repeated across the same corpora of tweets, which gradually stabilizes conceptual associations into the mental structures of 'background knowledge' about the political world into *idealized cognitive models* (see Figure 3.6 below).

Departing from Hjelmslev's plane of *expression matter*, we can parse out the words and phrases that have been grammatically strung together on the plane of *expression / form* into coherent sentences on the plane of *expression* / *substance*. Conventions established according to the schematic patterns of existing systems and structures (e.g., grammar, social customs, political constraints, online norms and practices, mental schemas, linguistic schemas, etc.) on the planes of *expression / form* and *content / form* unite the political words from the Twitter discourse with concepts on the plane of *content / matter,* thus *semantically framing* concepts that are assembled and stabilized into *idealized cognitive models* within the mental structures of cognition.

	Expression	Content		
Matter	PMO, Coverup, Justin Trudeau, liberal, party, whisper, campaign, Trudeau, Scandal, LavScam, let, her, speak, etc.	Unformed concepts related to politics, crime, law and order, criminal activities, the legal system, ethics, morality etc.	Semantic Framing of words and concept	Semantic Contagion
Form	Grammar, Digital Customs, Conventions, & practices	Schemas, Language Use, Confluence of schemas - Cognitive Dialectic, Repetition & Persistence	Stabilization of semantic frames into idealized cognitive models within mental structures	
Substance	Sentences (tweets)	Public Opinion of PM Trudeau and Liberal Party of Canada		

Figure 3.6 Adaptation of Hjelmslev's Glossematics to Lakoff's conception of Idealized Cognitive Models

According to Hjelmslev's emphasis on the importance of paying attention to the animating processes between nodes (*matter*, *form*, and *substance*) and across the planes of *content* and *expression*, the flow of semiosis put in motion by human minds, digital algorithms, and political intermediaries on Twitter is equal in importance to the signifying components (matter) being assembled into a composite

whole since it animates the contexts, conditions, and circumstances within which words, sentences, concepts, and ideologies are formed.

3.5. Summary and Concluding Remarks

In this chapter, I have supplied an overview of the theoretical framework used to inform the methods applied in examining the flow of semiosis within the convergence of human thought, algorithmic computation, and political electioneering on Twitter. I first broke down the nature of human thought and behaviour as they relate to the phenomena of *interactive alignment*, *priming effects*, *heuristics*, *word frequency effects* and *sematic contagions* based on what is known about human thought according to social psychology. I then expanded on the technological dynamics of digital algorithms and the intricacies of political electioneering in the digital age before turning attention to my interpretations and use of Hjelmslev's semiotic model, *Glossematics*, which helped illustrate the cognitive impact of political communications composed by political intermediaries through the use of digital algorithms for electioneering purposes on Twitter. Finally, I delineated important insights and principles from cognitive linguistics and CDA that help explain how ideologies, political beliefs, and bipartisan values are embedded in language and affect politics, human thought, public opinion, and ultimately, the public sphere in the process.

The next chapter will explore how this theoretical framework informed the methodological approach that I used to conduct the research for this dissertation as well as detailed descriptions of the empirical and qualitative research instruments used to examine the impact of *botaganda* on political thought within the dynamics of Twitter discourse, which fundamentally shaped public opinion and the public sphere around the SNC Lavalin scandal.

Chapter 4: Methods –
Semantic Contagion Effects in Political Twitter Discourse

4.1. Introduction

The purpose of this chapter is to outline the empirical approach used to test for independence between tweets posted humans and those posted by bots across to the #SNCLavalin Twitter discourse of 2019, as well as the qualitative approaches used to evaluate what a lack of empirical independence may signify using insights from cognitive linguistics and CDA. These qualitative perspectives guided the identification of instances where words and phrases were frequently and consistently assembled into composite wholes across the #SNCLavalin Twitter discourse in 2019. Cognitive linguistic theory informed the study of how interactions between language and cognition are represented in word and phrase composites, and how these composites likely functioned as *semantic contagions* across the #SNCLavalin Twitter discourse of 2019. CDA supplied several concepts and principles related to the ways in which patterns in language-use in discourse reflect patterns in thought, which helped delineate the ideological function of *semantic contagions* that set *interactive alignment* between human minds and tweets posted by bots in motion. Finally, this chapter outlines the mixed-methodological approach employed to establish whether *semantic contagions* do, in fact, induce human minds into a state of *interactive align*ment with content posted by bots, thus influencing the tenor of political discourse across the #SNCLavalin Twitter discourse.

4.1.1. Chapter Outline

I begin by articulating the research philosophy that framed my general approach to the study of political Twitter discourse. In subsection 4.1.3, I delineate this research approach and Section 4.2. summarizes my sampling strategy. Section 4.3 supplies a detailed description of my research design followed by a granular look at the qualitative research instruments borrowed from cognitive linguistics and CDA to substantiate what rejection of the null hypothesis likely signifies with respect to the relationship between tweets posted by bots and those posted by humans. The chapter closes with a summary of what this research accomplished in terms of confirming *interactive alignment* between tweets posted by humans and those posted by bots followed by a few concluding remarks about the following chapter.

4.1.2. Research Philosophy

Because this dissertation is informed by an interdisciplinary, mixed-methods approach to discourse analysis, it is difficult to isolate a single philosophical paradigm to guide its methodology. However, since a substantial portion of this dissertation's analysis is informed by cognitive linguistics, this research inherently adapts a certain degree of structural functionalist epistemologies. Moreover, because this

research ascribes to cognitive linguistic approaches to the analysis of language-use in social and mediated contexts, it inherently excludes perspectives from more generative grammar paradigms, which favours more 'universal' conceptions of grammar as innate to human cognition (a perspective that has been challenged and debunked in recent years – see Evans and Levinson 2009).

The mixed-methods approach that I employed to investigate political phenomena on Twitter fundamentally informs real-world problems encountered in daily life. Thus, my dissertation can also be said to assume a methodological perspective that is inherently pragmatic in scope, especially since I leverage the strength of both quantitative and qualitative data analysis to generate an understanding of the political problems generated through the flow of semiosis within the convergence of human thought, algorithmic computation, and political electioneering on Twitter.

Finally, provided that the crux of this dissertation's research aims to assess whether, to what extent, and in which ways the flow of semiosis through the convergence of human thinking, algorithmic computation, and political electioneering on Twitter affects and shapes political information, political communication, public opinion, and the public sphere in the digital age, it is centrally concerned with the ways in which human minds collaboratively construct our socio-political realities in tandem with the algorithmic code enlisted by political intermediaries for electioneering purposes. Thus, this research can also be said to assume social constructivist philosophical perspectives, as well.

4.1.3. Summary of Research Approach

This dissertation first applies Pearson's chi-square test for independence and then employs a qualitative research framework that synthesizes insights and principles from cognitive linguistics and CDA to make sense of quantitative research outcomes. For the empirical portion of the study, I collected tweets affixed to the #SNCLavalin Twitter discourse between March 14 and April 9, 2019, I segmented those tweets into corpora comprised of content posted by humans and content posted by bots. For the chi-square test, I operationalized WMatrix5's semtag markers (e.g., demarcated by codes that are mapped like this: G1-, E1.1+) as quantifiable nominal variables, which were used to cross-tabulate and test for independence (statistical) between the tweets posted by bots and those posted by humans (see Section 4.2., Subsection 4.2.5 for a full description of WMatrix5's semtag markers).

From the initial corpus of tweets, I first segmented the corpus into three temporal sub-corpora consisting of 2,000 tweets each posted on March 14, between March 28-29, and between April 89 of 2019 respectively. I used an API (a computational tool) called Botometer to identify Twitter accounts operated by bots, and I generated a separate corpus consisting of tweets statistically likely to have been posted by bots. Using special classifiers for Twitter bots produced by Botometer, I generated a separate corpus of tweets posted by 'astroturfing' (politically motivated) bots. In total, I used five sub-corpora (3 corpora of

tweets posted by humans and 2 corpora of tweets posted by astroturfing Twitter bots). Using the quantified compilation of WMatrix5 semtags for each corpus, I entered the data in SPSS for crosstabulation (see Table 4.3 in Subsection 4.3.1. below for an outline of this data). The purpose of this analysis was to determine whether the content of tweets posted by bots were independent from the content of tweets posted by humans in some way across the #SNCLavalin Twitter discourse, and to further examine instances where the null hypothesis was rejected (further elaboration of data collection and analysis is outlined in Section 4.2 below).

Qualitative analysis was applied to produce 'thick' descriptions and explanations for instances where the null hypothesis was rejected between tweets posted by bots and those posted by humans. To determine which words and phrases were represented most prevalently in each corpus, I first used WMatrix5 to perform a word frequency inquiry followed by a word collocation analysis. Through this process, I was able to identify instances across each corpus where words and phrases were frequently and repeatedly assembled into composite wholes. I then examined which composites appeared most often in syntactic proximity to other words and phrases of political significance embedded in the text of tweets posted by bots. This process produced a typology of word and phrase composites that I examined to explore potential instances where *prime lures* may have been included to draw human minds into *interactive alignment* with the content of tweets posted by bots. To explore potential instances of *interactive alignment,* I first determined whether word and phrase composites embedded most frequently in tweets posted by bots were reproduced, both implicitly and explicitly, in tweets posted by humans. I then drew from cognitive linguistics and CDA to assess whether the syntactic proximity of word and phrase composites to others produced *pragmatic traction*, thus cultivating *semantic contagion effects* yielding relationships of conceptual equivalency.

To examine whether *semantic contagions* could have become entrenched in the minds of Twitter users, I examined word and phrase composites reproduced in tweets posted by humans, which facilitated further qualification of the nature of the relationship between tweets posted by bots and those posted by humans as identified in instances where the null hypothesis was rejected. Finally, I evaluated the ideological and political value of the concepts represented by word and phrase composites appearing most frequently and prevalently in tweets posted by bots and replicated in tweets posted by human users across the #SNCLavalin Twitter discourse.

4.1.4. Rationale for Methodology

In 2014, a seminal study conducted by a team of communications and data scientists (Kramer et al. 2014) established evidence of mass-scale emotional contagion on Facebook. In 2017, computational social scientists Sandra Matz, Mikael Kosinski, Gideon Nave, and David Stillwell (2017a) found that digitally

mediated psychological targeting of large numbers of social media users' personality influenced their online behaviours. In that same year, computer scientists, psychologists, and sociologists Aylin Caliskan, Joanna Bryson, and Arvind Narayanan (2017) established that applying machine learning to ordinary colloquial language-use online resulted in the replication of human-like semantic biases – "the same sort of language humans are exposed to every day" (Caliskan et al. 2017). In 2023, Tappin et al. found that the use of microtargeting did increase the persuasive force of campaign messaging on social media. Thus, the affective, psychological, and mimetic influence of digital media has been tested, explored, and confirmed. However, the cognitive linguistic dimension of *contagion effects* within the semantic qualities of political discourse generated between human minds, digital algorithms, and political intermediaries on Twitter has not yet been fully explored or developed, nor have the implications of online *contagion effects* within political discourse and online public opinion.

To reiterate Ross' (2009: 144-145) definition of the term *semantic contagion* (as briefly discussed in Section 3.2., Subsection 3.2.1.5. in Chapter 2), it is a cognitive linguistic phenomenon in which the meaning of a word adapts to the meaning of other words according to underlying *general semantic relativity*. Additionally, the combination of words into metonymic structures involves assembling various values and units of meaning in a syntax-affecting way (Ross 2009). Thus, the meaning and significance of *semantic contagions* within linguistic texts combine with others in situ producing semantic 'wholes' in such a way that references any single component (individual words) compositing the ensemble, thus activating a relative meaning to the ensemble itself. The syntactic structure of semantic composite 'wholes' forms in consequence of what Ross (2009: 145) terms *semantic adjustment*, which is the shifting of meaning in tandem with changes to the contexts within which they operate. In this respect, *semantic contagions* are both combined units of meaning that are stabilized in context but are also subject to polysemic shift as the context evolves.

Ross also asserts that the lexical organization of *semantic contagions* is best understood using Fillmore's (2006) iteration of *frame semantics*, which articulates how the polysemous constitution of meaning unfolds within language in use. Fillmore's *Frame semantics* is a cognitive linguistic approach to analyzing language used in social contexts and to studying the meaning of words and the conception of new words or phrases through language in use (Fillmore 2006). A *frame*, according to Dancygier (2023), is made up of units of meaning situated in knowledge structures within the mind of language users. As language users become increasingly exposed to the same combinations of meaning units over time, *frames* become so entrenched within the knowledge structures of memory in such a way that mere reference to individual components of the combination (e.g., a single word such as 'corrupt') represented in a similar social context to its initial production can activate the recall of the entire *frame* as well as its underlying meaning. Through protracted use in language, words, phrases, and expressions, as units of meaning may

evolve into *semantic contagions* that elicit immediate recollection of the meaning, feeling, sensation, belief, or worldview represented by a composite 'whole' (e.g., a political ideology or belief). Prolonged exposure to frequently recurring word and phrase composites under the pressures of conventionalization also supports the entrenchment of *frames* within the knowledge structures of language users. Indeed, psychologists have empirically tested how exposure to *word frequency* in natural language-use impacts recall (Mendes et al. 2021) and found that "word frequency is an important cue that affects metamemory even in multiple-cue situations."

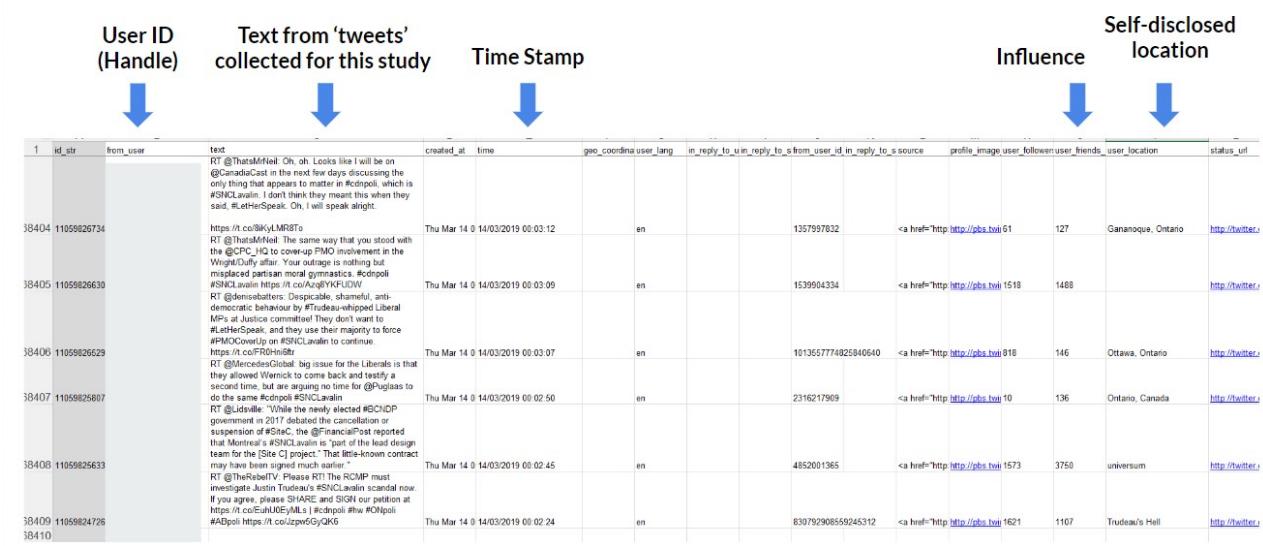
By computing the degree of association between frequently recurring collocations, for example, Stefanowitsch and Gries (2003; Gries and Wulff et al. 2007) developed a collostructional approach to linguistic analysis that builds on Goldberg et al.'s (2003: 13), who conclude that "high token frequency of a single general exemplar does indeed facilitate the acquisition of constructional meaning.' In their examination of interactive constitutions of meaning between lexemes (words), Stefanowitsch and Gries' collostruction analysis goes beyond raw word frequency by identifying the degree of association between frequently recurring collexemes, which psychology has identified as a significant determinant of *prototype* formation (Stefanowitsch and Gries 2007: 100).

Prototypes, as mental categories, also contribute to the cultivation of *semantic contagions* within language-use by facilitating the lexical organization of linguistic units into *semantic frames*. Exposure to high *word-frequency* collocations with a high degree of associative *prototypicality* across a corpus of text, therefore, likely enhances the entrenchment of *semantic fames* into the knowledge structures of human minds. Since the recurrence of collocations with a high degree of association in language use is found to determine the formation of *prototypes* (Bybee and Napoleão de Souza's 2021), we can also conclude that high frequency words situated in the lexical organization of meaning into collocations of high semantic association also transforms frequently recurring word and phrase composites into *semantic contagions*.

Multimodality, which represents multiple representational modes of organizing information within a single medium (e.g., the Internet, Twitter, algorithmic mediation, language, human communication, etc.) also affects how polysemic shifts in meaning manifests through *pragmatic traction* and *semantic adjustment* across different semiotic channels (Feyaerts et al. 2017; Dancygier 2023). *Botaganda* – the flow of semiosis through the convergence of human thought, algorithmic computation, and political electioneering (three representational modes of semiosis) – represents an example of *multimodality* on Twitter, which contributes significantly to the constitution of political meaning across the #SNCLavalin Twitter discourse.

4.2. Sampling Strategy and Data Analysis

To collect Twitter data, I used a semi-automated Twitter archiving tool called TAGS (Hawksey 2014), which is programmed to automate the collection of tweets along with corresponding metadata such as usernames, timestamps, and self-disclosed location. I initiated the collection of Twitter data and metadata by first entering the hashtag that I wished to research (e.g., #SNCLavalin) and the timeframe within which I wished to collect the data (e.g., March 14 of 2019 forward). The data was then archived automatically into a Google Sheet within a scheduled period (see Figure 4.1). For the purposes of this study, I collected data and metadata affixed to #SNCLavalin between March 14 and April 9, 2019, resulting in the collection of 68,409 tweets in total. Since this study involved a good deal of manual data entry and coding, I chose to first segment the 68,409 tweets into three temporal samples of 2,000 tweets (representing tweets posted on March 14, March 28-29, and April 8-9 of 2019) each for a total of 6,000 tweets, which were further segmented into two additional samples of tweets posted by regular Twitter bots and astroturfing bots across the entire temporal span of the study. To ensure that I sampled a proportionate representation of content reflecting the political concepts and themes across the entire temporal period (between March 14 and April 9, 2019), I sampled the first 2,000 tweets, the very middle 2,000 tweets and the very last 2,000 tweets (see Table 4.1), resulting in a semi-random final sample of tweets.



1	id_str	from_user	text	created_at	time	geo_coordina	user_lang	in_reply_to_u	in_reply_to_s	from_user_id	in_reply_to_s	source	profile_image	user_follower	user_friends_	user_location	status_url
38404	1105982673		RT @ThatsMrNeil: Oh, oh. Looks like I will be on @CanadiaCast in the next few days discussing the only thing that appears to matter in #cdnpoli, which is #SNCLavalin. I don't think they meant this when they said, #LetHerSpeak. Oh, I will speak alright. https://t.co/8iKyLMR8To	Thu Mar 14 0	14/03/2019 00:03:12		en			1357997832		<a href="http	http://pbs.twi	61	127	Gananoque, Ontario	http://twitter.c
38405	1105982663		RT @ThatsMrNeil: The same way that you stood with the @CPC_HQ to cover-up PMO involvement in the Wright/Duffy affair. Your outrage is nothing but misplaced partisan moral gymnastics. #cdnpoli #SNCLavalin https://t.co/Azq8YKFUDW	Thu Mar 14 0	14/03/2019 00:03:09		en			1539904334		<a href="http	http://pbs.twi	1518	1488		http://twitter.c
38406	1105982662		RT @denisebatters: Despicable, shameful, anti-democratic behaviour by #Trudeau-whipped Liberal MPs at Justice committee! They don't want to #LetHerSpeak, and they use their majority to force #PMOCoverUp on #SNCLavalin to continue. https://t.co/FR6Hni6ltr	Thu Mar 14 0	14/03/2019 00:03:07		en			1013657774825840640		<a href="http	http://pbs.twi	818	146	Ottawa, Ontario	http://twitter.c
38407	1105982580		RT @MercedesGlobal: big issue for the Liberals is that they allowed Wernick to come back and testify a second time, but are arguing no time for @Puglass to do the same #cdnpoli #SNCLavalin	Thu Mar 14 0	14/03/2019 00:02:50		en			2316217909		<a href="http	http://pbs.twi	10	136	Ontario, Canada	http://twitter.c
38408	1105982563		RT @Lidsville: "While the newly elected #BCNDP government in 2017 debated the cancellation or suspension of #SiteC, the @FinancialPost reported that Montreal's #SNCLavalin is 'part of the lead design team for the [Site C] project.' That little-known contract may have been signed much earlier."	Thu Mar 14 0	14/03/2019 00:02:45		en			4852001365		<a href="http	http://pbs.twi	1573	3750	universum	http://twitter.c
38409	1105982472		RT @TheRebelTV: Please RT! The RCMP must investigate Justin Trudeau's #SNCLavalin scandal now. If you agree, please SHARE and SIGN our petition at https://t.co/EuhU0EyMLs	#cdnpoli #hw #ONpoli #ABpoli https://t.co/Jzpw6GjQK6	Thu Mar 14 0	14/03/2019 00:02:24		en		830792908559245312		<a href="http	http://pbs.twi	1621	1107	Trudeau's Hell	http://twitter.c
38410																	

Figure 4.1 Example of data collection using TAGS v6.0[4]

[4] A Google Sheets template used to automate the collection of Twitter content

n=6,000	CORPUS	DATE RANGE
2,000	**HUMT1**	March 14, 2019
2,000	**HUMT2**	March 28-29, 2019
2,000	**HUMT3**	April 8-9, 2019

Table 4.1 Corpus Segmentation

4.2.1. Data Processing with Botometer

Because the aim of this study was to evaluate whether the convergence of human thought, algorithmic computation and political electioneering on Twitter incited human minds to interactively align with the content of tweets posted by bots, thus influencing the tenor of public opinion about the Canadian governments' conduct in dealing with the SNC Lavalin scandal in 2019, I devised a means to further segment the temporal samples of human-generated and bot-generated tweets so that I could test for independence between the two. To accomplish this, I used another computational tool called Botometer (Ferrara 2022), which is a machine learning interface that calculates the statistical probability that an account is operated by a Twitter-bot (e.g., whether a Twitter account operated by a digital algorithm).

To use Botometer (Ferrara 2022), one enters the 'Twitter handle' (User ID – e.g. @MyUserName) affiliated with the Twitter account to be analyzed by the Application Programming Interface (API). Using Botometer (Ferrara 2022) also enabled me to collect a sample of metadata about Twitter accounts' engagement with other hashtags on Twitter. While bot-scores calculate the statistical probability that an account is operated by a Twitter-bot, the platform also assigns specialized classifier scores using feature vectors (see Figure 4.3), which specify whether a bot account engages with politically salient content, whether it is connected to 'fake followers,' is engaged in content related to the financial sector, is a self-declared bot, or is a spamming bot (e.g. push advertising).

Botometer (Ferrara 2022) assigns 'bot-scores' between 0 and 1. The nearer a bot-score is to 1, the more likely it is to be operated by a Twitter-bot. To determine the degree of probability that a Twitter account is operated by a bot, Botometer (Ferrara 2022) first collects 200 of the most recent tweets published by the target account and the tweets referencing that account (marked by the '@' symbol). Botometer's (Ferrara 2022) API then segments various features of those tweets into different categories called 'feature vectors of specialized classifiers' (see Figures 4.3 and 4.4). Feature vectors are programmed classifications that algorithms use to assign 'categorical features' to each 'tweet's' online behaviour according to a set of programmed parameters (Yang, Ferrara and Menczer 2022). Though the recommended cut-off for a Botometer score is ≥ 0.42, I opted to increase that threshold to ≥ 0.6 to enhance the likelihood that the corpus of bot-generated content was, in fact, produced by Twitter-bots (see Figure 4.2 and 4.3 below).

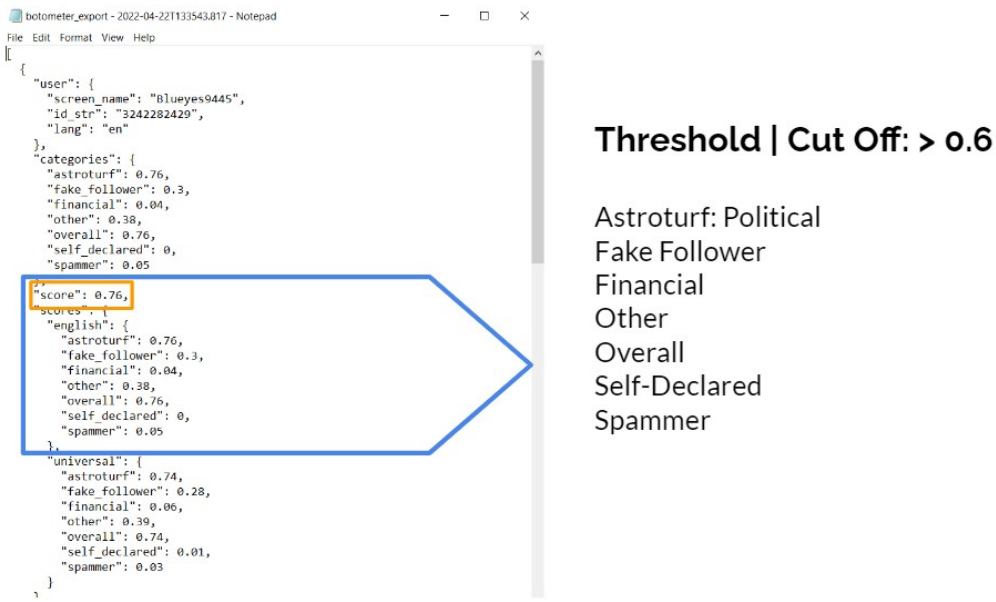


Figure 4.2 Sample of JSON data report generated by Botometer[5]

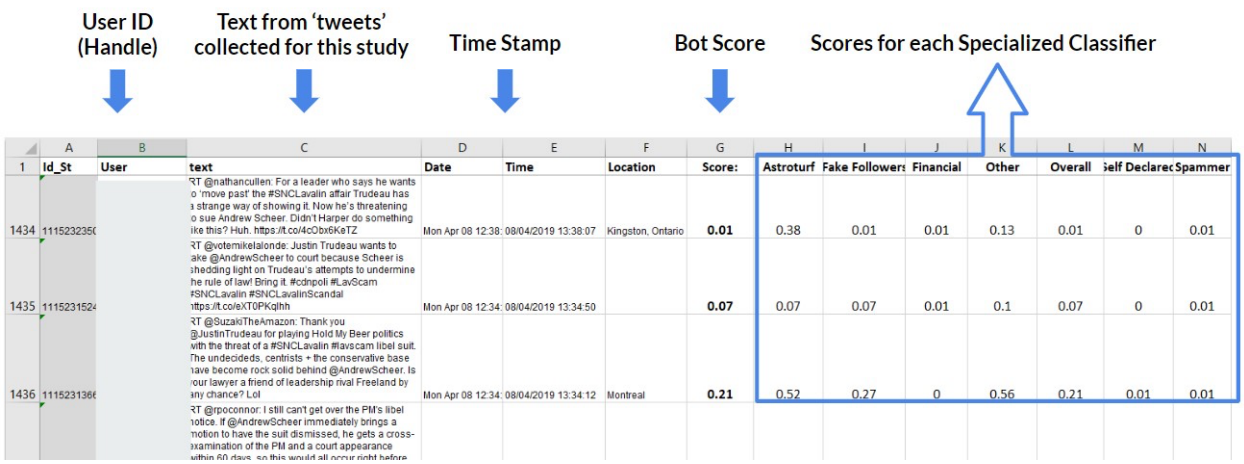


Figure 4.3 Botometers' Specialized Classifiers[6]

According to the developers of Botometer (Ferrara 2022), human accounts tend to display familiar patterns across feature vectors whereas accounts operated by Twitter-bots tend to display specific patterns across several feature vectors. For example, accounts operated by Twitter-bots may flood a thread of

[5] These are produced according to the user handles (user-names) for each Twitter account sampled for this study.

[6] Botometer produces a 'bot score' that statistically calculates the probability that a Twitter account is operated by an automated bot or not. This 'bot score' is calculated according to several sub-calculations of special classifiers. Note – user IDs (Twitter handles) have been concealed to protect the privacy of Twitter users.

Twitter discourse with large volumes of retweeted posts to amplify a certain narrative. They may also manipulate representations of stock prices or strategically disseminate misinformation that confounds and distorts knowledge among a targeted population of Twitter users. Other accounts may strategically 'follow' targeted accounts to inflate the appearance of its popularity, or they may simply promote certain commercial services and products. For this reason, the developers of Botometer (Ferrara 2022) programmed the API with an Ensemble of Specialized Classifiers (ESC) into the platform's algorithm architecture according to several 'Random Forest'[7] classifiers.

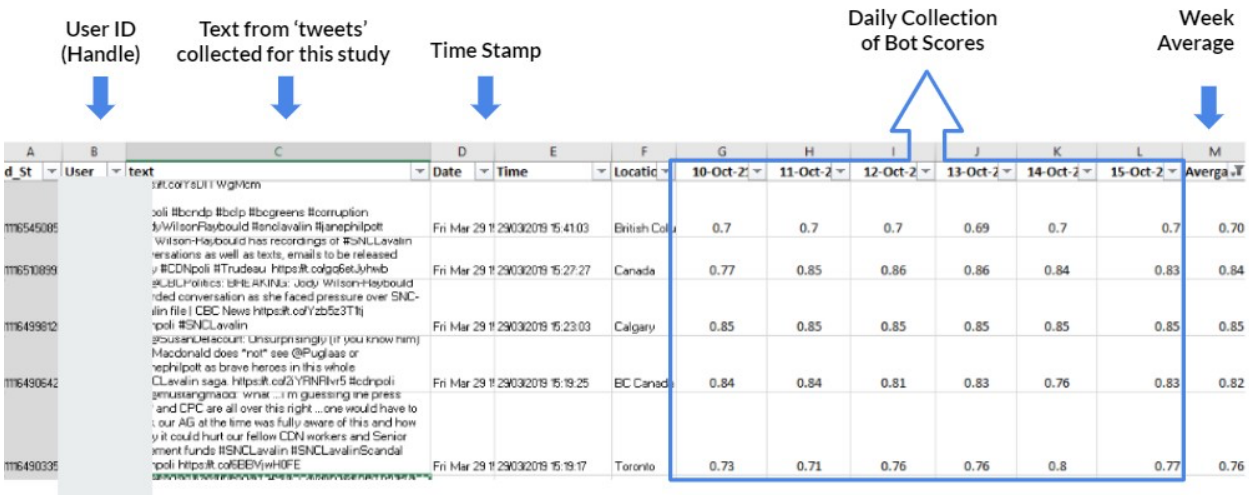
Botometer's statistical accuracy in detecting Twitter-bots is determined by a 5-fold cross-validation process, which, put simply, means that the platform's algorithm is trained on a pre-annotated dataset that is cross-referenced according to the APIs performance with the rest of the dataset. According to Yang et al. (2022), Botometer V4 accomplished a 0.99 AUC (Area Under [the receiver operating characteristic] Curve), which means that Botometer can successfully distinguish between the activities of a Twitter bot from those of a human with a high degree of accuracy if the platform is employed in methodologically prescribed ways (for example, see Yang, Ferrara and Menczer 2022: 4-5).

Recent studies testing the efficacy of Botometer (e.g., Rauchfleisch and Kaiser 2020; Gallwitz and Kreil 2022) highlighted concerns about Botometer's ability to successfully identify the prevalence of Twitter-bots within a Twitter corpus. Kai-Chen Yang, Emilio Ferrara and Filippo Menczer (2022) promptly produced a counterresponse critiquing the methods and approaches used by such studies, citing exploitation of the computational tools' limitations (such as the presence of inactive accounts having produced insufficient data, new accounts with novel behaviour patterns, or the use of datasets that the algorithm has not been trained with, which the authors claim are inevitable for any machine learning algorithm) as their explanation for faulty bot-detection. Yang, Ferrara and Menczer (2022: 5) also note that:

> One might select small sets of accounts with large false-positive error rates to argue that no bot detection tool is valid or that social bots do not exist at all. These arguments use fallacies such as cherry-picking and strawman in disingenuous ways. Validation through manual annotations is extremely valuable, especially when highlighting cases where existing machine learning models perform poorly, but should be used in constructive ways.

[7] A Random Forest algorithm executes a series of operations for classification, regression and other statistical operations that construct a 'decision making tree' as the algorithm is being mechanically 'trained' to work with data in specific ways. Random Decision Forests are specifically designed to self-correct for overfitting feature classifiers to programmed parameters.

Erring on the side of caution, I chose to collect daily bot-scores for all accounts segmented into corpora of bot-generated content over the span of a week. I then calculated the mean average of those bot-scores and eliminated any account with a mean average below the 0.6 cut-off (see Figure 4.4). A total of 259 accounts initially tagged as Twitter-bots were removed from the bot sample. I also removed accounts that Botometer returned as 'suspended' from all corpora (see Figure 4.5).



d_St	User	text	Date	Time	Locatic	10-Oct-2	11-Oct-2	12-Oct-2	13-Oct-2	14-Oct-2	15-Oct-2	Averga
1116545085		oli #bcndp #bclp #bcgreens #corruption ly/WilsonRaybould #snclavalin #janephilpott	Fri Mar 29 1	29/03/2019 15:41:03	British Colu	0.7	0.7	0.7	0.69	0.7	0.7	0.70
1116510899		Wilson-Raybould has recordings of #SNCLavalin ersations as well as texts, emails to be released y #CDNpoli #Trudeau https://t.co/gq6etJyhwb	Fri Mar 29 1	29/03/2019 15:27:27	Canada	0.77	0.85	0.86	0.86	0.84	0.83	0.84
1116499812		gCBCPolitics: BHe AKINUs: Jody Wilson-Raybould rded conversation as she faced pressure over SNC- lin file	CBC News https://t.co/Yzb5z3T1tj npoli #SNCLavalin	Fri Mar 29 1	29/03/2019 15:23:03	Calgary	0.85	0.85	0.85	0.85	0.85	0.85	0.85
1116490642		Macdonald does "not" see @Puglaas or nephilpott as brave heroes in this whole CLavalin saga. https://t.co/2iYRNRlvr5 #cdnpoli	Fri Mar 29 1	29/03/2019 15:19:25	BC Canad	0.84	0.84	0.81	0.83	0.76	0.83	0.82
1116490335		and CPC are all over this right ...one would have to our AG at the time was fully aware of this and how y it could hurt our fellow CDN workers and Senior ment funds #SNCLavalin #SNCLavalinScandal npoli https://t.co/6BBVjwH0FE	Fri Mar 29 1	29/03/2019 15:19:17	Toronto	0.73	0.71	0.76	0.76	0.8	0.77	0.76

Figure 4.4 Mean Average of Bot Scores[8]

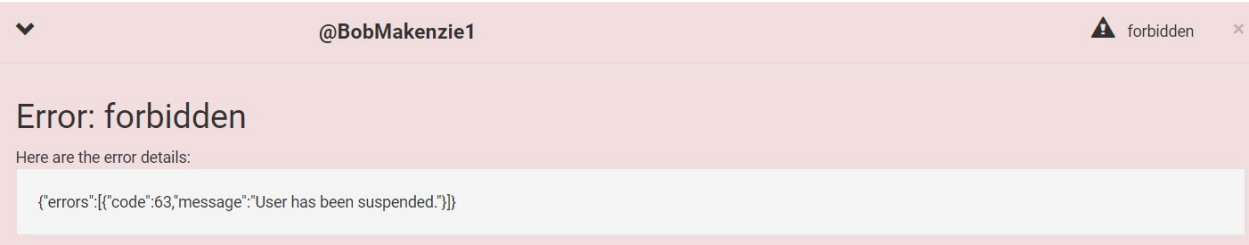


Figure 4.5 Suspended Twitter Accounts[9]

4.2.2. Data Overview

Once Twitter data was segmented into 5 unique corpora (3 consisting of human-generated tweets and 2 consisting of bot-generate tweets), I removed accounts that had been suspended (see Figure 4.5) and 'falsely tagged' bot accounts (bot-accounts that did not meet the ≥ 0.6 threshold over a week). Once this

[8] Daily collection of bot-scores and their mean average over the period of a week for each account that had initially returned a bot-score of (>) = 0.6

[9] Results returned by Botometer representing instances where a Twitter account had been suspended

operation was complete, the study was left with a total sample size of N=4,981, human operated Twitter accounts representing 79% of the total sample (*n*= 3,954) and bot-operated Twitter accounts representing 6% (*n*= 275) of the total sample. 49% (*n*=259) of the bot-generated corpus was identified as 'falsely tagged' and 8% (*n*=398) were flagged as suspended (see Figure 4.5).

Corpus	*n* = 4,981
Human Accounts	3,954 (79% of Sample)
Twitter Bots	275 (6% of Sample)
Falsely Tagged Bots	259 (49% of Initially Identified Bots)
Suspended Accounts	398 (8% of Sample)

Table 4.2 Overview of Twitter data collected and used for this study

Self-disclosed 'location' metadata collected using TAGS allowed me to generate a heatmap representing where the most actively engaged population was situated (by province) across the thread of Twitter discourse affixed to #SNCLavalin between March 14 -April 9, 2019. Québec residents were the most heavily engaged with the #SNCLavalin Twitter discourse in early 2019, representing 2,880 tweets, followed by Ontario residents representing 1,622 tweets from the 4,981 tweets sampled for this study (see Figure 4.8 and Chart 4.1 below).

4.2.3. Data Segmentation into Corpus Pairs

To organize the data into a schematic for crosstabulation (to apply the null hypothesis test for independence between human-generated content and bot-generated content), I arranged the 3 human-generated samples (HT1, HT2, HT3) and 2 Twitter-bot samples (BOTS, ASTRO) into 6 corpus-pairs (HT1 + BOTS; HT2 + BOTS; HT3 + BOTS; HT1 + ASTRO; HT2 + ASTRO; HT3 + ASTRO). I also used WMatrix5's (Rayson 2021) semantic analysis system (USAS) to generate semantic tags (semtags) for each word belonging to each corpus according to the API's semantic domains (also known as semantic fields). Because *astroturfing* (politically motivated Twitter-bots) scores were more prominently represented than other feature vectors of special classifiers, I chose to use the 'Government & the Public Domain' and 'Emotional Actions, States & Processes' semtags as categorical variables common to all 5 corpora because they represent the two semantic dimensions that this study is most interested in exploring: politics and emotional responses to political content. I operationalized these semtags for cross-tabulation accordingly (see Table 4.3 below).

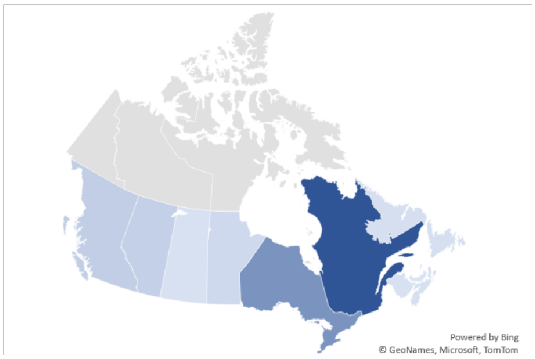


Figure 4.8 Heat Map[10]

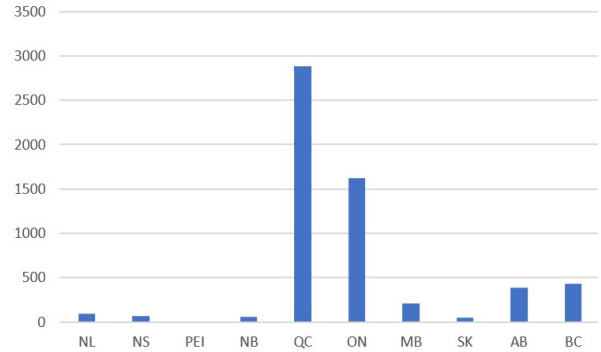


Chart 4.1 Distribution of tweets by province

	CORPUS	
1	HT1	Human 1
2	HT2	Human 2
3	HT3	Human 3
4	BOTS	Twitter bots
5	ASTRO	Astroturf Twitter Bots

	SEMTAG	
1	POL	Politics
2	EMO	Emotions

Table 4.3 Corpus schematic and SEMTAGS used for cross-tabulation

Ensemble of Specialized Classifiers (ESC)

	Astroturf	Fake Follower	Financial	Self-declared	Spammer	Other
	hyper-active political bots (follow trains and systematic deletion of content)	bots purchased to increased follower counts	bots that post using cashtags	bots from botwiki.org	accounts labelled as spambots from several datasets	miscellaneous other bots obtained from manual annotation, user feedback, etc.
Human1	0.30	0.11	0.04	0.01	0.01	0.36
Human 2	0.33	0.11	0.06	0.02	0.01	0.25
Human 3	0.34	0.11	0.04	0.02	0.01	0.27

Based on score average across each corpus by classifier

Prominent representation

[10] Figure 4.8 & Chart 4.1 Geographic distribution of tweets sampled for study (n = 5,894). The sample is overrepresented by roughly 15% due to instances where a single user self-disclosed both their province and city of residence, which resulted in the user's location being accounted for twice. However, this heatmap still provides a general overview of engagement with the #SNCLavalin discourse thread on Twitter by province.

Figure 4.7 Political classification of human activity within #SNCLavalin Twitter discourse[11]

To review the process of segmenting data, this phase of my research involved the following operations:

1) I used Botometer to collect daily bot-scores for all bot-operated accounts and calculated a mean average of bot-scores over the period of a week to statistically increase the likelihood that the segmented sample of bot-generated data was, indeed, produced by Twitter-bots.
2) I removed tweets from the #SNCLavalin Twitter data that returned a bot-score of ≥ 0.6.
3) I then further segmented the remaining bot-generated Twitter data into a sub-category of tweets posted by 'astroturfing' bots, which are politically motivated bot accounts.
4) I generated 6 temporally segmented corpus-pair samples of bot-generated and human generated tweets across the entire sample of data collected between March 14 – April 9, 2019 (see Table 4.5 below.
5) Using WMatrix5 (Rayson 2021), I generated semtags (e.g., G1-, E2.2+) for each word belonging to each corpus according to WMatrix5's preprogrammed semantic domains (also known as semantic fields) pertaining to 'Government & the Public Domain' and 'Emotional Actions, States & Processes.'
6) Because semantic tags are common to all 5 corpora, I operationalized them as categorical variables for cross-tabulation in conducting the chi-square test for independence between tweets posted by bots and tweets posted by human user.

4.2.4. Statistical Analysis of Twitter Data

To conduct the chi-square test for independence, I used WMatrix to semantically tag each word of each corpus according to the 'Government & the Public Domain' and 'Emotional Actions, States & Processes' discourse fields (see Figure 4.8). WMatrix5's semtags further attribute words as being 'neutral,' 'positive,' or 'negative' according to the textual context that they are situated in. Semtags assigned to words from a specific corpus semantically representing affective positivity are coded by WMatrix5 with "+" whereas those representing negative sensibility are coded with "-". Words conveying neither positive nor negative affectivity remain uncoded. For example, within the 'Government & the Public Domain' discourse field,

[11] Average bot-score of each special classifier by corpus (Human 1, Human 2, & Human 3) – we can see that within the #SNCLavalin Twitter data used for this study, Astroturfing scores (the special classifier representing hyper-active political bots) is most prominently compared with other 5 special classifier scores across all three corpora. This signifies that a significant amount of bot-activity was conducted by Astroturfing bots within the Twitter data used for this study.

words conveying ‘general ethics’ (in governance) may be coded as follows: ATROCITIES (G-), BACK-BITING (G-), BAMBOOZLE (G-), ETHICAL (G+), HONOURABLY (G+), HUMANELY (G+).

These classifications are assigned according to semantic fields that group ‘word senses’ together according to how they are related by virtue of their being connected at some level of generality to similar mental concepts. ‘Word sense’ groups are established according to a lexicon of 37,000 words containing 16,000 multi-word units, which also include synonyms, antonyms, hypernyms, and hyponyms (Archer, Wilson and Rayson 2002). Since these three modes (+ / - / 0) of marking for affect oversimplify the range of nuance variations in emotional expression, use of this feature represents one of this study’s limitations. However, at the same time, this simplification also enabled the operationalization of semtags for empirical analysis. Moreover, I was able to organize the 5 corpora into a schematic of 12 corpus pairs with the inclusion of these attributions to further qualify the affective character of the #SNCLavalin Twitter discourse (see Table 4.4 below).

To explore potential areas where human-generated and bot-generated Twitter content affixed to the #SCNLavalin Twitter discourse were possibly related, I created a coding schematic using corpus codes and semtags for SPSS (see semtags POL and EMO in Table 4.4 below), which allowed me to compare affective (positive, negative, and neutral) qualities of the discourse across 12 temporally segmented corpus-pairs (see Figure 4.9 below).

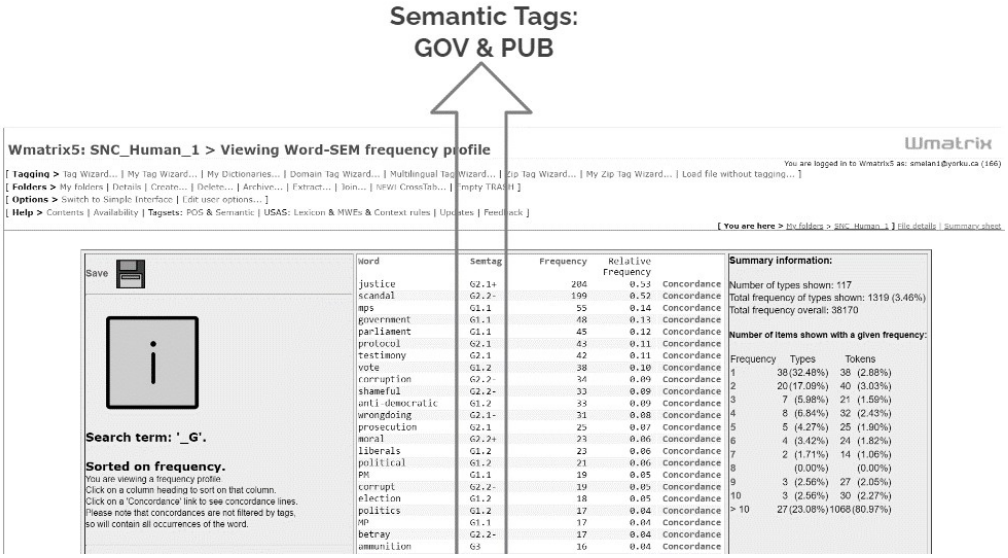


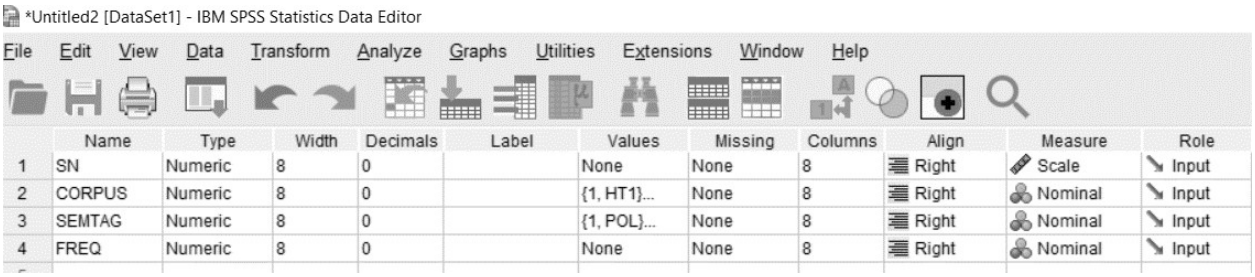
Figure 4.8 Government and Public Semantic Tags as generated by WMatrix5’s user interface[12]

[12] The WMatrix5 interface generates SEMTAGs (semantic tags) that correspond with 21 discourse fields outlined in Figure 4.X. In this example, I had performed a SEMTAG inquiry using the ‘Government & Public’ semantic domain (e.g., according to definitions of ‘Government & Public’s’ discourse field subdomain, G2.1+ represents positive iteration of some aspect of ‘Crime, Law & Order.’ What is significant for the purposes of the chi-square

	CORPUS	
1	HT1	Human 1
2	HT2	Human 2
3	HT3	Human 3
4	BOTS	Twitter bots
5	ASTRO	Astroturf Twitter Bots

	SEMTAG	
1	POL	Politics
2	EMO	Emotions

Table 4.4 Coding schematic for the chi-square test for independence in SPSS



	Name	Type	Width	Decimals	Label	Values	Missing	Columns	Align	Measure	Role
1	SN	Numeric	8	0		None	None	8	Right	Scale	Input
2	CORPUS	Numeric	8	0		{1, HT1}...	None	8	Right	Nominal	Input
3	SEMTAG	Numeric	8	0		{1, POL}...	None	8	Right	Nominal	Input
4	FREQ	Numeric	8	0		None	None	8	Right	Nominal	Input

Figure 4.9 Data categories and input for chi-square test in SPSS

4.2.5. Chi-Square Test for Independence

Using IBM's SPSS (Statistical Package for the Social Sciences), I applied the chi-square test for independence to the 12 corpus-pairs (24 refined temporally segmented corpora containing 12 human-generated corpora and 12 bot-generated corpora) and I used semtags to cross-tabulate the data (see Tables 4.5, 4.6, and 4.7 below).

CORP 1	CORP 2
HT1	BOTS
HT1	ASTRO
HT1 (-)	BOTS (-)
HT1 (+)	BOTS (+)
HT2	BOTS
HT2	ASTRO
HT2 (-)	BOTS (-)
HT2 (+)	BOTS (+)
HT3	BOTS
HT3	ASTRO
HT3 (-)	BOTS (-)
HT3 (+)	BOTS (+)

Table 4.5 12 corpus pairs based on 5 corpora of tweets posted by humans and 2 corpora of tweets posted by bots

test is that this is a subdomain of the SEMTAG 'Government and Public' and it is marked to represent positive sentiment.

Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
CORPUS * SEMTAG	276	100.0%	0	0.0%	276	100.0%

CORPUS * SEMTAG Crosstabulation

			SEMTAG		
			Politics	Emotions	Total
CORPUS	3	Count	84	149	233
		Expected Count	90.3	142.7	233.0
	BOTS (+)	Count	23	20	43
		Expected Count	16.7	26.3	43.0
Total		Count	107	169	276
		Expected Count	107.0	169.0	276.0

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	4.649[a]	1	.031		
Continuity Correction[b]	3.944	1	.047		
Likelihood Ratio	4.538	1	.033		
Fisher's Exact Test				.040	.024
Linear-by-Linear Association	4.633	1	.031		
N of Valid Cases	276				

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 16.67.

b. Computed only for a 2x2 table

$$\chi 2 = {}^{R}\sum i \; {}_{i=1} \; {}^{C}\sum j \; {}_{j=1} C \; (oij - eij)^2 / eij$$

$$E_{ij} = \frac{\text{row i total} * \text{col j total}}{\text{grand total}}$$

$$\alpha = < 0.05$$

H_0: "[*Variable 1*] is independent of [*Variable 2*]"

H_1: "[*Variable 1*] is not independent of [*Variable 2*]"

$0.031 = H_1$ / Not Independent

Table 4.6 Chi-square Test of Independence[13]

CORPORA: HT1, HT2, HT3, BOTS, ASTRO
SEMTAGS: POLITICAL & EMOTION

CORP 1	CORP 2	p-Value
HT1	BOTS	**<0.001**
HT1	ASTRO	**0.039**
HT1 (-)	BOTS (-)	**<0.001**
HT1 (+)	BOTS (+)	0.157
HT2	BOTS	0.162
HT2	ASTRO	0.522
HT2 (-)	BOTS (-)	0.654
HT2 (+)	BOTS (+)	0.179
HT3	BOTS	0.295
HT3	ASTRO	**0.021**
HT3 (-)	BOTS (-)	**<0.001**
HT3 (+)	BOTS (+)	**0.033**

Example: HT1 & BOTS
The chi-square statistic is 28.3689. The *p*-value is < 0.001
The result is significant at $p < .05$.

HT1 & BOTS: political and emotional content generated by bots and humans on **March 14th, 2019** meet the criteria for the alternative hypothesis (H1), indicating that the variables are not independent

HT1 & Astroturf bots: meets criteria for H1 hypothesis (not independent)

HT1 (-) & BOTS (-): meets the criteria for H1 hypothesis (not independent)

HT1 (+) & BOTS (+): meets criteria for the H0 null hypothesis **(independent)**

HT2 & BOTS: political and emotional content generated by bots and humans on **March 28-29, 2019** does not meet the criteria for the alternative hypothesis (H1), indicating that the variables are independent

HT2 & Astroturf bots: does not meet criteria for H1 hypothesis (independent)

HT2 (-) & BOTS (-): does not meet the criteria for H1 hypothesis (independent)

HT2 (+) & BOTS (+): meets criteria for the H0 null hypothesis **(independent)**

HT3 & BOTS: political and emotional content generated by bots and humans on **April 8-9, 2019** does not meet the criteria for the alternative hypothesis (H1), indicating that the variables are independent (0.295)

HT3 & Astroturf Bots: does meet criteria for H1 hypothesis (not independent - 0.021)

HT3 (-) & BOTS (-): does meet the criteria for H1 hypothesis (not independent - < 0.01)

HT3 (+) & BOTS (+): does meet the criteria for the H1 hypothesis **(not independent - 0.033)**

Table 4.7 Results of chi-square test for independence using SPSS

[13] Crosstabulation and Results Example of crosstabulation matrix and SPSS display of chi-square test of independence results, as well as the chi-square formula used to test corpus-pairs for independence

4.3. Research Design

In what follows in this section, I describe the use and purpose of the chi-square test for independence before outlining its application and relevance to the objective of this dissertation. I then delineate key principles from cognitive linguistics and CDA that best accommodate qualitative analysis of frequently recurring word and phrase composites nested in tweets posted by bots and replicated in tweets posted by humans. To evaluate which word and phrase composites were most likely to have functioned as *semantic contagions* across the #SNCLavalin Twitter discourse, and which *semantic contagions* conveyed meaning of ideological significance, I borrowed heavily from theoretical paradigms belonging to cognitive linguistics and CDA, as well as some well-established principled from social psychological.

4.3.1. Quantitative Research: Chi-square Test for Independence

Pearson's chi-square test of independence is a 'goodness of fit' statistical model applied to assess for the interdependence between two categorical variables. Rejection of the null hypothesis (i.e., that the two variables are independent of one another) signifies that there is likely an association between the two variable distributions. As is customary for interpreting the results of the chi-square test of independence, I used a p-value of ≤ 0.05 as my threshold based on standard conventions for applying the test. This means that a p-value of 0.05 or higher rejects the *null hypothesis*, which signifies that the two categorical variables from the same sample are more likely to be dependent, and thus are also less likely associated (see Table 4.7 above for overview of results).

To revisit my application of the chi-square test for independence, I applied the model to reject or not reject the null hypothesis in analyzing tweets posted by humans and tweets posted by bots. I first collected the #SNCLavalin Twitter data using a computation tool called TAGS. I then segmented the data into tweets posted by humans and tweets posted by bots using a computational tool called Botometer to statistically determine which accounts were most likely operated by Twitter-bots. I extracted the linguistic content from tweets and created 5 corpora: 3 temporally segmented corpora of tweets posted by humans and 2 corpora of tweets posted by Twitter-bots. I then tested for correlation between 12 corpus-pairs (once again, see Table 4.5 above for further detail).

For the two categorical variables used for crosstabulation across human-generated and bot-generated tweets, I used another computational tool called WMatrix5 to semantically tag every word using two discourse fields: 'Government & the Public Domain' (POL) and 'Emotional Actions, States & Processes' (EMO). POL and EMO semtags were operationalized as the nominal variables used for cross-tabulation while conducting the chi-square test of independence (see Table 4.4). The null hypothesis was rejected in 6 of 12 corpus-pairs representing tweets posted on March 14, and April 8-9, 2019, but the null

hypothesis was not rejected in half of the cases evaluated, thus suggesting no correlation between tweets posted by bots and those posted by humans between March 28 and 29, 2019.

4.3.2. Qualitative Research: Cognitive Linguistics, Social Psychology, and CDA

While the null hypothesis was rejected in 6 of the 12 temporally segmented corpus-pairs extracted from the #SNCLavalin Twitter discourse, which supports one of this dissertation's claims that tweets posted by Twitter-bots relate in some way with tweets posted by humans, the use of other research instruments was necessary to gain more insight into the nature of that relationship. Through more 'thick-analyses' using qualitative approaches, I determined that specific word and phrase composites embedded in tweets posted by bots were frequently replicated in tweets posted by humans on March 14 and between April 8-9, but not between March 28-29, which corresponds with instances where the null-hypothesis was rejected while conducting the chi-square test for independence. Through this analysis, I was able to identify frequently recuring word and phrase composites that gradually came to function as *semantic contagions* across the #SNCLavalin Twitter discourse of 2019. Once identified, I could further evaluate whether word and phrase composites positioned in syntactic proximity to others cultivated relationships of equivalency through *pragmatic tractions*.

To test the premise that language is used in the service of constructing concepts and sharing meaning within intersubjective communication – that language, thinking, and conceptual formation are intertwined, I identified instances where frequently recurring word and phrase composites posted by bots were replicated in tweets posted by humans, which I contend instantiates instances in which human users *interactively aligned* with the content of tweets posted by bots, as predicated by Garrod and Pickering's research findings (2004). According to Fauconnier and Turner, analyzing language-use in situ extends a path into the inner workings of the mind (Fauconnier and Turner 1999; Coulson and Fauconnier 1999). In other words, adopting approaches borrowed from cognitive linguistics to extrapolate insight into the features of frequently recurring word and phrase composites across the #SNCLavalin Twitter discourse supplied insight into the "deep features of our thinking, cognitive processes, and social communication… associated with their linguistic manifestations" (Fauconnier 1999: 96).

CDA provided an approach for studying "language and other semiotic systems in use" (Catalano and Waugh 2020) and for analyzing "hidden, opaque, and visible structures of dominance, discrimination, power, and control as manifested in language" (Wodak and Meyer 2016: 12). Discourse, according to CDA, can function intersubjectively through language in ways that define and perpetuate social patterns of domination, discrimination, exploitation, dehumanization, naturalization, and ideologically constituted conceptions of 'common sense' (Catalano and Waugh 2020 – see Sections 2.3. and 2.4. in Chapter 2 for further elaboration). I used CDA to examine these representational qualities of

language 'in use' and to uncover intersections of ideology and power within the linguistics structure of the #SNCLavalin Twitter discourse of 2019. By engaging in critical examination of this intersection within the #SNCLavalin Twitter discourse (Catalano and Waugh 2020), I explored how language in use among human minds, digital algorithms, and political intermediaries shaped ideological beliefs about Prime Minister Trudeau and the Liberal Party of Canada's involvement in the SNC Lavalin scandal in ways that supported the interests, status, positions, and perspectives of the Conservative Party of Canada.

To identify frequently recurring words and phrase composites embedded in each corpus, I used WMatrix5 (Rayson 2021) once again to locate words with a high degree of statistical frequency across the #SNCLavalin Twitter discourse. Through this process, I was able to establish that the word 'scandal' appeared with the highest frequency across all corpora examined for this study (see Tables 4.8 – 4.10 below). Having established that the word 'scandal' was significant to all corpora, I then extracted a focused sample of tweets containing the word 'scandal' across the #SNCLavalin Twitter discourse and examined words and phrases most prevalently represented in syntactic proximity with the word 'scandal.'

To determine which word and phrase composites most likely functioned as *semantic contagions* in tweets posted by bots, I examined words and phrases reproduced in tweets posted by human users. I also borrowed Langacker's (2006) conception of *landmark* (the secondary point of focus that qualifies some aspect of a *trajector* – for example, a descriptor like 'corrupt') and *trajector* (the focal point of reference or the receptacle of adjectival qualification – for example, a subject like 'Trudeau'). According to Hart (2011), and as previously discussed in Sections 2.3. and 2.4. in Chapter 2, this phenomenon also helps explain how *idealized cognitive models* come to classify concepts into a common category, which become *framed* within *semantic memory* in the minds of Twitter users via language-use.

In some instances, words and phrases assembled into composites behaved conceptually as *landmarks* while others influenced *pragmatic traction* as *trajectors* (such as attributive adjective-noun sequences) that came to constitute the meaning of political ideas, beliefs, and ideologies, which likely became entrenched in human thought as *idealized cognitive models* over time and with increased exposure.

By adopting this methodological process, I identified several instances where frequently recurring word and phrase composites appeared in syntactic proximity to others in tweets posted by bots. This textual schematic was implicitly and explicitly replicated in tweets posted by humans, confirming the cultivation of *semantic contagion effects* that gradually culminated within the *semantic frames* of cognition among Twitter users.

4.4. Qualitative Analysis Approaches and Techniques

Conceptualization is a difficult cognitive linguistic dimension of semantic cognition to analyze empirically, but several qualitative methods can be applied to systematically analyze words in the context of 'language in use,' revealing several important dimensions of the intersubjective constitution of meaning in the process. For example, the semantic construal of meaning in language-use can be assessed in the context of communication events recorded in a corpus of discourse by examining patterns in the combination of words (Fischer 2010). Some word combinations (such as attributive adjective-noun sequences) guide the identification of the *behavioural profiles* of words in context (Fischer 2010: 47, paraphrasing Gries and Divjak 2010).

4.4.1. Word Frequency and Collocation Typology

Cognitive linguist Dylan Glynn (2010) explains that the first step in studying the cognitive semantics of words in context is the creation of a word typology based on word frequency within a corpus. Accordingly, as delineated above, I created a word typology for all corpora using the most frequently recurring word and phrase composites (with a relative frequency score cut-off threshold at 0.10 – see Tables 4.8 - 4.10 below). This approach is supported by neurobiologists who contend that high word frequency can generate a *word-frequency effect* (e.g., recognition of words and their meaning occurs faster for higher frequency words than lower frequency words) within recognition memory, and that "word frequency is encoded in the semantic structure of language" (Monaco et al. 2007 – see also Section 3.2., Subsection 3.2.1.4 in Chapter 3).

Moreover, linguist Richard Schmid (2010) contends that it has been generally accepted that there is a direct correlation between lexical frequency within a corpus and the degree of cognitive entrenchment (*word-frequency effect*) that lexical frequencies impose. Thus, the more frequently a particular lexical item appears in a corpus, the more easily and likely it will be recognized as significant. Moreover, repeated instances of the same semantic and schematic organization of words in "frequency distribution of lexico-grammatical variants of linguistic units correspond[s] to variable degrees of entrenchment of cognitive processes or representations associated with them" (Schmid 2010: 102, 2000: 39).

HUMT1 – GOVERNMENT & PUBLIC SEMANTIC DOMAIN

WORD	SEMTAG	FREQUENCY	RELATIVE FREQUENCY
justice	G2.1+	204	0.53
scandal	G2.2-	199	0.52
mps	G1.1	55	0.14
government	G1.1	48	0.13
parliament	G1.1	45	0.12
protocol	G1.1	43	0.11
Testimony	G1.1	42	0.11

Table 4.8 Coding schematic for semantic analysis of #SNCLavalin Twitter discourse on March 14, 2019 (coded as HT1)[14]

HUMT2 – GOVERNMENT & PUBLIC SEMANTIC DOMAIN

WORD	SEMTAG	FREQUENCY	RELATIVE FREQUENCY
scandal	G2.2-	72	0.20
judge	G2.1	72	0.20
legal	G2.1	64	0.17
political	G1.2	51	0.14
prosecutors	G2.1	50	0.14
scandals	G2.2-	47	0.13
wrongful	G2.2-	46	0.12
prosecutor	G2.1	46	0.12
justice	G2.1+	35	0.10

Table 4.9 Coding schematic for semantic analysis of #SNCLavalin Twitter discourse on March 28-29, 2019 (coded as HT2)

HUMT3 – GOVERNMENT & PUBLIC SEMANTIC DOMAIN

WORD	SEMTAG	FREQUENCY	RELATIVE FREQUENCY
scandal	G2.2-	168	0.35
suing	G2.1	163	0.34
PM	G2.1	150	0.32
defamation	G2.1-	95	0.20
corruption	G2.2-	92	0.19
crimes	G2.1-	80	0.17
election	G1.2	77	0.16
sue	G2.1	66	0.14
prime-minister	G1.1	62	0.13
Political	G1.2	60	0.13
lawyer	G2.1	54	0.11
criminal	G2.1-	49	0.10

Table 4.10 Coding schematic for semantic analysis of #SNCLavalin Twitter discourse on April 8-9, 2019 (coded as HT3)

[14] WMatrix5 permits researchers to examine word frequency according to semantic domains (also known as semantic fields), which are groups of words that share a common set of meanings within the linguistic context that they are found (Ottenheimer 2006). Dixon (2006: 3) explains that "the lexical roots in every language can be arranged in a number of semantic types. Certain types have prototypical association with a given word class, while others vary in their word class associations."

However, Schmid (2010) does caution against unfettered acceptance of the idea that lexical frequency unequivocally instantiates cognitive entrenchment. To control for this assumption, he suggests that researchers record frequency distribution of lexical items mathematically and test for statistical significance (Schmid 2010: 104). Using the statistical features supplied by WMatrix5 (Rayson 2021), I measured the significance of word frequency using the 'relative frequency' score with a cut-off of ≥ 0.10 (see Tables 4.8-4.10 above).

To identify potential word and phrase composites in tweets posted by bots, I located statistically significant collocations with high frequency words belonging to typology identified in Tables 4.8-4.10. WMatrix5 (Rayson 2021) uses LL-scores to calculate how likely words are collocated across a corpus beyond chance probability and it employs t-tests to determine if words are collocated beyond this chance probability (see Tables 4.14-4.16 below). For this phase of the analysis, collocated words served as indexes of potential instances where *semantic contagions* might be situated within each corpus of tweets. Locating *semantic contagions* allowed me to evaluate whether words and phrases in semantic proximity to *semantic contagions* facilitated the *conceptual blending* of ideological concepts into *frames*, that gradually stabilized into *idealized cognitive models* within the minds of human Twitter users.

Operationalization of lexical signs making up each corpus in this way supplied a strategic set of processes to first identify words and phrases recurring at statistically significant intervals; to identify words and phrases functioning as *semantic contagions*; to identify words and phrases behaving as attributive constructs; and to examine words belonging to collocations as functioning as either a *landmark* or *trajector* within attributive constructs across the #SNCLavalin Twitter discourse of 2019.

WORD	COLLOCATES					
JUSTICE	Committee	committee	reappear	opportunity	testimony	further
SCANDAL	investigate	RCMP	Trudeau's	Justin	now	SNCLavalin
MPS	whipped	Liberal	Justice	committee	easily	Unceremoniously
GOVERNMENT	thoroughly	disgusted	I'm	hesitate	your	resources
PARLIAMENT	protocol	deceive	openly	trying	committee	---
PROTOCOL	deceive	parliament	committee	---	---	---
TESTIMONY	further	justice	before	committee	responding	Minister

Table 4.11 HT1 most frequently recurring words and their 6 most prevalent collocates

WORD	COLLOCATES					
SCANDAL	GropeGate	Pressuring	Accused	Sermon	Three	preaching
JUDGE	wrongful	conviction	claims	legal	SCC	advice
LEGAL	outside	sought	tells	judge	SCC	advice
POLITICAL	those	arguments	side	pass	junkies	clerk
PROSECUTORS	federal	Bill	arguments	difference	Morneau	pass
SCANDALS	GropeGate	India	---	---	---	---
WRONGFUL	conviction	claims	judge	SCC	former	---
JUSTICE	ObstructionOfJustice	Minister	TelfordWives	TelfordOpEd	PMOLeaks	AdmiralNormanTrial

Table 4.12 HT2 most frequently recurring words and their 6 most prevalent collocates

WORD	COLLOCATES					
SCANDAL	Inquiry	LYING	FUCKING	becuz	STOP	He's
SUING	Scheer	inquiries	becuz	'to	Sun	LYING
PM	immediately	brings	notice	still	libel	can't
DEFAMATION	pale	beyond	'inquiries'	o	evidence	crimes
CORRUPTION	stop	press	corporate	hold	talking	people
CRIMES	o	evidence	becuz	accusing	defamation	w
ELECTION	before	bonkers	occur	all	right	cdnpoli
SUE	prepare	lawyer	AndrewScheer	LavScam	cndpoli	Threatening
PRIME_MINISTER	---	---	---	---	---	---
POLITICAL	Future	Excuse	Choice	Behaviour	When	JustinTrudeau?s
LAWYER	prepare	sue	AndrewScheer	cndpoli	ruthmkb	called
CRIMINAL	Rhetoric	Mastermind	Line	Type	conspiratorial	case

Table 4.13 HT3 most frequently recurring words and their 6 most prevalent collocates[15]

Because the word 'scandal' appears in high frequency across all 5 corpora, I chose to focus the remainder of the qualitative analysis on tweets containing the word 'scandal' as potential instances in the discourse where *semantic contagions* were likely to have been cultivated (see Tables 4.11-4.13 above and Tables 4.14-4.16 below).

[15] Represented in this table as they appeared within the #SNCLavalin Twitter discourse of 2019**.** Tables 4.11, 4.12 and 4.13 display collocations with the words from the coding schematic devised for this study based on LL-scores. Because of the amplifying quality of 'retweets,' a Twitter corpus tends to produce exceptionally high LL-scores, and so the cut-off for the LLscore at 1000.00 reflects the exaggerated amplification generated by 'retweets.'

Astroturf Bot Content					Human 1 Content March 14 (00:03) - March 14 (14:53				
Rank	**Collocate**	**With**	**LL**	**T-score**	**Rank**	**Collocate**	**With**	**LL**	**T-Score**
1	*RCMP*	scandal	120.04	3.44	1	*investigate*	scandal	1318.58	11.02
2	*investigate*	scandal	120.04	3.44	2	*RCMP*	scandal	1152.94	10.51
3	*Trudeau's*	scandal	106.52	3.44	3	*Trudeau's*	scandal	1054.08	10.49
4	*Justin*	scandal	91.31	3.42	4	*Justin*	scandal	1054.08	10.49
5	*now*	scandal	88.97	3.42	5	*now*	scandal	947.10	10.46

The LL (log-likelihood) field shows how significant the difference is. You should just look at items with a '+' code since this shows overuse in your text as compared to the standard English corpora. To be statistically significant you should look at items with a LL value over about 7, since 6.63 is the cut-off for 99% confidence of significance.

Table 4.14 HT1 5 most prevalently recurring collocates with the word 'scandal'

Astroturf Bot Content					Human 2 Content March 28 (03:15) - March 29 (16:11)				
Rank	**Collocate**	**With**	**LL**	**T-score**	**Rank**	**Collocate**	**With**	**LL**	**T-Score**
1	*RCMP*	scandal	120.04	3.44	1	*Gropegate*	scandal	547.51	6.39
2	*investigate*	scandal	120.04	3.44	2	*Senior*	scandal	215.17	3.87
3	*Trudeau's*	scandal	106.52	3.44	3	*retirement*	scandal	215.17	3.87
4	*Justin*	scandal	91.31	3.42	4	*funds*	scandal	207.69	3.87
5	*now*	scandal	88.97	3.42	5	*workers*	scandal	187.65	3.87

Table 4.15 HT2 5 most prevalently recurring collocates with the word 'scandal

Astroturf Bot Content					Human 3 Content April 8 (13:34) - Apr 9 (09:23)				
Rank	**Collocate**	**With**	**LL**	**T-score**	**Rank**	**Collocate**	**With**	**LL**	**T-Score**
1	*RCMP*	scandal	120.04	3.44	1	*inquiries*	scandal	1098.78	8.76
2	*investigate*	scandal	120.04	3.44	2	*LYING*	scandal	1098.78	8.76
3	*Trudeau's*	scandal	106.52	3.44	3	*FUCKING*	scandal	1098.78	8.76
4	*Justin*	scandal	91.31	3.42	4	*becuz*	scandal	1098.78	8.76
5	*now*	scandal	88.97	3.42	5	*STOP*	scandal	1088.07	8.76

Table 4.16 HT3 5 most prevalently recurring collocates with the word 'scandal

To summarize, the qualitative phase of this research involved the following processes:

1) The creation of a typology of words appearing in each corpus with high frequency based on a 'relative frequency' score of ≥ 0.10.

2) Identification of collocates of statistical significance using WMatrix5's (Rayson 2021) LLscores[16] (with a cut-off of ≥ 7 reflecting the amplification of key words and phrases generated by the digital logistics of the 'retweet' feature) and T-scores.

3) The identification of words behaving as *landmark*s and *trajectors* within collocates making up composite conceptual wholes.

4) The identification of words and phrases likely operating as *semantic contagions* within tweets containing the word 'scandal' posted by Twitter-bots across the #SNCLavalin Twitter discourse.

5) Analysis of collocated words and phrases posted by bots and an assessment of which of these were replicated in tweets posted by humans.

4.4.2. What Collocation Potentially Signifies

From the perspective of cognitive linguistics, frequent recurrence of collocates in language use (within discourse) can convey instances where the meaning of one word becomes scaffolded onto the meaning of another word in situ, generating the conceptual *categorization* of each word's meaning. Based on Lakoff's (1988) conception of *idealized cognitive models*, frequently recurring collocates can also instantiate instances of "categorization [which] involves comparison where the phenomenon encoded is judged as belonging to the same class of phenomena to which the selected linguistic expression has been previously applied" (Hart 2011: 179).

Thus, repeated recurrence of words, phrases, and expressions within a thread of discourse not only renders their *semantic framing* and the stabilization of their meaning into *idealized cognitive models* possible, but it may also produce ideological effect, especially when one word in the collocate is repeatedly used by text-producers as an ideological classifier (Hart 2011).

For example, within the context of the #SNCLavalin Twitter discourse, we can see that some words *classify* 'meaning' into *frames* by activating semantically salient ideologies that set different narratives and assumptions in motion within the mind. For instance, the pairing of words like **TRUDEAU'S** with **SCANDAL** or **RCMP** with **SCANDAL** activate different *semantic frames* than the word-pairs **NOW** and **SCANDAL** or even **INVESTIGATE** and **SCANDAL** in the same context (see

[16] An LL-score is a 'Log Likelihood Score,' which is a "goodness of fit" model that identifies 'keyness' in focal text by measuring co-occurrence affinity – for more explanation on the LL-ratio, see Piao et al. 2005; Manning and Schutze 2000; Dunning 1993; Daille 1995.

Figure 4.9, for example). The inclusion of a proper noun belonging to a significant political actor (e.g., Prime Minister Justin Trudeau) alongside words semantically contributing to the attribution of the person to whom the proper noun belongs frames our interpretation of the tweet within which these words appear together. To refine analysis and further qualify word-sense and expression of collocated words, I used WMatrix5's (Rayson 2021) semtag operation (see Figures 4.9-4.12). The API's semtag operation tags every word making up a corpus and assigns a 'tag' to each word (e.g., G1.1 + or E1.2 -) according to a multi-tiered framework consisting of 21 major discourse fields refined into 232 fine-grained subdivisions according to a lexicon of over 37,000 words and 16,000 multi-word units of synonyms, antonyms, and hypernyms (Archer, Wilson and Rayson 2002).

Figure 4.9 BOTS USAS Tagsets[17]

[17] Semantically tagged collocations from BOTS and SEMTAG descriptors from the USAS Semantic Tagset. See http://ucrel.lancs.ac.uk/usas/ for more details.

Figure 4.10 ASTRO USAS Tagsets [18]

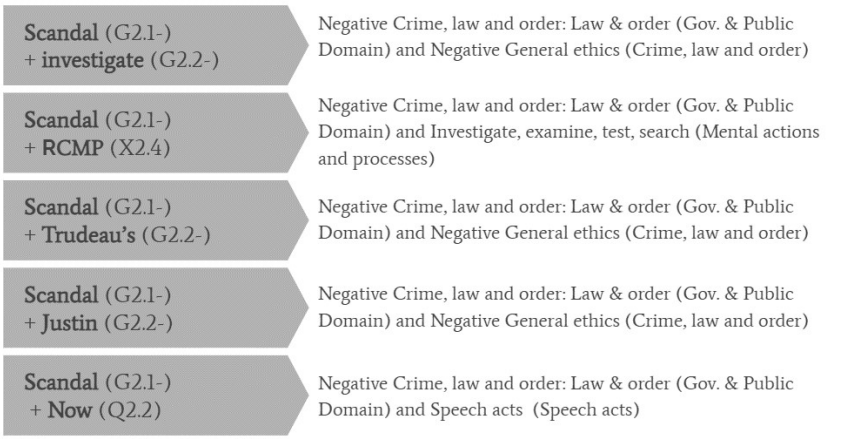


Figure 4.11 HT1 USAS Tagsets [19]

[18] semantically tagged collocations from ASTRO and SEMTAG descriptors from the USAS Semantic Tagset
[19] Semantically tagged collocations from HT1 and SEMTAG descriptors from the USAS Semantic Tagset

Scandal (G2.1-) + **Gropegate** (G2.2-)	Negative Crime, law and order: Law & order (Gov. & Public Domain) and Investigate, examine, test, search (Psychological Actions, States & Processes)
Scandal (G2.1-) + **Senior** (I3.1-)	Negative Crime, law and order: Law & order (Gov. & Public Domain) and Negative Work and employment: Generally (Work & Employment Domain)
Scandal (G2.1-) + **Retirement** (Z1)	Negative Crime, law and order: Law & order (Gov. & Public Domain) and Work and employment: Generally (Work & Employment Domain)
Scandal (G2.1-) + **Funds** (Z99)	Negative Crime, law and order: Law & order (Gov. & Public Domain) and Unmarked
Scandal (G2.1-) + **Workers** (I3.1-)	Negative Crime, law and order: Law & order (Gov. & Public Domain) and Work and employment: Generally (Work & Employment Domain)

Figure 4.12 HT2 USAS Tagsets [20]

Scandal (G2.1-) + **Inquiries** (Z99)	Negative Crime, law and order: Law & order (Gov. & Public Domain) and and Unmarked
Scandal (G2.1-) + **LYING** (G2.1)	Negative Crime, law and order: Law & order (Gov. & Public Domain) and Crime, law and order: Law & order (Gov. & Public Domain)
Scandal (G2.1-) + **FUCKING** (G2.1)	Negative Crime, law and order: Law & order (Gov. & Public Domain) and Crime, law and order: Law & order (Gov. & Public Domain)
Scandal (G2.1-) + **becuz** (G2.1-)	Negative Crime, law and order: Law & order (Gov. & Public Domain) and Negative Crime, law and order: Law & order (Gov. & Public Domain)
Scandal (G2.1-) + **STOP** (G2.2-)	Negative Crime, law and order: Law & order (Gov. & Public Domain) and General ethics (Terms relating to moral principles/accepted moral practices, or the lack of)

Figure 4.13 HT3 USAS Tagsets[21]

According to Fillmore (1976, 1982, 1985, 2006), analysis of linguistic phenomena, such as noun-adjectival sequences, within a thread of discourse can potentially expose how words, phrases, and collocates become classified into a common *semantic field*. Linguists Adrienne Lehrer and Paul Lanan Battan (1985: 119) define a *semantic field* as "…a set of lexemes which cover a certain conceptual domain, and which bear certain specifiable relations to one another" as determined by the semantic, textual, and social context they are embedded in. Thus, locating statistically significant and frequently

[20] Semantically tagged collocations from HT2 and SEMTAG descriptors from the USAS Semantic Tagset
[21] Semantically tagged collocations from HT3 and SEMTAG descriptors from the USAS Semantic Tagset

recurring collocates within a thread of discourse may reveal instances in where words and phrases are assembled into conceptual composites representing a specific semantic domain of ideological salience. Indeed, the compositing of words and phrases demarcated by collocates may also uncover the conceptual classification of *semantic contagions* in the minds of Twitter users, bringing their *prototype effects* to light through analysis (Fillmore 1976; Charteris-Black 2006: 574).

Moreover, the linguistic construction of statistically significant recurring collocates belonging to a thread of discourse within a 'controlled situation' (e.g., the Twitter platform could be considered a controlled situation since it regulates and limits the parameters for engagement) may contribute to the constitution of meaning generated in human minds, which also, therefore, determines which conceptual knowledge becomes blended into the *semantic frames* of memory (Charteris-Black 2006: 574). For example, the following tweet containing the collocated words 'investigate' and 'scandal' from the HT1 corpus (which appeared within the #SNCLavalin Twitter discourse on 03/14/2019 - see Figure 4.11 above):

> *Please RT! The RCMP must* ***investigate Justin Trudeau's #SNCLavalin scandal*** *now. If you agree, please SHARE and SIGN our petition at https://t.co/EuhU0EyMLs | #cdnpoli #hw #ONpoli #ABpoli (Posted by independent news outlet: 03/13/2019; Retweeted by human users 112 times 03/14/2019; Retweeted by bots 31 times)*

The phrase "the RCMP must investigate" *semantically frames* issues of criminality requiring investigation within the semantic field of law and order, and the phrase "Justin Trudeau's #SNCLavalin scandal" *semantically frames* the Prime Minister's political conduct as scandalous within the semantic field of general ethics. Juxtaposition of the collocates affixed to the words 'investigate' and 'scandal' embedded in two semantic fields that conceptually constitute the underlying meaning of the tweet (implicitly and explicitly) could potentially activate *gestalt-like* heuristic reasoning. In this way, analysis of collocation across the #SNCLavalin Twitter discourse can also expose the *priming effects* that *semantic contagions* incite, potentially resulting in the classification of "Justin Trudeau" and the "#SNCLavalin scandal" as mutually inclusive in the minds of Twitter users (drawing, once again, from the tweet cited above as our example).

It is also worth noting that Twitter constitutes a 'controlled situation' since its technological affordances (e.g., the character limit per tweet) as well as the semantic and syntactic design of the interface determines how content flows and appears in our mediated spaces. Its interface also constrains the degree of possible interactions that can take place with a tweet, and thus constrains the flow of semiosis within which *semantic contagions* derive their meaning. Moreover, the semantic and syntactic design of the interface enables political intermediaries to control the organization of the word and phrase

composites – the tenor and tone of the language – of political information that Twitter users are exposed to by leveraging the predictable conditions that the Twitter platform affords. All these factors contribute to the ways in which human minds interpret collocated words and phrases, as well as their conceptual currency as they become *semantically framed* within politically charged Twitter discourse.

Further investigation of the collocation of the words 'RCMP' and 'scandal' (see Figures 4.10 and 4.11 above), for example, exposes instances where the content of tweets posted by bots is replicated by human Twitter users (within the tweet cited above), which indirectly affirms the activation of *priming effects* of *prototypical* significance in instances where collocates were likely entrenched into conceptual categories framing the federal government's intervention in the scandal as something rising to the level of a crime that "the RCMP must investigate" within the minds of Twitter users. As these classifications conceptually coalesce into a common *semantic frame* within the minds of Twitter users, reference to the words 'Trudeau's scandal' or 'RCMP' in the context of the #SNCLavalin discourse thread may gradually come to activate the entirety of the *frame* "the RCMP must investigate Trudeau's SNC Lavalin scandal now" with prolonged exposure to, and engagement with the #SNCLavalin Twitter discourse.

Though visual content is not the primary target of inquiry for this dissertation, the significance of including the 'JailTrudeau.com' poster in the initial post featuring the tweet cited in Image 4.1 below also contributes to the entrenchment of *semantic contagions* framing 'Justin Trudeau's SNC Lavalin scandal' as something that ought to be 'investigated by the RCMP.'

Image 4.1 Screenshot of original tweet – posted by independent media outlet 03/13/2019 – on Twitter (captured on 05/15/2023 at 15:08)

Accordingly, identification of collocations across the #SNCLavalin Twitter discourse of 2019 reveals the *framing effects* of word and phrase composites textually organized in syntactic proximity to others. The conceptual effect of this syntactic proximity can be detected in subsequent tweets posted by humans, where several of the word and phrase composites circulated by bots are replicated by human users:

> ***Liberals shut down SNC justice committee meeting, preventing vote on recalling WilsonRaybould*** */via @globeandmail https://t.co/6nMNwQnbD8 #bcpoli #bcndp #bclp #bcgreens* ***#corruption*** *#JodyWilsonRaybould* ***#snclavalin*** *#janephilpott (Posted by news media outlet: 03/13/2019 16:58; Retweeted by human users 7 times: 03/14/2019; Retweeted by bots 7 times)*
>
> *Charlie, there is no way that you can be so right on so many issues, and be so wrong on* ***#SNCLavalin****. The SNC story is simple:* ***they were corrupt. They are being prosecuted.*** *The only (internal) debate was wether through court or DPA. Harping on it is worthy of P.Poilievre, not you (Posted by human user: 03/14/2019 01:16; Retweeted by human users 8 times: 03/14/2019; Retweeted by bot: 03/14/2019 02:35)*

*How about **Justin Trudeau's moral character is imploding**. This is **corruption** in the Liberal government starting from the top. It's not about misogyny. #JustinTrudeau #SNCLavalin **#SNCLavalinScandal** (Posted by human user: 03/14/2019 02:57:55)*

*Total #CoverUp by Trudeau's MP majority at #JusticeCommittee like today's meeting is exactly why our #CPC Senate Opposition introduced motion for #SenCA **Legal committee to investigate #SNCLavalin scandal**. LISTEN to my Senate speech on why this must happen (Posted by Senator Denise Batters on 03/14/2019 14:57; Retweeted by human users 11 times on 03/14/2019)*

*THIS IS MY OPINION... #Canadians CANNOT LET THEM **SHUT THIS DOWN,** WE DONT KNOW ANYMORE TODAY THAN WE DID AFTR **JUSTICE COMMITTEE SHUTDOWN**! #SNC #SNCLavalin DONT LET HIM **SLITHER OUT OF THE TRUTH**! **#RCMP Is** #Trudeau hiding something worse in #Lavscam rift? (Posted by human user: 04/09/2019 10:41; Retweeted by human users twice 04/09/2019; Retweeted by bot: 04/09/2019 15:09)*

As we can see, repeated juxtaposition of words like 'Trudeau's,' 'scandal' (also denoted by the appearance of '#SNCLavalin'), and 'criminal investigation' are regnant across tweets and retweets posted by humans, which appear frequently alongside related disparaging words and phrases such as *Legal committee to investigate, they were corrupt, they are being prosecuted, shut down, justice committee, corruption, moral character is imploding, SHUT THIS DOWN, JUSTICE COMMITTEE SHUTDOWN, SLITHER OUT OF THE TRUTH,* and *hiding something worse*, which are assembled into an ecology of signification that gradually comes to semantically frame 'Trudeau' and the 'Liberal Party' as corrupt and morally deficient in ways that requisite significant criminal investigation.

As we proceed with this analysis, it is important to remember that the question for consideration here is not a matter of whether Prime Minister Trudeau breached the *Conflict of Interest Act*, but whether a sound, sober, and cogent critique of his political conduct was accomplished across the #SNCLavalin discourse of 2019, as Habermasian paradigms would predict, or whether Canadian Twitter users were *primed* to accept that his conduct did, in fact, constitute a violation of 'the Act' before due process could be conducted. The material point is that the conceptual force of *semantic frames* frequently repeated on Twitter is sufficiently substantial to generate *priming-effects* that activate *gestalt-like* heuristic modes of thinking in ways that cultivate relationships of equivalency between concepts that may not inherently belong together, or that may oversimplify the complexity of their affiliation.

4.4.3. Landmarks and Trajectors

Langacker's (2006) conception of *cognitive grammar* – a theory that falls within the ambit of cognitive linguistics – is pertinent to the analysis of collocations as *semantic contagions* appearing within

#SNCLavalin Twitter discourse. *Cognitive grammar* works from the premise that language is not a self-contained system and cannot be analyzed without an account of corresponding cognitive processes and social contexts (Langacker 1986). Following this assumption, Langacker's iteration of *cognitive grammar* postulates that human minds construct grammatical structures according to distributed cognitive networks responsible for the structuring, categorizing, classifying, and conventionalizing the symbolic representations of conceptual matter as human minds engage with the world (Langacker 1986: 2).

I use Langacker's (1987) formulation of the terms *landmark* and *trajector* to represent the role that each word potentially serves within certain collocates appearing in tweets containing the word 'scandal.' Together, the *landmark* and *trajector* conceptually make up a composite whole in noun-adjectival sequences. For example, the word phrase 'illicit scandal' consists of a landmark (e.g., illicit) which qualifies some aspect of the *trajector*, or receiving lexical unit (e.g., the scandal). Langacker proposed that the grammatical significance of conceptualization processes involves the imposition of a 'profile' (descriptor) to a 'base' (receptor), which corresponds to 'figure / ground' relationships as conceived by *gestalt theory*, within linguistic predication. This is to say that in principle, grammatical structure correlates with the conceptual and categorical organization of representations in time and space across general distributed networks of human cognition. Within the grammatical structuring of word and phrase composites demarcated by collocates across the #SNCLavalin Twitter discourse, therefore, we may detect several instances where some words act as a 'base' (a *trajector*), or as a target domain being qualified (in time and space), while other words act as 'profiles' (*landmarks*) or substructures that designate the quality, character, state, condition, etc. of the 'base.' The semantic significance of linguistic expression does not reside in the 'profile' or 'base' individually, but rather, it is construed in the relationship between both.

For example, in the sentence: *David read a new book,* the verb 'read' contains both a *landmark* and a *trajector* as "relational predications at any level of organization, even if left implicit" (Langacker 1986: 11). In this example, 'David' is the active target or *trajector* being qualified in some way by the *landmark*, and the *landmark* is implicitly referenced in 'relational predication' with 'David's state of 'reading' or the personal characterization of 'David' as an avid reader. In this sense, a *trajector* is the predicating 'figure' within the relational profile and the *landmark* is the 'grounding' or contextualizing concept that attributes qualities to the *trajector* within a 'profile' (composite whole).

Within the Twitter discourse affixed to #SNCLavalin in 2019, analysis of several instances where relational predications between *landmarks* and *trajectors* within word and phrase composites revealed ways in which the flow of semiosis through the convergence of human thought, algorithmic computation, and political electioneering on Twitter were replicated in tweets posted by human users, thus confirming their relevance in shaping public opinion about Prime Minister Trudeau and the Liberal Party

of Canada within the context of the SNC Lavalin affair in 2019. Locating words and phrases assembled into composites associated within others situated in syntactic proximity to one another helped identify instances of relational predications between *trajectors* and *landmarks* creating pair associations, which supports the qualitative assessment of #SNCLavalin Twitter discourse.

Table 4.17 features several collocations with T-scores of ≥ 0.10 that functioned explicitly and implicitly as *landmark* / *trajectory* word pairs. For example, the word pairs *obstruction* and *justice*, *political* and *future*, as well as *PM* and *Coverup* explicitly operate as landmark / trajectory collocates in which one word helps anchor the meaning of the other in ways that semantically frame their significance. The relational meaning of the collocates 'scandal' and 'RCMP,' 'testimony' and 'committee,' and 'government' and 'defensive' are less obvious and may only function within the *landmark/trajectory* schematic implicitly and contextually. Further contextualization of these implicit associations is, therefore, necessary.

WORD	RELATIVE FREQUENCY	COLLOCATE	T-SCORE	LANDMARK	TRAJECTOR
scandal	0.50	RCMP	3.44	RCMP	scandal(ous)
corruption	0.31	bcndp	3.15	bcndp	corrupt(ion)
justice	0.22	obstruction	3.31	justice	obstruct(ed)
government	0.20	defensive	2.00	government	defensive
PM	0.18	CoverUp	1.73	Prime Minister (Office)	coverup
political	0.14	future	1.73	future	political
testimony	0.14	committee	2.63	testimony	(made by) committee

Table 4.17 BOTS Collocated word-pairs / Landmarks & Trajectors

Examining these collocates in situ within the tweets from which they originate (delineated below in the order in which they appear in Table 4.17) allows us to confirm their meaning and relational predication:

> *#bcliberals also **deep in bed with #SNCLavalin** and others, but no other party has **obstructed justice** for SNC besides liberals, no other party wrote #TooManyDonationsToJail DPA law for & no other party likely to lose power over a coverup for what they did #lavscam #cdnpoli (Posted by human user: 04/08/2019 15:29; Retweeted by Twitter bot: 04/08/2019 20:29)*

> *Despicable, shameful, anti-democratic behaviour by #**Trudeau-whipped Liberal MPs** at Justice committee! They don't want to #LetHerSpeak, and they use their majority to*

*force #**PMOCoverUp** on #SNCLavalin to continue. (Posted by Senator Denise Batters 03/13/2019 13:31; Retweeted by human users 33 times on 03/143/2019; Retweeted by bots 8 times 03/14/2019)*

*Is Canada's PM @JustinTrudeau's **political future** in jeopardy? @AJStream explores how the #SNCLavalin scandal could possibly threaten his bid for re-election. Join the conversation live on YouTube (Posted by human user: 04/09/2019 20:30; Retweeted by human users 5 times 04/09/2019; Retweeted by bot: 04/09/2019 21:50)*

*Do you believe that @Puglaas should be afforded the opportunity to reappear before the **justice committee** for further **testimony**? #cdnpoli #LetHerSpeak #SNCLavalin #LavScam (Retweeted by human user: 03/14/2019 00:39; Retweeted by human users 32 times: 03/14/2019; Retweeted by bots 8 times)*

In the first tweet, we can see that the phrase *obstructed justice* is positioned alongside other words and phrases like *#bcliberals, deep in bed with #SNCLavalin, no other party likely to lose power,* and *a coverup for what they did*. This conceptual schema replicates linguistic and grammatical patterns from examples examined later in Section 5.2.3.3 of Chapter 5, thus activating reference to Prime Minister Trudeau's alleged corruption within semantic memory, increasing the likelihood that Twitter users will succumb to the *priming effects* of the collocation *obstructed justice*. Twitter users exposed to these conceptual schemas are more likely to ascertain that justice was obstructed, that this obstruction is related to the SNC Lavalin scandal, and that the Liberal Party is somehow responsible for the obstruction of justice related to the SNC Lavalin scandal.

These themes are also repeated in subsequent tweets within which the same collocates appear. For example, the collocates *PM(O)* and *Coverup* also imply an *obstruction of justice* that Prime Minister Trudeau and the Liberal Party are alleged to have committed in relation to the SNC Lavalin scandal. The words *despicable, shameful,* and *anti-democratic* confirm the tenor of this allegation that the collocation of *PM Coverup* helps activate within the semantic memory of Twitter users. In the last tweet cited below (and featured in Tables 4.17-4.19 below), the collocated words *committee* and *testimony* are relationally predicated by the inclusion of the words *justice* and the phrases *let her speak* and *Lavscam*, which came to operate as *semantic contagions* through their frequent, repeated, and recurring appearance in similar conceptual contexts across the #SNCLavalin Twitter discourse in 2019.

The collocation of words in the context of tweets posted by Astroturfing bots also reveal a good deal about the themes that were 'trending' most significantly and/or the conceptual themes that political intermediaries endeavoured to punctuate most fervently on March 14, 2019. Allegations that Prime Minister Trudeau and the Liberal Party were engaged in *covering up* the *#Lavscam* and were *obstructing justice* by not *letting her* (Attorney General Jody Wilson Raybould) *speak* about allegations

that Prime Minister Trudeau attempted to influence her decision pertaining to SNC Lavalin's request for a DPA were central political talking points perpetuated by Astroturfing Twitter-bots on March 14, 2019, as highlighted by the frequency with which these themes were repeated within the #SNCLavalin Twitter discourse at that time.

WORD	RELATIVE FREQUENCY	COLLOCATE	T-SCORE	TRAJECTOR	LANDMARK
scandal	0.27	RCMP	1.99	RCMP	scandal(ous)
judge	0.24	conviction	2.00	conviction	Judge(d)
justice	0.16	obstruction	2.00	justice	obstruct(ed)
legal	0.16	outside	2.00	legal	outside (external)
PM	0.13	CoverUp	1.73	coverup	(conducted by) PM
mps	0.13	Liberal	2.23	mps	Liberal
Wrongful	0.11	conviction	2.00	conviction	wrongful
prosecutor	0.11	experienced	2.00	prosecutor	experienced

Table 4.17 ASRTO Collocated word-pairs / Landmarks & Trajectors

> *Gee, now JWR tells us she sought **outside legal advice** from a former SCC **judge** on **wrongful conviction** claims. And we'd been told she was such an **experienced former prosecutor** she didn't need such advice on #SNCLavalin. #cdnpoli (Posted by human user: 03/28/2019; Retweeted by human users 46 times between 03/28 – 03/29/2019; Retweeted by bots 20 times)*

> *By all means Prime Minister, test your case in court. That would allow an investigative setting in which **Liberal MPs** can't control proceedings and all #SNCLavalin testimony would be under oath and open. What might we learn then? (Posted by human user 04/08/2019: 15:47; Retweeted by human users 3 times: 04/08/2019; Retweeted by bots 3 times)*

WORD	RELATIVE FREQUENCY	COLLOCATE	T-SCORE	TRAJECTOR	LANDMARK
justice	0.53	committee	9.66	committee	justice
scandal	0.52	investigate	11.02	investigat(ion)	scandal
mps	0.14	whipped	5.73	mps	whipped
government	0.13	disgusted	5.47	government	disgust(ing)
parliament	0.12	deceive	6.55	parliament	dece(ptive)
protocol	0.11	parliament	6.55	protocol	parliament(ary)
testimony	0.11	further	5.73	testimony	further (more)

Table 4.18 HT1 Collocated word-pairs / Landmarks & Trajectors

Similar themes represented in word and phrase collocates are replicated in tweets posted by human users on March 14, 2019, which is in line with findings generated by the chi-square test of independence (see Table 4.7 above) confirming correlation between tweets posted by humans and those posted by bots. As we can see, within the collocation of the words *justice* and *committee*, we come to ascertain that the former (*trajector*) serves to qualify the latter (*landmark*). Again, the meaning and significance of this collocation is further contextualized by words and phrases positioned alongside the collocate within the tweet's text, such as *whipped Liberal MPs*, *deceive*, *Lavscam*, and *Let Her Speak*:

> *Despicable, shameful, anti-democratic behaviour by #**Trudeau-whipped Liberal MPs** at Justice committee! They don't want to #LetHerSpeak, and they use their majority to force #PMOCoverUp on #SNCLavalin to continue. (Posted by Senator Denise Batters 03/13/2019 13:31; Retweeted by human users 33 times on 03/143/2019; Retweeted by bots 8 times 03/14/2019)*
>
> *I can't tell if I am angry that Canadian media is openly trying to **deceive** us about **Parliament Committee protocol**, or if I am enjoying the meltdown on Twitter by Journalists not getting the show they were promised? (Retweeted by human user: 03/14/2019 13:40; Retweeted by human users 42 times: 03/14/2019; Retweeted by bots 3 times)*
>
> *Do you believe that @Puglaas should be afforded the opportunity to reappear before the justice committee for **further testimony**? #cdnpoli #LetHerSpeak #SNCLavalin #LavScam (Retweeted by human user: 03/14/2019 00:39; Retweeted by human users 32 times: 03/14/2019; Retweeted by bots 8 times)*

Below, in Table 4.20, we can see that, once again, the most frequently collocated words reveal a good deal about the general tenor of the #SNCLavalin Twitter discourse between March 28-29, 2019. Again, the meaning and significance of some collocations are clearer than others. For example, the words *political* and *arguments*, *federal* and *prosecutors*, *wrongful* and *conviction*, and *obstruction* and *justice* all denote the explicit meaning of the words paired into collocates based on their conventional familiarity in colloquial parlance. Other collocations are less obvious, as is the case for the words *Gropegate* and *scandal*, and *legal* and *outside* (see Table 4.20).

WORD	RELATIVE FREQUENCY	COLLOCATE	T-SCORE	TRAJECTOR	LANDMARK
scandal	0.20	Gropegate	6.39	scandal	N/A
judge	0.20	wrongful	6.77	judge	wrongful
legal	0.17	outside	6.84	legal	Outside (external influence)
political	0.14	arguments	4.12	arguments	political
prosecutors	0.14	federal	6.55	prosecutors	federal
wrongful	0.12	conviction	6.55	conviction	wrongful
justice	0.10	obstruction	5.73	justice	obstruct(ed)

Table 4.19 HT2 Collocated word-pairs / Landmarks & Trajectors

Understanding the first implicit reference to *GropeGate* in relation to the word *scandal* necessitates some background. The term references an allegation publicly announced in July of 2018 that Prime Minister Trudeau had inappropriately interacted with a woman. The pairing of the term *GropeGate* with the word *scandal* in the context of a tweet that also features phrases like *Let Her Speak* and *shame on you* alongside the term *GrassyNarrows*[22] foregrounds notions of Trudeau as a political leader prone to *scandal*, thus positioning the Prime Minister as the *trajector* or receptacle of the adjectival qualities of sexual predation, inhumanity, callousness, and unscrupulousness, which are concepts embodied by the word *scandal* operating in the tweet as a *landmark*. In this way, a conceptual ecology of representations denoting the notion of *infamy* ensconces representations Prime Minster Trudeau's character within the tweet cited above and in the following tweet:

[22] #GrassyNarrows is used to reference Trudeau's alleged attempt to pass on responsibility for the contamination of Grassy Narrows First Nation's as well as his blunder in sarcastically uttering "thank you for your donation" as a supporter of the Grassy Narrows First Nation was escorted out of an event hosted by the Liberal Party on the topic of the community's contaminated water source (Fiddler 2019)

> *@JustinTrudeau Its beginning to make me wonder if a $1500 donation from #GrassyNarrows will be his downfall. Rather than the #SNCLavalin, #MarkNorman, #LetHerSpeak, #GropeGate scandals? Thank you Justin for showing your true colours. And to those applauding in the crowd, shame on you. (Posted by human user 03/27/2019 23:48; Retweeted by human users 25 times: 03/28 – 03/29/2019; Retweeted by bot once: 03/28/2019 14:11)*

The tweet containing the words *obstruction* and *justice* is colloquially referred to as a "Twitter bomb" because it contains only hashtags that are meant to characterize a primary target, which is Prime Minister Trudeau (the *trajectory*) in the case of the following tweet:

> *#fakefeminist #fraud #globalist #puppet #Trudeau #Butts #Morneau #Telford #Freeland #PMO #Corruption #investigateTrudeauFoundation #SNCLavalin #TrudeauCoverUp #**ObstructionOfJustice** #Canada #cdnpoli #TrudeauIsDone #LibsAreDone #Scheer4PM #LavScam (Posted by human user: 03/28/2019 19:11; Retweeted by human users 14 times: 04/08 – 04/09/2019; 05:49:36)*

Here, the hashtag *#fakefeminist* correspond with the *GropeGate* allegations alongside other hashtags of accusatory tone, including *#fraud*, *#globalist*, *#Corruption*, *#TrudeauCoverUp*, and *#LavScam*. Other hashtags like *#Butts*, *#Morneau*, and *#Telford* cultivate a web of culpability around Trudeau alongside other members of the Liberal Party that are allegedly complicit with the SNC Lavalin scandal. The hashtag *#Scheer4PM* is revealing, in that it points to more conservative political sympathies of the Twitter user who retweeted this tweet, which was initially posted by a Twitter-bot on 03/28/2019 at 22:44:09.

Taken together, the most frequently collocated words from the corpus featuring tweets that were posted by human users between March 28-29, 2019, reveal a general focus on Prime Minister Trudeau's suppression of Attorney General Jody Wilson Raybould's ability to speak publicly about the events surrounding the SNC Lavalin affair in 2019. Reviewing tweets featuring these frequently recurring collocates also uncovers the linguistic and representational techniques used by political intermediaries for electioneering purposes online, which are designed to generate semantic associations between Trudeau and the Liberal Party and derogatory conception of their character, conduct, and integrity. In the process, these deleterious qualities become *landmarked* in the foreground of public opinion while diverting public attention away from any favourable attributes of the *trajector*. While the narrative generated by tweets posted by human users between March 28-29, 2019 continue to cultivate assumptions about Prime Minister Trudeau and the Liberal Party's culpability in the SNC Lavalin affair, words and phrases used most frequently by human users do not correspond with the words and phrases appearing most frequently

in the tweets posted by Twitter-bots at that time, which, once again, is consistent with findings generated by the chi-square test for independence (see Table 4.7 above).

Table 4.20 below features the most frequently recurring collocations of words and phrases appearing in tweets posted by human users between April 8-9, 2019. From this list, the meaning and significance of only two collocations appear to be clearly represented. Specifically, the signification of the collocation of the word *political* and *future*, as well as *criminal* and *mastermind* can be discerned at face value.

WORD	RELATIVE FREQUENCY	COLLOCATE	T-SCORE	TRAJECTOR	LANDMARK
scandal	0.35	inquiries	8.76	inquiries	scandal(ous)
suing	0.34	Scheer	12.78	Scheer	suing (fault)
PM	0.32	libel	6.77	PM	libel(ous)
defamation	0.20	crimes	8.75	crimes	defam(ing)
corruption	0.19	scandal	6.58	corruption	scandal(ous)
crimes	0.17	evidence	8.76	evidence	crim(inal)
election	0.16	cndpoli	7.13	election	Canadian
political	0.13	future	4.12	future	political
lawyer	0.11	cndpoli	6.16	lawyer	Canadian
criminal	0.10	mastermind	4.00	mastermind	criminal

Table 4.20 HT3 Collocated word-pairs / Landmarks & Trajectors

We can see this clarity reflected by the collocation in the context of the following tweet:

> *Well, right now, "winning" would be @AndrewScheer and the @CPC_HQ ceasing talking as if the PM is some type of conspiratorial* ***criminal mastermind****. If this line of rhetoric stops, it's pretty much an admission of guilt. #CdnPoli #SNCLavalin (Posted by human user: 04/08/2019; Retweeted by human users 16 times between 04/08 – 04/09/2019; Retweeted by bots 6 times)*

In contrast, collocation of the word *corruption* with *scandal* is less conventional, less prevalent and, thus, less familiar to general audiences, and requires further contextualization. In the following tweet:

> *Take a moment to savour the fact Trudeau's Liberals actually thought a good way to stop people talking about a corporate* ***corruption scandal*** *was to hold a press conference announcing millions of dollars in handouts to the 2nd richest family in*

> *Canada. #cdnpoli #Loblaws #SNCLavalin (Posted by human user: 04/09/2019 05:30; Retweeted by human users: 04/08 - 04/09/2019; Retweeted by bots twice)*

The word *corruption* serves a more adjectival function (*landmark*), and the word *scandal* serves a more *vehicular* (*trajector*) function. Thus, *corruption* qualifies the kind of *scandal* that the tweet references. The context of the tweet in its entirety conveys that its author is critical of the Prime Minister's decision to hold a press conference announcing the federal government's plan to allocate funds to a major Canadian corporation while the SNC Lavalin scandal is allegedly under investigation. In this tweet, the author accuses Trudeau of using this announcement to redirect public attention away from SNC Lavalin's *corporate corruption scandal* and, implicitly, away from his alleged involvement in the matter.

Other collocated words such as *scandal* with *inquiries* and *defamation* with *crimes* also require contextual substantiation. The following tweet contains the collocated words *scandal* and *inquiries* and *defamation* and *crimes*:

> *Front page of The Sun today says #Trudeau is suing #Scheer to 'to shut down* ***inquiries*** *about the #SNCLavalin* ***'scandal'****. STOP.FUCKING.LYING. He's suing becuz Scheer is accusing him of* ***crimes w/o evidence****. That's* ***defamation****. That's beyond the pale of 'inquiries'! #fishwrapping (Posted by human user: 04/08/2019 22:26; Retweeted by human users 77 times between 04/08 – 04/09/2019; Retweeted by bots 3 times)*

In this tweet, we can discern that the word *scandal* is used somewhat adjectivally (as a *landmark*) to characterize the kind of *inquiries* (*trajectors*) that are being 'shut down,' as in "Trudeau is being accused of shutting down *SCN Lavalin scandal inquiries*." Thus, in this collocation, the word *scandal* functions more as a *landmark* while the word *inquiries* functions as the conceptual receptacle or *trajector* of qualification. The meaning of the second pair of collocated words *defamation* and *crimes* is also vague without contextualization. In this case, the conceptual dynamic of the pairing does not fit into the *landmark / trajectory* (noun /adjectival relationship) schema. Rather, the conceptual relationship appears to be one of elaboration, in that *crimes w/o* (without) *evidence* further qualifies the meaning of the word *defamation*. What is especially poignant about collocated words in this particular tweet is that Prime Minister Trudeau is not the primary target of reference. Rather, the logic of an article reporting on Trudeau's intention to sue Andrew Sheer for defamation (published in *The Sun*) is, in fact, the object of scrutiny. Use of the hashtag *#fishwrapping*, which suggests that the article published by *The Sun* is unreliable, confirms that the primary objective of this tweet is to question the article's integrity rather than the Prime Minister's.

Collocated words that operate grammatically according to more adjectival / vehicular schematics appear to accommodate the facility of entrenchment, retention, and recall than collocations that do not function according to the grammatical structuring of *landmarks* and *trajectors*. Langacker suggests that grammatical structuring of information is significant to how we conceptualize the world, and that human minds have a proclivity to categorize representations of the world through grammar by imposing a 'profile' to a 'base.' Thus, grammatical structures inform how human minds conceptually organize representations in time and space within the distributed networks of human cognition. One might conclude, therefore, that words collocated grammatically in ways that accommodate *landmark* / *trajectory* schematics (profile / base schematics) help human minds with the process of structuring, categorizing, classifying, and conventionalizing conceptual representations. We might also conclude that these kinds of word pairings are more likely to function as *semantic frames* that activate *contagion effects* within the collective consciousness of the public.

4.4.4. Semantic Frames and Contagion Effects

To articulate the ways in which *semantic contagions* across the #SNCLavalin Twitter discourse of 2019 function as *prime lures* that activate ideological concepts *semantically framed* within the minds of Twitter users, and to determine whether *semantic contagions* embedded in tweets posted by bots function as *prime lures* that also foment into categorically entrenched *prototypes* of ideological significance in the minds of human, I borrow from Geeraerts' (2019) work on the polysemic nature of semantic relations between words that are synchronically and diachronically unstable. Here, I posit that the *prototypicality* of *semantically framed prime lures* is subject to, but also dependent on the polysemic shifting of meaning alongside the changing parameters of socio-textual information on Twitter, as represented by aggregates of tweets belonging to a common discourse thread (e.g., #SNCLavalin) on Twitter.[23] The instability and polysemic vagueness of semantic relations between words is what makes new semantic construal of meaning possible since so many variables (e.g. context, word-pair choices, technological affordances, social conditions, cultural texts, etc.) contribute to the semantic constitution of meaning between words across a thread of Twitter discourse, and those variables are perpetually subject to change according to the shifting parameters of the textual and technical contexts (Taylor 2003; Geeraerts 1993; Tuggy 1993).

For example, the inclusion of *landmarks* and *trajectors* into common linguistic assemblage with other word and phrase composites (belonging to similar *semantic fields*) within a political tweet can augment the likelihood that they will function as *semantic contagions* in the constitution of public opinion

[23] Wierzbicka (1985), Sweetser (1986, 1987), Geeraerts (1994), Cruse (1995), Schmid (2000), Janssen (2003), Taylor (2003a, 2006), Zlatev (2003), Allwood (2003), Riemer (2005), Evans (2006, 2009)

on Twitter. Pre-existing knowledge of, and attitudes toward the SNC Lavalin scandal itself would also contribute to the ways in which these words and phrases become *semantically framed* within the minds of Twitter users and the ways in which *word-frequency effects* enhance the cognitive entrenchment of *semantic contagions* as users engage with the #SNCLavalin Twitter discourse in 2019.

Words and phrases frequently assembled in the same way in the same social media context can also be said to generate *prototype effects* when the relationship between a *landmark* and a *trajector* achieves some degree of *categorization* according to the ways in which they are *conceptually blended* (Fauconnier 2014) into a common *semantic field*. *Conceptual blends* (Faucconier 2014) also facilitate the entrenchment of the meaning generated by word and phrase composites into *semantic frames* within the knowledge structures of human minds, which may then come to shape ideologically loaded *schemas* and *heuristic* habits in reasoning (Fillmore 1982; Schank and Abelson 1977) – a process termed *confirmation bias* in the field of social psychology.

As mentioned in Section 3.2., Subsection 3.2.1.3. in Chapter 3, *heuristics* tend to activate 'best guess' or 'fill-in-the-blank' modes of reasoning. Thus, in this respect, the 'fuzzier' or implicit the boundaries are between the conceptual categories represented by words and phrases, the more successfully a collocate is likely to be in activating *heuristic* modes of thinking with exposure to political content. Moreover, the *fuzziness* of conceptual boundaries is what enables particular word and phrase composites to function as *semantic contagions* since the puzzle-like quality of resolving the *fuzziness* in the minds of Twitter users is also likely to activate *discovery misattribution effects* that best accommodate existing *heuristic biases* imprinted in human minds. Likewise, the more entrenched *semantic contagions* become within the *semantic frames* of human minds, the more likely they are to activate subsequent *prime lures* embedded across political Twitter discourse by continuing to make implicit reference to underlying political concepts, beliefs, values and assumptions held by constituents engaging with political discourse on Twitter.

For example, the colocation of 'Trudeau's' and 'Scandal' within the BOTS, ASTRO, and HT1 corpora are semantically tagged by WMatrix5 to represent some degree of legal deficiency on Prime Minister Trudeau's part. When analyzed in context, we can establish that the collocation of 'Trudeau's [#SNCLavalin] and 'scandal' coupled with the word-pair 'RCMP' and 'investigate' (see Corpus Sample 4.1) does, indeed, come to infer Trudeau's culpability in the SNC Lavalin affair, as affirmed by their implicit replication in tweets posted by human users. This replication also tacitly confirms that these words operate as *semantic contagions* that *prime* human minds to *conceptually blend* word and phrase composites embedded in tweets posted by bots into a metonymic chain of meaning *mentally framed* and stabilized into *idealized cognitive model* in the minds of human Twitter users. This process then

predisposes human Twitter users to continue interpreting the characterization of Prime Minister Trudeau as a legally and morally deficient politician when engaging in subsequent tweets related to the scandal.

Colocation of the words 'Justice' and 'committee' within the HT1 corpus is much less self-evident. The semtags assigned to each word making up the collocate suggest what we already know based on common knowledge: the collocation is referencing some aspect of crime, law, order, power, and institutional organization. When analyzed in context (see Tables 4.17-4.20 above), we can safely anticipate that the meaning of words and phrases assembled into composite wholes becomes clearer alongside other words and phrases in syntactic proximity. For example, the words and phrases 'shut down,' 'Liberals,' 'Corruption Obstruction,' 'RCMP,' 'ethics watchdog,' 'objections of the opposition,' 'PMOCoverUp,' 'Liberal Committee,' and '[approved] Deferred Prosecution,' which (though perhaps less obviously when compared to the collocation of 'Trudeau's' and 'scandal') denotes some degree of equivalency or categorical association between word and phrase composites situated in syntactic proximity to one another, some of which function according to noun-adjectival sequencing according to the principles of *landmarks* and *trajectors*, thus creating a metonymic chain of meaning.

As a *semantic contagion*, the signification of this metonymic chain of meaning suggests that the Liberal Party of Canada obstructed justice by 'shutting down' the justice committee as it was deciding whether to grant SNC Lavalin a Deferred Prosecutorial Agreement (DPA) or not. The composite of *landmarks* and *trajectors* that operates in the tweet as a linguistic representation can activate entire *frames* of reference according to the linguistic context produced on Twitter (Dancygier's 2023). The resulting *protype effect* activates *political frames* implying that Prime Minister Trudeau and the Liberal Party of Canada's actions were unethical and warranted further investigation by the RMCP.

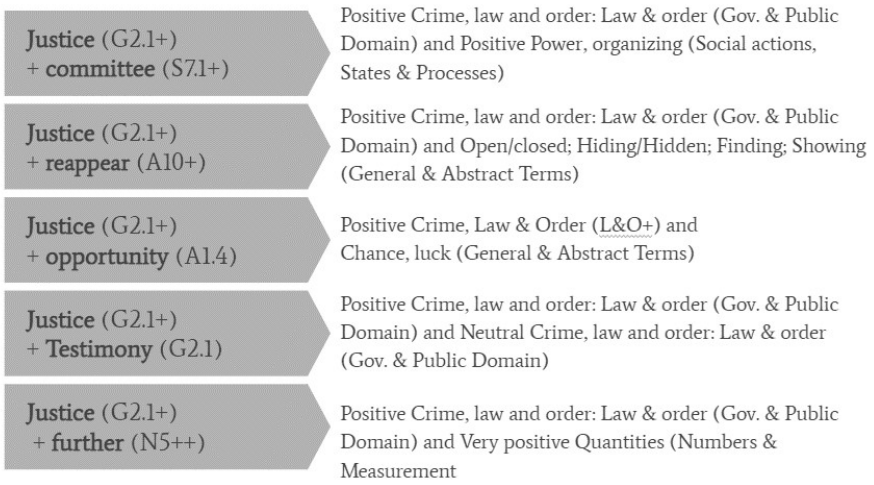


Figure 4.14 semantically tagged collocations from HT1 and semtag descriptors from the USAS Semantic Tagset

4.4.5. Critical Discourse Analysis

As previously discussed in Section 2.3 of Chapter 2 and Section 3.4 of Chapter 3, this dissertation employs CDA to examine the formulation of partisan ideologies embedded within political Twitter discourse that helped political candidates regulate the distribution of their power and influence. The discourse analysis conducted for this dissertation was informed by Ruth Breeze's (2020) approach to using WMatrix5 (Rayson 2021) in analyzing traces of political affect circulated within tweets posted by political leaders. Though several approaches to CDA have been developed since the 1970s (for example, see Bhaskar 1986; van Dijk 1997, 2002, 2013; Weiss and Wodak 2003; Chouliaraki and Fairclough 2010; Fairclough 1995, 1998, 2006, 2012; Hodge and Kress 1993), my use of CDA was most prominently influenced by Breeze's computational methods and on Chris Hart's (Hart et al. 2005; Hart and Lukeš 2009; Hart and Cap 2014; Hart 2007, 2011, 2015) theoretical approach to critical discourse analysis, the latter involving a good deal of input from cognitive linguistics.

Like cognitive linguistics, critical discourse analysis frames discourse as 'situated' in and produced according to the contexts in which they manifest as interlocutors interact with in the world in some way (Hart 2011). CDA is equally concerned with context and phenomenological conditions as driving forces in constituting meaning through discourse but is particularly concerned with the ways in which language operates in those contexts as a representational system through which power and influence may be reinforced, negotiated, and sustained. Thus, CDA is highly compatible with cognitive linguistics while contributing socio-cognitive consideration into the ways in which relations of political power are articulated through language.

CDA also contributes another dimension of analysis that is particularly illuminating for the purposes of this dissertation. Specifically, it is fundamentally a methodological model for analyzing the linguistic modes of persuasion and manipulation employed to discursively construct socio-political power-relations and knowledge (Hart 2011: 1). The synthesis of cognitive linguistic and CDA, therefore, provides an ideal qualitative tool to examine the social construction of power relations within the flow of semiosis generated among human minds, digital algorithms, and political intermediaries on Twitter across the #SNCLavalin Twitter discourse in early 2019.

Critical theorist Roy Bhaskar and Mervyn Hartwig (Bhaskar 1986; Bhaskar and Hartwig 2016) as well as Chouliaraki and Fairclough's (1999) offer a framework for CDA that emphasizes the importance of paying attention to three dimensions of discourse: text, discursive practice, and social praxis. Fairclough (2003: 209) outlines Bhaskar's (1986) schematic for 'explanatory critique' as follows:

1) Focus upon a social problem which has a semiotic aspect. "Beginning with a social problem rather than the more conventional 'research question' accords with the critical intent of this approach – to produce knowledge which can lead to emancipatory change" (Fairclough 2003: 209)

2) Identify obstacles to it being tackled, through analysis of

a) the network of practices it is located within;

b) the relationship of semiosis to other elements within the particular practice(s) concerned;

c) the discourse (the semiosis itself):

i) Structural analysis: the order of discourse

ii) Interactional analysis

iii) Interdiscursive analysis

iv) linguistic and semiotic analysis.

3) Consider whether the social order (network of practices) in a sense 'needs' the problem.

4) Identify possible ways past the obstacles.

5) Reflect critically on the analysis (1-4).

Accordingly, I used Bhaskar's (1986) CDA schematic (as outlined by Fairclough 2003) to first describe how the flow of semiosis through the convergence of human thought, algorithmic computations, and political electioneering on Twitter influences the ways in which human minds interpret political information posted on Twitter. I then identify the semiotic aspects of words and phrases potentially operating as *semantic contagions* by situating them within networks of other discursive practices (e.g., using hashtags, making reference to other social actors, retweeting, etc.), semiotic interactions created within those discursive practices, and the interdiscursive naturalization of *semantic contagions* that form in consequence of the recursive and protracted inclusion of word and phrase composites operating as *semantic contagions* within the semiotic interactions made possible across the #SNCLavalin Twitter discourse of 2019.

To retain analytical focus on instances in which the content of tweets posted by humans replicate *semantic contagions* embedded in tweets posted by bots, and thus on instances where human minds are likely to have aligned with tweets posted by bots, I chose to specifically target tweets containing the word 'scandal' in each corpus since it is common to all corpora. To reiterate my analytical approach, I first identified word and phrase composites recuring most frequently within the 'scandal' tweets, which

potentially pointed inquiry toward the inclusion of collocates operating as *semantic contagions* across the #SNCLavalin discourse on Twitter in early 2019 (see Table 4.21-4.24 below). I then explored whether these word and phrase composites embedded in tweets posted by bots were replicated in tweets posted by human user across all corpora, thus supplying potential evidence for the *contagion effect*.

4.4.5.1. Structural Analysis

To examine potential *semantic contagions* in context, I identified all tweets containing the word 'scandal' in each corpus and I extracted other word and phrase composites situated in syntactic proximity to the word 'scandal,' including hashtags. I mapped them in Tables 4.21-4.24, which guided my evaluation of the relational meanings formed between clusters of word and phrase composites functioning *semantic contagions*. This methodology also enabled me to identify the hashtags included in tweets containing the word 'scandal' to perform an *interactional analysis* (see section 4.4.5.2 for further elaboration). To keep the manual identification and coding of word and phrase composites for this process manageable, I limited the number of identified words and phrases to 4.

Table 4.21 showcases words and phrases often clustered together in tweets posted by Twitter-bots featuring the word 'scandal' between March 14 – April 9, 2019, which also function adjectivally in characterizing the targeted object of each tweet. For example, in 'scandal tweet' 0.1 in Table 4.21, the target object is *Justin Trudeau*, who is described as Canada's *golden boy*, which uses irony to suggest that he has been mistakenly lauded as a successful political leader for a man of such a young age. The phrase *scandal takes a toll* [on Canada's *golden boy* Trudeau] situated in proximity to the word *sinking* suggests that Prime Minister Trudeau's political power and status are at risk. This sentiment is mirrored in tweet 0.2 in Table 4.21, which also suggests that the SNC Lavalin scandal is likely to place Trudeau's political future in *jeopardy.* This structural sequence and flow of tweets reveals which topics Twitter-bots were most likely programmed to amplify across the progression of the #SNCLavalin Twitter discourse.

For instance, tweets posted earlier in the day on March 14th centre on the idea that Trudeau's affiliation with the SNC Lavalin scandal is likely to jeopardize his political future, which transitions to the notion that Trudeau and the Liberal Party undermined the "rule of law" and abused their "concentration of power" later that day. Focus then gradually shifts to allegations that Trudeau and the Liberal Party were "covering up" their "obstruction of justice" and the "corruption" of their political conduct around the SNC Lavalin affair by April 8th.

Scandal Tweet	***TWITTER BOTS*** *March 14 – April 9, 2019*			
0.1	JustinTrudeau	Golden Boy	Sinking	Scandal takes toll
0.2	JustinTrudeau's	Political Future	Jeopardy	Threaten
0.3	Leader	Won't listen	Change	
0.4	Trudeau	Scheer	Suing	Shut down
0.5	Trudeau's	Corporate corruption	Handouts	Loblaws
0.6	Political interference	Prime Minister	Trudeau	Political future
0.7	Hidden details	Jody Wilson-Raybould	#CNDpoli	#indigenous peoples
0.8	Distraction	Displacing	#liberalparty scandal	#MarkNormanTrial
0.9	Prime Minister	JustinTrudeau	Re-election	Political future
0.10	RCMP	Investigate	Justin Trudeau's	Petition
0.11	Criticism	Justin Trudeau's	Behaviour	Pointless Stunt
0.12	Corrupt	Biased	Socialist	Liberal
0.13	Justin Trudeau	Court	Undermine	Rule of law
0.14	#PMOCoverUP	Concentration of power	Andrew Coyne	Bottom of it
0.15	Liberal MPs	#JusticeCommittee	#CoverUp	Liberal ringmaster
0.16	Academics	Journalists	Triggered	Isn't there
0.17	@Liberal_Party	Mess	Attacking	Call it quits
0.18	MPs	@liberal_party	Exploit	Justice committee
0.19	#Ottawa	Liberal Government	#Corruption	#Trudeau
0.20	#CoverUp	#Corruption	#JodyWilsonRaybould	#Libranos
0.21	NDP	CPC	Fully aware	Senior retirement
0.22	#ObstructionofJustice	Leaks	@JustinTrudeau	Threat
0.23	War on stupid	Liberal gov't	#Corruption	#Trudeau
0.24	Faux	Media created molehill	Mountain	#cndpoli
0.25	Prime Minister Justin **Trudeau**	Suffered	Damage	Donald Trump
0.26	Conservative influenced media	News	Pressing things	worry
0.27	@Justin**Trudeau**	Wasn't ready	#Socialismkills	#TrudeauCoverUp
0.28	#Trudeau	Majority	Like a company	Like a dictator
0.29	Wernick	Political junkies	Privy Council	controversial
0.30	Clowns	Preaching	Fake	sermon
0.31	#JustinTrudeau	Handling	Look like	Competent politics

Table 4.21 Clusters of words, words and phrases with adjective-like attributive qualities from each tweet containing the word 'scandal' in the BOTS corpus

Many of these themes are repeated in tweets containing the word 'scandal' posted by human users on March 14, 2019:

Scandal				
Tweet	***HT1** – March 14, 2019*			
1.1	#Liberals	Go away	Harper	Party Politics
1.2	RCMP	Investigate	Sign	petition
1.3	Concentration of power	Bottom of it	Public inquiry	Breaking up
1.4	Non-blindly-loyal	#TeamTrudeau	#JusticeCommittee	Corruption
1.5	Andrew Coyne	#PMOCoverUp	Concentration of power	Bottom of it
1.6	Big @liberal_party donor	US College Cheating	Libtards	Crooked
1.7	Media and cons	Upset	Non scandal	cheating
1.8	Trudeau	Budget	Election	mired
1.9	#SponsorshipScandal	Liberal Leopards	#ChairmanJustin	#ObstructionOfJustice
1.10	Cover up	@Liberal_Party	Mess	Attacking
1.11	Academic	Journalists	Triggered	Isn't there
1.12	#CoverUp	**Trudeau**'s MP Majority	Opposition	investigate
1.13	False dichotomy	Other problems	Entwined	Profit of corporate few
1.14	Faux	Andrew Coyne	Validate	Narrative
1.15	ANOTHER RCMP investgtn	Montreal	#Trudeau	Poss charges
1.16	Not a scandal	Futile	CPC	Scheer
1.17	Investment Quebec	Meddling	Prosecution's ruling	#Trudeau
1.18	NEVER	Demented rantings	Jackasses at CPC	Move on
1.19	MPs from @liberal_party	Exploit	Majority	Justice committee
1.20	Third time's a charm	Can't wait	Scandalous budget	#cndpoli
1.21	#Liberal	Caught up	Lobbying scandal	#LavScam
1.22	Justin Trudeau's	Moral character	Imploding	Corruption
1.23	The #JUST	Internet	Liberals	Didn't want to
1.24	**#Trudeau** government	Dangled #DPA	Tap dancing	flipflop
1.25	Stinks	Cover up!	Integrity	Liberals
1.26	#CoverUp	#Corruption	#LavScam	#Libranos
1.27	Truly Scandalous	Typical muck	Political decision making	#cndpoli
1.28	Trudeau	#Election2015	#JustinCommittee	#Liar
1.29	Liberal MPs	#JusticeCommittee	#CoverUp	Liberal ringmaster
1.30	@liberal_party	Exploit	Justice committee	testimony

Table 4.22 Clusters of Words, phrases, and expressions with adjective-like attributive qualities from each tweet containing the word 'scandal' in the HT1 corpus

However, these themes are far less prevalently represented by words and phrases embedded in tweets posted by human users between March 28-29, 2019 (as predicted by the chi-square test for independence – see Section 4.2.5 above) which are represented in Table 4.23. In fact, there are far more words and phrases belonging to this corpus of tweets denouncing Attorney General Wilson Raybould's conduct and challenging bipartisan criticisms of Prime Minister Trudeau and the Liberal Party:

Scandal Tweets	***HUMT2** – March 28-19, 2019*			
2.1	Faux	Media molehill	Mountain	#cndmedia
2.2	JWR	Advantage	Recording	Bait / trigger
2.3	Music	Dark & surprising	#corruption	#Cndpoli
2.4	NDP	CPC	All over this	Senior retirement funds
2.5	Conservative media	Canadians	More pressing things	Worry
2.6	Justice Minister	@Justin**Trudeau**	Vilified	Bruised ego
2.7	@Justin**Trudeau**	#GrassyNarrows	#LetHerSpeak	#Gropegate
2.8	#lavscam	#TrudeauBrand	#Liberals	#Grassy Narrows
2.9	#Trudeau	Majority	Political	dictator
2.10	Political junkies	Clerk of Privy Council	Accused	threatening
2.11	Driving	#cndpoli voter sentiments	Affordability anxiety	poll
2.12	@NavdeepSBains	Single accomplishment	Trudeau govt	No mention
2.13	@AndrewScheer	Come clean	@CPC_HQ	#cndpoli
2.14	Accurate reporting	10 year ban	Best talent	Jump ship
2.15	#GrassyNarrows	Get it together	#ThankYouForYourDonation	Clean up
2.16	@Justin**Trudeau**	Deep #Colonic treatment	Full of shit	Lying
2.17	Warned	U.S.	Slashing workforce	Plea deal
2.18	Three clowns	Preaching	Fake	sermon
2.19	Blame	Dragging out	#cndpoli	#pnpcbc
2.20	Blow over	JWR	Trudeau	Criminally outrageous
2.21	@Justin**Trudeau**	Conservatives	Nothing to say	Change the channel
2.22	Liberal Attorney General	Trudeau	Lied	again
2.23	Mistakes	Liberals	Bribe	Canadians
2.24	Faux	Report	Operative word	Sick to death
2.25	#GrassyNarrows	#TrudeauIsDone	#LavScam	#Tyrant
2.26	@liberal_party	@Justin**Trudeau**	Crooks	Liberal Party
2.27	Drama of politics	Dig into	#Justin**Trudeau**	#Trump
2.28	#Trudeau's	3rd visit to Maritimes	New polling	Imperils govt fortunes
2.29	#cndpoli	JWR	Cross the floor	Conservatives
2.30	Leak	@Justin**Trudeau**	Investigated	Discredit

Table 4.23 Clusters of Words, phrases, and expressionswith adjective-like attributive qualities from each tweet containing the word 'scandal' in the HT2 corpus

This deviation from the critical narrative conceptually woven into tweets posted by Twitter-bots featured in Tables 4.21 and 4.22 is also reflected in the results of the chi-square test for independence conducted for this dissertation (see Section 4.2.5 above and Section 5.2 in Chapter 5 for a summary of these findings), which suggested that tweets posted by Twitter-bots were less likely to be related to tweets posted by humans between March 28-29, 2019.

Scandal Tweets	***HUMT3** – April 8-9, 2019*			
3.1	Savour	**Trudeau**'s Liberals	Corporate corruption	#Loblaws
3.2	Hidden details	Jody Wilson Raybould	#CDNmedia	#Indigenous people
3.3	@CBCpolitics	@liberal_party	@NDP	#LavScam
3.4	Bad advice	Leader who won't listen	Change	Lack of clear thinking
3.5	#cdnpoli	#LavScam	#Justin**Trudeau**	#AndrewScheer
3.6	#Trudeau	Suing	#Scheer	STOP FUCKING LYING
3.7	Complained	#CDNmedia	JWR	Belly-aching
3.8	@Justin**Trudeau**	#lavscam	#NoTo**Trudeau**2019	#**Trudeau**MustGo
3.9	PM	@Justin**Trudeau**'s	Political future	jeopardy
3.10	Threaten	Bid for re-election	Join the conversation	Live on Youtube
3.11	@Justin**Trudeau**	#LavScam	Desperate attempt	#coverup
3.12	LIBERAL SCANDAL ALERT	Hidden camera	Secret meeting	@AndrewScheer
3.13	Political scandal	Prime Minister	@Justin**Trudeau**	Today's show
3.14	Prime Minister	@Justin**Trudeau**	Affect his chance	Re-election
3.15	Threatening	@Justin**Trudeau**	Political future	Canadian Prime Minister
3.16	Ethics Commissioner	Investigation	Political interference allegations	@Justin**Trudeau**
3.17	Trudeau	Risked	Fuel flames	ruinous
3.18	#JodyWilsonRaybould	#Philpott	#bulletproof**trudeau**	#lavscam
3.19	Scheer	Elected	@janephilpott	responsibility
3.20	Trudeau	Broke the law	Helping rich friends	Avoid prosecution
3.21	Jody Wilson Raybould	Deferred prosecution agreement	Corporate criminals	Off the hook
3.22	All clown all the time	@Justin**Trudeau**	#LavScam	
3.23	Another attempt, another failure	Promote	In bed with	#corruption
3.24	@Justin**Trudeau**	Putting a price on	#corruption	Even BETTER
3.25	Justin **Trudeau**	@AndrewScheer	Court	Undermine rule of law
3.26	5 second distraction	Displacing	#liberalparty	#MarkNorman trial
3.27	No place for partisan politics	Investigating wrongdoing	Integrity	Public appearance
3.28	No corruption	@AndrewScheer	made up	No laws broken
3.29	Justin **Trudeau**	#ObstructionOfJustice	Bribe	Avoid investigation
3.30	Real scandal	**Trudeau** pretend	Media	Making it (a scandal)
3.31	#liberals	Setting up	Election	Distraction
3.32	Sea of sleaze	Facts from fiction	#justin**trudeau**	#JWR

Table 4.24 Clusters of words, words and phrases with adjective-like attributive qualities from each tweet containing the word 'scandal' in the HT3 corpus

Themes showcased in Tables 4.21 and 4.22 above return between April 8-9, 2019, around the idea that the *scandal [took] a toll* on Canada's *golden boy* placed Trudeau's political future in *jeopardy*; that Trudeau and the Liberal Party's conduct was *corrupt* because they *obstructed justice*; that they obfuscated the *rule of law* by abusing a *concentration of power*, which they *covered up* by *avoiding investigation* by the *RCMP.* This structure in the sequence and flow of tweets posted by Twitter-bots and those posted by

human users is also reflected in the results of the chi-square test for independence outlined above in Section 4.2.5 and in Section 5.22 in Chapter 5.

4.4.5.2. Interactional Analysis

To examine the *interactional* dimension of the #SNCLavalin Twitter discourse, I operationalized hashtags embedded within tweets containing the word 'scandal.' Hashtags are used on Twitter as a means of consolidating discourse and engagement around a particular subject, as a means of locating trends and associations generated by a particular hash-tagged subject, and amplifying networks of specific discursive meaning and interactional significance. Thus, analyzing hashtag distribution across corpora of Twitter discourse reveals a lot about the semiotic relationship between hashtags and other elements within the field of discursive practices on Twitter (see Tables 4.21-4.23).

BOTS: HASHTAG ASSEMBLAGE		
#CNDpoli	#indigenous peoples	#PMOCoverUP
#liberalparty scandal	#MarkNormanTrial	#Ottawa
#JusticeCommittee	#CoverUp	#Libranos
#Corruption	#Trudeau	#ObstructionofJustice
#CoverUp	#Corruption	#JodyWilsonRaybould
#Corruption	#Trudeau	Trudeau
#Socialismkills	#TrudeauCoverUp	#JustinTrudeau

Table 4.25 Hashtags embedded in BOTS tweets containing the word 'scandal'

Table 4.25 above contains hashtags that appeared in tweets featuring the word 'scandal' posted by Twitter-bots between March 14 and April 9, 2019. Many of the themes represented by these hashtags are also represented in the words and phrases embedded in tweets posted by human users across the same temporal period (featured in Table 4.22 above). These hashtags also reveal the underlying narrative that Twitter-bots were programmed to promote across the #SNCLavalin Twitter discourse. As can be discerned from the hashtags listed in Table 4.25 above, the themes that are central to this narrative frame the SNC Lavalin affair as a *socialist*, *Liberal Party scandal* involving the *corrupt* political conduct of *Justin Trudeau*, who is accused alongside the Liberal Party of *covering up* and exploiting their majority within the *justice committee*, thus *obstructing justice* in the process.

These themes are, once again, repeated in the hashtags included in tweets featuring the word 'scandal' posted by human users on March 14, 2019 (see Table 4.26 below).

HUMT1: HASHTAG ASSEMBLAGE (March 14, 2019)		
#Liberals	#SNCLavalin	#Cdnpoli
#cpc	#LavScam	#SNCLavalin
#cdnpoli	#hw	#ONpoli
#ABpoli	#cdnpoli	#SNCLavalin
#cdnpoli	#TeamTrudeau	#SNCLavalin
#SNCLavalin	#PMOCoverUp	#SponsorshipScandal
#ChairmanJustin	#ObstructionOfJustice	#CoverUp
#Trudeau	#cndpoli	#Liberal
The #JUST	#LavScam	#Trudeau government
#Trudeau government	#Corruption	#LavScam
#Election2015	#JustinCommittee	#Liar
#JusticeCommittee	#CoverUp	#JusticeCommittee
#CoverUp		

Table 4.26 Hashtags embedded in HT1 tweets containing the word 'scandal'

Interestingly, these hashtags also supply evidence that human users not only replicated the themes represented by the hashtags embedded in tweets posted by Twitter-bots, but they also elaborated on those themes. For example, the hashtags *#CoverUp*, *#ObstructionOfJustice*, *#Corruption*, *#JusticeCommittee* are also present in the tweets posted by human users featured in Table 4.26, but human tweets posted on March 14 also include the hashtags *#ChairmanJustin*, *#Liar*, the *#JUST*, and *#JustinCommittee*. A good deal of inuendo and implicit reference are also captured by the hashtags that human users included within the #SNCLavalin Twitter discourse on March 14, 2019. For instance, the hashtag *#ChairmanJustin* cultivates rhetorical reference to leadership of communist regimes while *#JustinCommittee* suggests that the *Justice Committee* overseeing the SNC Lavalin affair was a sham since it was stacked with a Liberal majority loyal to Prime Minister Trudeau.

Table 4.27 below contains hashtags that were embedded in tweets containing the word 'scandal' posted by human users between March 28-29, 2019. Once again, as reflected within findings established by the chi square test for independence (delineated in Section 5.2.2. in Chapter 5), tweets belonging to the bot-corpus were not significantly associated with those belonging to the human corpus between March 28-29, 2019 (HT2), thus, the hashtags featured in tweets posted by Twitter-bots were not replicated in the tweets posted by human users (see Tables 4.25 and 4.27 for comparison). However, the hashtags listed in Table 4.27 still characterize the tenor of the narrative woven into the #SNCLavalin Twitter discourse at the end of March in 2019 since human users are still capable of inciting interactive alignment among themselves without the involvement of Twitter bots. For example, the hashtags *#GrassyNarrows* and *#ThankYouForYourDonation* represent Prime Minister Trudeau's misstep at an event

that took place at Grassy Narrows First Nations, while *#GropeGate* and *#LetHerSpeak* reference Trudeau's alleged misogynistic conduct related to accusations that he interacted inappropriately with a woman. These contentions were used to frame Trudeau's character in light of assertions that he had oppressed Attorney General Wilson Raybould as a woman, as a woman of First Nation's descent,[24] and as the chief law officer of the Crown in her role as Attorney General by preventing her from speaking about the SNC Lavalin affair publicly. The imbrication of these themes together constructs a conceptual assemblage that characterizes the Trudeau government as intrinsically corrupt, misogynistic, discriminatory, racist, oppressive, and unjust. These characterizations are also reflected in hashtags like *#Tyrant*, *#Trump*, *#lavscam*, and *#Colonic*.

HUMT2: HASHTAG ASSEMBLAGE (March 28-29, 2019)		
#cndmedia	#corruption	#Cndpoli
#GrassyNarrows	#LetHerSpeak	#Gropegate
#lavscam	#Trudeau	#cndpoli
#TrudeauBrand	#Liberals	#Grassy Narrows
#cndpoli	#GrassyNarrows	#ThankYouForYourDonation
#Colonic	#cndpoli	#pnpcbc
#GrassyNarrows	#TrudeaulsDone	#LavScam
#Tyrant	#JustinTrudeau	#Trump
#Trudeau's	#cndpoli	

Table 4.27 Hashtags embedded in HT2 tweets containing the word 'scandal'

Several themes represented by hashtags featured in the corpus of tweets posted by Twitter-bots listed in Tables 4.25 and 4.26 reappear in the HT3 corpus of tweets posted by human users between April 8-9, 2019. The hashtags *#Lavscam*, *#CoverUp*, *#Corruption*, and *#ObstructionOfJustice*, for example, are prevalent in Tables 4.25 (BOTS), 4.26 (HT1), and below in Table 4.28 (HT3), which is concomitant, once again, with findings deriving from the chi-square test for independence (see Section 4.2.5 above and Section 5.22 in Chapter 5). As is the case with the hashtags featured in Tables 4.25 and 4.26 above, the hashtags represented in Table 4.28 also foment anti-Trudeau sentiments, as confirmed by the inclusion of *#NoToTrudeau2019*, *#TrudeauMustGo*, and *#bulletprooftrudeau.*

[24] Attorney General Jody Wilson Raybould is a descendent of the Musgamagw Tsawataineuk and Laich-kwil-tach First Nations within her paternal lineage

HUMT3: HASHTAG ASSEMBLAGE (April 8-9, 2019)		
#Loblaws	#CDNmedia	#Indigenous people
#LavScam	#cdnpoli	#AndrewScheer
#cdnpoli	#LavScam	#JustinTrudeau
#Trudeau	#Scheer	#CDNmedia
#lavscam	#NoToTrudeau2019	#TrudeauMustGo
#LavScam	#coverup	#corruption
#JodyWilsonRaybould	#Philpott	#bulletprooftrudeau
#lavscam	#corruption	#liberalparty
#MarkNorman	#ObstructionOfJustice	#justintrudeau
#liberals	#JWR	

Table 4.28 Hashtags embedded in HT3 tweets containing the word 'scandal'

As can be discerned across the structural and interactional analyses outlined above, the ways in which words and phrases become embedded and organized in tweets contribute significantly to the constitution of meaning and the cultivation of ideological conceptualizations that inform public opinion about political leaders on Twitter in the digital era. Words and phrases organized into *landmark / trajector* schemas with adjectival / receptacle relationality appear to be especially memorable, as evidenced by their replication in tweets posted by human users, and are, therefore, highly likely to facilitate the cognitive process of entrenching the representational cache of meaning carried by those words and phrases making up *semantically contagious* collocations.

4.5. Summary and Concluding Remarks

In this chapter, I first outlined the research philosophy, the research approach, and a rationale for the methods adopted for this dissertation. I then articulated my sampling strategy and my approach to data analysis, and I then outlined my research design for the application of empirical research to test for independence between tweets posted by bots and those posted by humans, and qualitative research approaches to further explore what instances of potential association between the two signified in more granular detail using 'thick' descriptions. In the next chapter, I offer a detailed overview of this dissertation's findings and I also supply an analysis of the significance of these findings.

Chapter 5: Findings & Analysis –
Human Replication of Semantic Contagions Embedded in Tweets Posted by Bots

5.1. Introduction

In the previous chapter, I outlined the empirical methods employed to test for independence between tweets posted by bots and those posted by Twitter-bots across the #SNCLavalin Twitter discourse in 2019 and I summarized this dissertation's qualitative application of cognitive linguistics and CDA to further interrogate the semantic nature of *interactive alignment* among human users to the content of tweets posted by bots in more granular detail. In this chapter, I present findings derived from the quantitative and qualitative data analysis as they relate to the research questions guiding this dissertation (see Section 1.5 in Chapter 1).

As referenced in Chapter 1 and outlined in Chapter 4, I employed a mixed methodological approach to study the #SNCLavalin tweets of 2019 collected for this dissertation. This involved both empirical and qualitative research instruments, which I applied first to test for independence between tweets posted by bots and those by humans and second, to perform rigorous analysis of the qualitative linguistic features of the corpora using 'thick descriptions,' and to explore the more discursive characteristics of the text sampled for my study. The amalgamation and synthesis of both quantitative and qualitative methodologies bridged gaps across the fulcrum of experimental and theoretical modes of inquiry.

Empirical analysis enabled investigation into the quantifiable attributes of the #SNCLavalin Twitter data and to test the hypothesis that the convergence of semiosis produced among human minds, digital algorithms, and political intermediaries induced *interactional*, *ideological*, and *linguistic alignment* between human users and tweets posted by Twitter bots. Using statistical and computational tools, *interaction alignment*, as framed in social psychology (Garrod and Pickering 2004), was discerned in 6 of 12 corpus pairs. However, since statistical findings only offer generalized insight about the quantifiable attributes of the research sample, I chose to also incorporate qualitative approaches using cognitive linguistics and CDA to investigate the more nuanced qualities of human meaning-making processes on Twitter. Quantitative research pointed inquiry toward interesting areas for further qualitative investigation, and qualitative research filled important gaps in characterizing the meaning of quantitative findings. This approach enabled me to answer research questions (see Section 1.5 in Chapter 1) that could not be answered using qualitative or quantitative methods alone (Shorten and Smith 2017).

5.1.1. Chapter Outline

In this section of the chapter, I provide a brief review of this dissertation's purpose and focus with respect to examining the #SNCLavalin Twitter discourse of 2019. Section 5.1.5 revisits the central research questions and hypotheses guiding the study conducted for this dissertation, and section 5.2 revisits this dissertation's research goals, presents a summary of key findings, brief interpretations of those findings, and their significance to existing research in communication and media studies, cognitive linguistics, and critical discourse analysis.

5.1.2. Research Framework

For the empirical component of the study, I used Pearson's chi-square test for independence to examine whether the null hypothesis could be rejected between tweets posted by humans and those posted by bots. While rejecting the null hypothesis infers the possibility that the two variables are associated in some way, it cannot substantiate the strength of the relation between them. This analysis, thus, examined whether the null-hypothesis could be rejected when operationalizing the text semantically tagged by WMatrix5 as belonging to the 'Government and Public' and 'Emotion' semantic fields, serving as the two categorical variables from the human and bot corpora to be measured through cross-tabulation.[26]

Pearson's chi-square test for independence is a common statistical analysis tool used in the social sciences to reject the null hypothesis, which infers that two categorical variables are possibly related in some way (Franke et al. 2013). The test works by comparing observed frequencies in categorical data (e.g., woman, man, gender, age, etc. or for the purposes of this dissertation, e.g., the politics and emotions semtags assigned to the content of tweets posted by bots and posted by humans).

The calculation is conducted using cross-tabulation (see Chapter 4 Table 4.3 for Data categories and input for chi-square test in SPSS), which means that observed frequencies (actual number of occurrences) are compared with expected frequencies to measure for independence. Divergence from expected cell frequencies suggests dependence, potentially inferring association between the categorical variables, or, for the purposes of this dissertation, potentially inferring that tweets posted by bots relate in in some way with those posted by humans across the #SNCLavalin Twitter discourse.

When performing the chi-square test, the data must be randomly selected, meaning that data cannot by collected according to the discretion or interference of the researcher (to minimize potential bias) and the variables being tested must be ordinal (numeric representation in an ordered list, such as 1 for poor, 2 for average, 3 for good, and 4 for excellent) or nominal (naming data such as 'pass' or 'fail').

Since the chi-square test for independence can only reject the null hypothesis, it does infer some degree of dependence between the categorical variables, but it does not calculate the strength of correlation between two categorical variables (nor can it be used to test for causation). One can only infer

that rejecting the null hypothesis suggests a possible relationship between the two categorical variables (e.g., the G and E semtags) belonging to the bot and human corpora. Thus, more detailed 'thick' analysis was necessary.

The theoretical paradigm guiding this dissertation's qualitative approach was informed predominantly by cognitive linguistics and CDA, but also incorporates insight from cognitive semiotics and social psychology. More specifically, the qualitative research instruments employed to analyze the #SNCLavalin Twitter discourse of 2019 were informed by various approaches to studying the semantic constitution of meaning in language use. To investigate the conceptual organization of political meaning across the #SNCLavalin Twitter discourse, I employed Bhaskar's (1986) 'explanatory critique' approach to CDA (see Subsection 4.4.5. in Chapter 4 for further description), and to examine the linguistic conventions employed by humans while composing tweets and the cognitive significance of the language used.

Synthesizing cognitive linguistics and CDA in this way revealed that in several instances across the #SNCLavalin Twitter discourse, the same words and phrases were frequently and repeatedly assembled in proximity to one another within the linguistic structures of tweets posted by Twitter bots and were replicated in the tweets posted by humans. The linguistic content of these posts also contained gaps in information, which likely compelled more heuristic modes of reasoning among human users in filling conceptual gaps in the Twitter discourse. These cognitive linguistic conditions were also likely to stimulate *discovery misattribution effects* among Twitter users, which could have resulted in the entrenchment false political insights, thereby reinforcing existing prejudice and biases.

The use of digital algorithms to psychologically profile and micro-target constituents on Twitter equips political intermediaries with digital data attributed to social media users' online behaviours, which can be exploited to gain insight into their political interests, worldviews, values, goals, and concerns. Armed with quantitative and measured interpretations of constituents' personalities, political intermediaries can then make informed decisions about the kind of content that curating algorithms should circulate on Twitter to *prime* prescribed responses (e.g., moral outrage) among social media users' by exposing them to content that violates their sense of justice in targeted ways.

Furthermore, given Twitter's character-length limitation, critical details related to the topics tweeted about on the social media platform are bound to be omitted. Thus, in many instances, Twitter users are left to their own cognitive devices to conceptually 'fill-in-the-gaps.' This is an especially important feature of Twitter discourse to consider given that facets of human users' personalities are digitally targeted in ways that are most likely to induce *gestalt* modes of *heuristic* reasoning. Likewise, because political intermediaries possess the agency for commissioning the creation of digital algorithms to psychologically profile and micro-target facets of social media users' personality, the content that

algorithms circulate is more likely to induce human minds to *interactionally align* with the content of tweets posted by Twitter bots. Identification of *prime lures* and *semantic contagions* embedded in tweets posted by Twitter bots and those posted by humans revealed several instances where human users replicated *prime lures* and *semantic contagions*, which suggests that they interactively, affectively, conceptually, and ideologically *aligned* with the political ideas and opinions circulated by Twitter bots across the #SNCLavalin Twitter discourse of 2019.

Through these analyses, I was able to articulate how the convergence of semiosis among human minds, digital algorithms, and political intermediaries on Twitter contributed to the formation of public opinion, the distortion of political communication, and the fragmentation of the public sphere around the SNC Lavalin affair on Twitter in 2019.

5.1.3. Conceptual Framework

The study conducted for this dissertation is situated within the scope of media effects research involving the interrogation of digital media and its impact on political communication, public opinion, and the psychology of the crowd (LeBon 1895). At the same time, while acknowledging that several characteristics of digital 'new' media continue to function similarly to more traditional media in shaping political communication, public opinion, and the public sphere, I also highlight several marked differences in the way that digital media regulates communication and communication practices. Namely, the threading of deep learning algorithms into the fascia of social media platforms, which synthesizes several facets of traditional media in a participatory way, serves as the distinction that differentiates digital media from its predecessors.

The digital segmentation of constituents into virtual 'profiles' by way of digital new media presents new challenges for traditional assumptions about media effects. The convergent, multilateral, and segmenting qualities of digital new media confounds Habermasian conceptions of public opinion and collective consciousness since the digital partitioning of constituents into virtual 'echo chambers' and 'filter bubbles' according to statistical interpretations of personality results in the splintering of a single public sphere (Habermas 1962) into several competing perspectives rather than the culmination of many views into one. As Waisbord (2018) notes, the disruptive forces of digital algorithms fragment the public sphere into several micro-spheres of political discontinuity.

Language, as a carrier of ideology alongside other semiotic vehicles, shapes political assumptions through which some signifiers become privileged and 'naturalized' while others lose significance within the public sphere (Eagleton 1994). Operating at the level of ideology, for example, 'left' and right' politics symbolically represent the dichotomization of constituents into social categories of 'us' and 'them.' And, of course, this is an ideological tradition reaching back to a watershed moment in

politics that occurred before contemporary conceptions of democracy. Following the storming of the Bastille in 1789, political representatives gathering at the National Assembly to write a new constitution for France would ultimately determine the limits of a monarch's power. Those who supported the monarch's absolute power sat on right of the Assembly's appointed president while those who believed that the monarch's power should be limited (a radical idea at the time) sat on the left (Carlisle 2019).

Marcel Gauchet (1996) notes that the distinction between 'left' and 'right' politics gradually came to define political identities through "a long drawn-out process that lasted more than three quarters of a century, until the first decade of the 20th century" (253). However, one could easily argue that Cold War politics contributed significantly to defining the signifying parameters of what 'left' and 'right' politics have come to mean since socialist and capitalist connotations have been injected into the second-order mythological filum making up contemporary ideological divides.

As discussed in greater detail in Section 3.2.2. in Chapter 3, deep learning capacities of digital algorithms represent a mediating force designed specifically to extract representations from their origins and to reconstitute their meaning according to statistical measures defined by the political agendas of those who commission the algorithm's creation. However, digital media is not the only mediating force involved in the constitution of meaning online, as this dissertation demonstrates. Language is also a powerful vehicle for the constitution of meaning online, which is why bots are programmed to circulate specific linguistic representations of politically polarizing content on Twitter.

Roland Posner's iteration of media broadens our conception of what mediation entails by defining it as any "system that makes a certain type of communication possible: a system of means for production, distribution, and reception of signs which imposes certain constraints on sign behaviours" (Posner 1986: 293, 302, as paraphrased by Threadgold 1997: 393). Posner's framing of media thus includes 'biological media,' which are the sense modalities through which signs are perceived and interpreted (including human cognition); 'technical media,' which are the inventions that humans create to extend the production of signs to one another using external tools; and 'social media,' which are the immaterial institutional systems that we invent to regulate our intersubjective existence in society (see Subsection 1.6.3. in Chapter 1 for further elaboration). This dissertation's conception of *botaganda* is informed by Posner's framing of mediation since it aims to uncover the meaning making processes that take place within the confluence of semiosis among human minds, digital algorithms, and political intermediaries on Twitter.

5.1.4. Research Questions & Hypotheses

The study conducted for this dissertation was guided by three hypotheses positing that the semantic expressions embedded in tweets posted by Twitter bots induced *interactional*, *ideological*, and *linguistic alignment* among human users who unconsciously replicated *semantically contagious* words and phrases embedded in tweets posted by Twitter-bots; that *interactional*, *ideological*, and *linguistic alignment* with the content of tweets posted by bots is the consequence of converging modes of semiosis generated among human minds, digital algorithms, and political intermediaries within the #SNCLavalin Twitter discourse of 2019; and that the inclusion of specific words, phrases, and expressions within tweets posted by bots generated *semantic contagion effects* among Twitter users, which fundamentally shaped political communication, public opinion, and the public sphere on Twitter.

The research questions guiding my hypotheses ask:

1) In instances where the null hypothesis is rejected, can a relationship between tweets posted by humans and those posted by bots be empirically and qualitatively observed, tested, and assessed?

2) Does rejecting the null hypothesis suggest a relationship between tweets posted by bots and those posted by humans? Does such a relationship suggest that the convergence of semiosis between human minds, digital algorithms, and political intermediaries affected the tenor of political discourse across the #SNC Lavalin Twitter thread of 2019? If so, how?

3) Which words, phrases, and expressions operated as *semantic contagions* within the convergence of human thought, algorithmic computation, and political electioneering processes on Twitter across the #SNCLavalin discourse of 2019?

4) In what ways do these words, phrases, and expressions contribute to the tenor of political communication and public opinion about the SNC Lavalin scandal, Prime Minister Trudeau, and the Liberal Party on Twitter in 2019?

5.1.5. Summary of Findings

Findings derived from the chi-square test indicate that there was a relationship between the tweets posted by bots and those posted by humans, and based on Garrod and Pickering's Interactive Alignment Model, bots were likely to have influenced the kind of content that humans posted just as humans were likely to have influenced the kind of content that bots posted within a recursive circuit of semiosis. Thus, the cognitive linguistic analysis, and critical discourse analysis mutually suggest that tweets posted by Twitter bots and those posted by humans influenced one another iteratively in a discursive flow of semiosis across the #SNCLavalin Twitter discourse in 2019. However, findings gleaned from this preliminary study does

advance the hypothesis that the cognitive conditions cultivated within the convergence of semiosis among human minds, digital algorithms, and political intermediaries on Twitter likely induced human minds to *linguistically, interactionally*, *ideologically align* with the tenor of the content posted by bots. Finally, findings from cognitive linguistic and critical discourse analysis support the hypothesis that *semantic contagions* embedded in tweets circulated by Twitter bots shaped the tenor of political communication and public opinion within the *convergence* of semiosis among human minds, digital algorithms, and political intermediaries on Twitter.

The research conducted for this dissertation, thus, broadens our understanding of how digital media infrastructures, networks, and interfaces contribute to the formation of public opinion at the cognitive level, thus contributing to the fragmentation of the public sphere in the digital age. It also sets precedence and establishes urgency for more stringent policy development around the *Canada Elections Act*, the harmonization of privacy laws between federal and provincial bodies, and the introduction of campaign regulations to existing Canadian law that sanction the use of deep learning neural network algorithms to psychologically profile and micro-target constituents online.

5.2. Research Findings

Briefly revisiting this dissertation's overarching goal, I sought to examine how political communication and public opinion are formed within Twitter discourse, and to determine whether and to what extent *semantic contagions* embedded in tweets posted by bots incited *interaction alignment* (e.g., interpersonal, ideological, and linguistic alignment), in the sense of the term reflected in the scope of social psychology, among human users. I also endeavoured to establish whether moral outrage expressed within political communication shaped public opinion about the SNC Lavalin scandal, Prime Minister Trudeau, and the Liberal Party of Canada. This research approach was inspired by a study conducted by Ruth Breeze (2020), which used the computational tool WMatrix5 (Rayson 2021) to examine political affect circulated within the tweets posted by political leaders in Britain. Chris Hart's (Hart et al. 2005; Hart and Lukeš 2009; Hart and Cap 2014; Hart 2007, 2011, 2015) integration of insights from cognitive linguistics with CDA to analyze ideologies embedded in political discourse guided the critical discourse analysis conducted for this dissertation.

Advocating for a cognitive approach to critical discourse analysis, Hart (2015) draws from several cognitive linguistic principles, and thus similarly, this dissertation makes use of several cognitive linguistic tools, including *frame semantics*, *idealized cognitive models*, *cognitive lexical semantics*, and *linguistic gestalts* (see Subsection 4.4.5. in Chapter 4 for further elaboration and Table 1.1). These theories and approaches informed this dissertation's qualitative analysis of language's cognitive function within

Twitter discourse as well as the socio-cognitive motivations for using Twitter as a common online space for political discussion.

5.2.1. Overview of Findings

Empirical research conducted for this dissertation first rejected the null hypothesis in 6 of 12 corpus pairs tested for independence between tweets posted by Twitter-bots and those posted by human users. Instances where the null hypothesis was rejected and not rejected also informed the creation of a typology or control while conducting the qualitative component of the overall analysis. For example, when words and phrases embedded in tweets posted by Twitter-bots were found to be replicated by human users, I was able to cross-reference how these findings corresponded with findings generated by the chi-square test for independence across the corpus pairs belonging to the #SNCLavalin Twitter discourse of 2019.

Cognitive linguistic analysis helped identify instances in which frequently recurring words and phrases likely operated as *semantic contagions*. That is, words and phrases that were repeated frequently and whose meaning aligned with the reading goals of Twitter users were more likely to become entrenched in memory, which then conditioned how Twitter users rationalized and thought about subsequent tweets about political leaders. Cognitive linguistic analysis also suggests that words arranged into phrases that conform to *landmark / trajectory* schematics (adjectival / vehicular dynamics) were more likely to become *contagious*. Findings drawn from the empirical analysis suggest that instances in which *semantically contagious* words and phrases embedded in tweets posted by Twitter-bots were replicated by human users mirrored instances where the null hypothesis was rejected (see Section 4.4 in Chapter 4 for more detail). Social psychological explanations for *semantically contagious* words and phrases provided further insight into why they were likely to be more memorable and why they were more likely to become entrenched in memory.

Critical discourse analysis of *semantically contagious* words and phrases enabled further contextualization of their ideological significance alongside other words and phrases within tweets containing the word *scandal*, whose high frequency in appearance was common to all corpora studied for this dissertation (see Tables 4.16-4.20 in Section 4.4.3 of Chapter 4). Structural analysis of these words and phrases confirmed that instances of their frequent recurrence in tweets posted by Twitter-bots were, indeed, replicated in tweets posted by humans, which also aligned with findings gleaned from the chi-square test for independence (see Section 4.2.5 in Chapter 4).

Interactional analysis of hashtags embedded in tweets containing the word *scandal* also revealed that hashtags nested in tweets containing the word ‘scandal’ posted by Twitter-bots were also replicated by human users, which were also inferred by the findings produced by the chi-square test for independence. Interdiscursive analysis of frequently recurring words, phrases, and hashtags across all

corpora uncovered the ideological narratives cultivated by interactions between human users and Twitter-bots on March 14, between March 28-29, and between April 8-9 in 2019. As conjectured according to findings generated by the chi-square test for independence, narratives cultivated by Twitter-bots were often reproduced (and even elaborated) in tweets posted by human users on March 14 but then deviated between March 28-29, 2019. Between April 8-9, however, the dominant narratives promoted by Twitter-bots were replicated by human users, once again, which coincides with instances where the null hypothesis was rejected across corpus pairs based on the findings generated by the chi-square test for independence. What follows in Sections 5.2 provides further elaboration of these findings.

5.2.2. Empirical Findings

Empirical findings suggest that tweets posted by Twitter-bots relate in some way with tweets posted by human users on March 14, 2019, and between April 8-9, 2019, but not between March 28-29, 2019. In testing for independence between tweets posted by bots and those posted by humans, the null hypothesis was rejected in 6 of 12 corpus pairs of tweets posted by humans and by Twitter-bots within the #SNCLavalin Twitter discourse of 2019 (see Table 5.1).

CORPORA: HT1, HT2, HT3, BOTS, ASTRO

SEMTAGS: POLITICAL (POL) & EMOTION (EMO)

CORP1	CORP2	p-value
HT1	BOTS	**χ^2 = < 0.001, p < .05**
HT1	ASTRO	**χ^2 = 0.039, p < .05**
HT1 (-)	BOTS (-)	**χ^2 = < 0.001, p < .05**
HT1 (+)	BOTS (+)	χ^2 = 0.157, p < .05
HT2	BOTS	χ^2 = 0.162, p < .05
HT2	ASTRO	χ^2 = 0.522, p < .05
HT2 (-)	BOTS (-)	χ^2 = 0.654, p < .05
HT2 (+)	BOTS (+)	χ^2 = 0.179, p < .05
HT3	BOTS	χ^2 = 0.295, p < .05
HT3	ASTRO	**χ^2 = 0.021, p < .05**
HT3 (-)	BOTS (-)	**χ^2 = < 0.001, p < .05**
HT3 (+)	BOTS (+)	**χ^2 = 0.033, p < .05**

Table 5.1 Results of chi-square test for independence using SPSS

The results outlined in Table 5.1 above show that the null hypothesis was rejected between tweets posted by human users (HT1) and tweets posted by bots (BOTS & ASTRO) on March 14, 2019, except in the

instant where the HT1 corpus was tested for independence with BOTS (+). The null hypothesis was also rejected between tweets posted by human users and those posted by astroturfing Twitter-bots, though with less significance.

Because the null hypothesis was not rejected when testing tweets posted by humans and those posted by bots between March 28-29, 2019 (HT2), there was likely much less association between the two corpora during this temporal period. The null hypothesis was also not rejected between tweets posted by human users and those posted by Twitter-bots overall between April 8-9 (HT3), but it was rejected between tweets posted by humans and those posted by 'astroturfing' Twitter-bots. However, the null hypothesis was rejected between tweets posted by Twitter-bots representing negative affect and those representing positive (+) and negative (-) affect (see Table 5.1 above).

Instances where the null hypothesis was rejected offer some insight into potential areas of interest for qualitative investigation across the #SNCLavalin Twitter discourse. Moreover, these findings offered some degree of instantiation that the convergence of semiosis among human minds, digital algorithms, and political intermediaries across the #SNCLavalin Twitter discourse contributed to the tenor of public opinion shaped on Twitter.

For the purposes of this dissertation, I operationalized WMatrix5's semtag codes G (Government & the Public Domain) and E (Emotional Actions, States & Processes) representing the 2 major discourse fields (see Table 5.2 below) that I examined. These codes were operationalized to serve as nominal variables to compare observed frequencies within tweets posted by humans and those posted by bots across the #SNCLavalin Twitter discourse of 2019 to test for independence.

WMatrix5 Discourse Field	WMatrix5	Chi-Square
Government & the Public Domain	(G)	(POL)
Emotional Actions, States & Processes	(E)	(EMO)

Table 5.2 Code legend for the application of WMatrix5's semtags according to discourse fields

Results were calculated according to a null hypothesis, which means that the statistical test is applied to determine whether a relationship may exist between the two nominal variables. If the null hypothesis is rejected (e.g., it does not satisfy the threshold of ≥ 0.05), then it is more likely that the two sets of nominal variables are related in some way.

CORPUS * SEMTAG Crosstabulation

			SEMTAG		
			Politics	Emotions	Total
CORPUS	3	Count	84	149	233
		Expected Count	90.3	142.7	233.0
	BOTS (+)	Count	23	20	43
		Expected Count	16.7	26.3	43.0
Total		Count	107	169	276
		Expected Count	107.0	169.0	276.0

Table 5.3 Sample of crosstabulation for chi-square test of independence

*Untitled2 [DataSet1] - IBM SPSS Statistics Data Editor

File Edit View Data Transform Analyze Graphs Utilities Extensions Window Help

	Name	Type	Width	Decimals	Label	Values	Missing	Columns	Align	Measure	Role
1	SN	Numeric	8	0		None	None	8	Right	Scale	Input
2	CORPUS	Numeric	8	0		{1, HT1}...	None	8	Right	Nominal	Input
3	SEMTAG	Numeric	8	0		{1, POL}...	None	8	Right	Nominal	Input
4	FREQ	Numeric	8	0		None	None	8	Right	Nominal	Input

Table 5.4 crosstabulation coded into SPSS

By using WMatrix5's semantic categories (e.g., semtags), I was also able to expand the scope of inquiry using the chi-square test of independence since the computational tool sub-categorizes semantically tagged words as (+) or a (-) to indicate the word's antonymic position on the semantic scale (Archer, Wilson and Rayson 2002). For instance, a word tagged as G2.1- indicates that it semantically corresponds with some political aspect of crime, law, and order related to criminal activities and the legal system (see Tables 5.5 and 5.6 below).

Word	Semtag
justice	G2.1+
scandal	G2.2-
mps	G1.1
government	G1.1
parliament	G1.1
protocol	G2.1
testimony	G2.1
vote	G1.2
corruption	G2.2-
shameful	G2.2-

Table 5.5 Sample of government semtag markers assigned by WMatrix5 (Rayson 2021)

Word	Semtag
outrage	E3-
angered	E3-
horror	E5-
angry	E3-
embarrassing	E4.1-
enjoying	E2+
abuse	E3-
upset	E4.1-
dear	E2+
come_at	E3-

Table 5.6 Sample of emotions semtag markers assigned by WMatrix5 (Rayson 2021)

Some prototypical examples offered by the developers of WMatrix5 (Archer et al. 2003) include: ACT OF PARLIAMENT, AGAINST THE LAW (-), BOYS IN BLUE, BREACH OF THE PEACE (-), BREAKING AND ENTERING (-), CALL TO THE BAR, GOING STRAIGHT (+), HARD LABOUR. These additional qualifications of WMatrix5's semantic tags enabled me to operationalize the (+) and (-) features, which informed a typology of 12 corpus-pairs of bot-circulated and human-generated tweets (see Table 5.7 below). Because the 'astroturf' (ASTRO) corpus was already too small to segment any further, it was not partitioned into (+) and (-) corpus pairs.

CORP 1	CORP 2
HT1	BOTS
HT1	ASTRO
HT1 (-)	BOTS (-)
HT1 (+)	BOTS (+)
HT2	BOTS
HT2	ASTRO
HT2 (-)	BOTS (-)
HT2 (+)	BOTS (+)
HT3	BOTS
HT3	ASTRO
HT3 (-)	BOTS (-)
HT3 (+)	BOTS (+)

Table 5.7 12 corpus-pairs used for the chi-square test of independence

5.2.2.1. Chi-Square Test for Independence

Overall, in 6 of the 12 temporally segmented corpus-pairs studied, the null hypothesis was rejected suggesting the possibility that the affective representation (G and E) of tweets posted by bots affected the kind of content that humans posted across the #SNCLavalin Twitter corpus of 2019. Thus, *interactive* and *linguistic alignment* between human users and bots on Twitter was probable in half of the cases studied. However, the null hypothesis was not rejected between HT1 (+) and BOTS (+) and between HT3 and

BOTS, establishing a lack of relationship in these cases. Lack of association between the HT2 corpora (March 28-29) and both bot-corpora (BOTS, ASTRO) was also established by the chi-square test (see results in Table 5.1 above).

5.2.3. Qualitative Analysis

The qualitative analysis conducted for this dissertation further characterized the flow of semiosis within the convergence of human thought, algorithmic computation, and political electioneering on Twitter. More specifically, text and corpus analysis approaches were first applied to identify frequently recurring words and phrases assembled into composites and positioned in syntactic proximity to other words and phrases that likely cultivated relationships of equivalency among associated concepts appearing in the same tweet – a phenomenon and Charteris-Black terms *semantic contagion* (see Section 3.2.1.5 in Chapter 3 for further elaboration). I then used qualitative research approaches informed by cognitive linguistics and CDA to investigate the potential and ideological meaning and significance of *semantic contagions* embedded in tweets posted by bots to determine if they were replicated in tweets posted by humans.

5.2.3.1. Cognitive Linguistic Analysis

Cognitive linguistics guided analysis into the ways in which words and phrases become conventionalized into *mental frames* and entrenched in the *mental spaces* of cognition, which Fillmore's (2006: 373) notes results in the constitution of meaning assigned to an entire conceptual structure when the mind is exposed to a single unit (e.g., a word) belonging to the entire *mental frame*. Frequent and prolonged exposure to concepts and ideas semantically assembled into frames gradually cultivates *prototype effects* within the minds of human Twitter users. *Prototype effects* prompt *frames* to become categorically organized as *idealized cognitive models* as they stabilize within the background knowledge of memory (Evans, Bergen, and Zinken 2008: 12, paraphrasing Lakoff 1987). The culmination of words and phrases that are frequently and consistently assembled into composites situated in syntactic proximity to one another produces *semantic contagions* that gradually come to activate entire *semantic frames* automatically within the minds of human Twitter users. The cognitive influence of prototypicality and *semantic contagions* cultivated by tweets posted by bots on the formation of the ideological worldviews within the minds of human Twitter users is outlined in more detail in Subsection 4.4.4. in Chapter 4.

Subsections 5.2.3.1.1. and 5.2.3.1.2. below offer brief descriptions of how *word frequency effects* and *semantic contagions* compel the convergence of semiosis among human minds, digital algorithms, and political electioneering on Twitter, and how *word frequency effects* enhance *pragmatic traction* between words and phrases assembled into composite wholes on Twitter.

5.2.3.1.1. Word Frequency Effects

Word-frequency effects, which Monsell, Doyle, and Haggard, [1989] describe as the influence of high frequency words in processing concepts efficiently when compared with the influence of low-frequency words (Adelman et al. 2006), has been a subject of contention among experimental psychologists over the last few decades (Brysbaert, Mandera, and Keuleers 2017 – see also Subsection 4.4.1. in Chapter 4). However, more recent developments in digital technologies have made the gathering of text samples (corpora), the creation of word frequency lists, and the application of statistical analysis to those samples much easier to work with and increasingly more accurate. According to most recent research, good frequency lists are integral to the validation of *word frequency effects*, and a good list comprises a corpus containing no less than 20 million words.

Since the cogency of word frequency effects research is contingent on the quality of word frequency lists, 'mega-studies' have been conducted to establish conventions for validating frequency lists (Brysbaert, Mandera, and Keuleers 2017). These validation studies established that the most cogent word frequency norms are determined by the volume of words making up a frequency list, and that the word list reflects the kind of language used by participants when engaged in a particular mode and style of communication. For example, not surprisingly, the best frequency list for undergraduate students is based on corpora containing television subtitles (Brysbaert & New, 2009), social media (Gimenes & New 2016; Herdağdelen and Marelli 2017), and blogs (Gimenes and New, 2016). In other words, paralleling with findings established by *cognitive linguistics* that language use reflects patterns of thought (Evans 2006, 2010), word frequency effects correspond with changes in narrative represented by language-use according to the context it is being used in.

For example, the word *scandal* appears across all corpora of tweets posted by human and Twitter bots, as do the words *justice, mps, corruption, government*, and *prosecutor*. Table 5.8 lists the most frequently recurring words tagged as being semantically relevant to discourse about politics and governance (G). The most frequently recurring words embedded in tweets posted by astroturfing bots represented below in Table 5.8 are *scandal, judge, court, justice,* and *legal*. These words align thematically with dominant narrative that Trudeau and the Liberal Party should be criminally investigated for their response to the SNC Lavalin affair:

Word	Semtag	Frequency	Relative Frequency
scandal	G2.2-	10	0.27
judge	G2.1	9	0.24
court	G2.1	6	0.16
justice	G2.1+	6	0.16
legal	G2.1	6	0.16
PM	G1.1	5	0.13
mps	G1.1	5	0.13
lawyer	G2.1	4	0.11
testimony	G2.1	4	0.11
government	G1.1	4	0.11
wrongful	G2.2-	4	0.11
prosecutor	G2.1	4	0.11

Table 5.8 Word Frequency, Astroturfing bots

These words are also represented in tweets posted by Twitter-bots (which are examined in more detail in Section 5.2.3.3 below), such as:

> *Please RT! The RCMP must* ***investigate Justin Trudeau's #SNCLavalin scandal*** *now. If you agree, please SHARE and SIGN our petition at https://t.co/EuhU0EyMLs | #cdnpoli #hw #ONpoli #ABpoli (Posted by independent news outlet: 03/13/2019; Retweeted by human users 112 times 03/14/2019; Retweeted by bots 31 times)*

As can be discerned by comparing word frequencies represented across Tables 5.8, 5.9, and 5.10, frequently recurring words semantically tagged as significant to the political discourse of the #SNCLavalin Twitter thread are also present in tweets posted by Twitter-bots and those by human users on March 14, 2019.

Word	Semtag	Frequency	Relative Frequency
scandal	G2.2-	39	0.50
corruption	G2.2-	24	0.31
justice	G2.1+	17	0.22
government	G1.1	16	0.20
PM	G1.1	14	0.18
political	G1.2	11	0.14
testimony	G2.1	11	0.14
judge	G2.1	11	0.14
politics	G1.2	10	0.13
lawyer	G2.1	9	0.12
legal	G2.1	9	0.12

Table 5.9 Word Frequency, Twitter Bots

Word	Semtag	Frequency	Relative Frequency
justice	G2.1+	204	0.53
scandal	G2.2-	199	0.52
mps	G1.1	55	0.14
government	G1.1	48	0.13
parliament	G1.1	45	0.12
protocol	G2.1	43	0.11
testimony	G2.1	42	0.11
vote	G1.2	38	0.10

Table 5.10 Word Frequency, HT1

While there is some overlap in the words most frequently embedded in tweets posted by Twitter-bots and human users between March 28-29 on 2019, the overlap is much less pronounced, as would be expected based on findings cultivated by the chi-square test for independence summarized above in Section 5.2.2.1.

Word	Semtag	Frequency	Relative Frequency
scandal	G2.2-	72	0.20
judge	G2.1	72	0.20
legal	G2.1	64	0.17
political	G1.2	51	0.14
prosecutors	G2.1	50	0.14
scandals	G2.2-	47	0.13
wrongful	G2.2-	46	0.12
prosecutor	G2.1	46	0.12
justice	G2.1+	35	0.10

Table 5.11 Word Frequency, HT2

By comparing Tables 5.8 and 5.9 above (containing frequently recurring words embedded in tweets posted by Twitter-bots and Astroturfing Twitter-bots) with Table 5.12 below, it is evident that frequently recurring words in tweets posted by bots were reproduced in tweets posted by human users between April 8-9, 2019.

Word	Semtag	Frequency	Relative Frequency
scandal	G2.2-	168	0.35
suing	G2.1	163	0.34
PM	G1.1	150	0.32
defamation	G2.1-	95	0.20
corruption	G2.2-	92	0.19
crimes	G2.1-	80	0.17
election	G1.2	77	0.16
sue	G2.1	66	0.14
prime_minister	G1.1	62	0.13
political	G1.2	60	0.13
lawyer	G2.1	54	0.11
criminal	G2.1-	49	0.10

Table 5.12 Word Frequency, HT3

We can, therefore, surmise that instances where the null hypothesis was rejected when applying the chi-square test for independence between tweets posted by bots and those posted by humans are likely related to the semantics of the #SNCLavalin Twitter discourse around narratives pertaining to governance, politics, and the SNC Lavalin scandal.

The frequency of the word 'scandal' is high across all corpora studied for this dissertation, and it thus helps isolate potential areas within the #SNCLavalin Twitter discourse where *interactional* and *linguistic alignment* may be significant (see Tables 5.8-5.12 above). For example, several patterns and ideological themes are repeated around the word 'scandal' in the following tweets:

*Please RT! The **RCMP must investigate Justin Trudeau's #SNCLavalin scandal now**. If you agree, please SHARE and SIGN our petition (Posted by independent news outlet: 03/13/2019; Retweeted by human users 112 times 03/14/2019; Retweeted by bots 31 times)*

*I wonder if she hadn't needed to spend so much time trying to push away the barrage from **@JustinTrudeau and the rest of the #SNCLavalin #scandal crooks in the Liberal Party** if she could have gotten to this sooner? #TrudeauMustGo (Posted by human user: 03/28/2019 14:36:50)*

*Canada's ethics commissioner launched an investigation into political interference allegations in the #SNCLavalin case at the center of a scandal threatening Prime Minister **@JustinTrudeau's government**. How do you think this will affect the political future of the Liberal Party? (Posted by astroturfing bot: 04/09/2019 14:00:00)*

*Are you in Canada and following the **political scandal revolving around Prime Minister @JustinTrudeau**? What do you think? Tweet us your thoughts for today's show. #SNCLavalin (posted by human user: 04/09/2019 18:27:25).*

***#Canada's onetime golden boy #JustinTrudeau sinking** in polls as **scandal takes toll** #SNCLavalin #LiberalParty #NanosResearch #PierreTrudeau (Posted by Twitter bot: 04/09/2019 23:19:08)*

In the examples included above, two conceptual patterns emerge around the word 'scandal:'

1) 'scandal' as the active descriptive word affecting Prime Minister Trudeau's political status as the object of the scandal (e.g., scandal takes toll, scandal threatens, scandal revolves around).

2) 'scandal' as the object that Prime Minster Trudeau possesses (e.g., Justin Trudeau's scandal). The themes that repeat across these tweets include 'Prime Minister Trudeau's scandal,' 'Trudeau's sinking political future,' and 'Trudeau's breach of ethics.'

According to researchers of rhetoric, cognition, and persuasion, Randy Harris and Chrysanne DiMarco, lexical repetitions are also more salient and memorable in part because human minds naturally respond to repetition, as they "re-activate recently active neural pathways" (Harris and DiMarco 2017: 212). Human minds have an innate affinity for repetition because it satisfies the mind's inclination for categorization, which is likely why Twitter "capitalize[s] on repetition" (Harris and DiMarco 2017: 211) within and across discourse threaded by a Twitter feed. Moreover, though rhetoric is not the central focus of this dissertation, it bears recognizing that repetition, represented by high-frequency words that are semantically assembled into phrases and expressions across the #SNCLavalin Twitter discourse discretely supports the recognition of patterns in rhetorical expression (Harris and DiMarco 2017), which could also activate *discovery misattribution* effects discussed in more detail below in section 5.2.3.1.

Making use of the examples of tweets offered above, rhetorical use of the word 'scandal' as a 'threat' to, or an agent that is 'taking a toll' on Prime Minister Trudeau is repeated in other tweets across the #SNCLavalin Twitter discourse of 2019:

> *On Tuesday, we discuss the scandal* ***threatening Canadian Prime Minister @JustinTrudeau's political future.*** *Are you in Canada? Tweet us your questions and thoughts for the show. #SNCLavalin #JodyWilsonRaybould #JanePhilpott (Posted by human user: 04/09/2019 17:44:50)*
>
> *Is Canada's* ***PM @JustinTrudeau's political future in jeopardy****? @AJStream explores how the #SNCLavalin scandal could possibly threaten his bid for re-election. Join the conversation live on YouTube (Posted by astroturfing bot: 04/09/2019 21:50:22)*

5.2.3.1.2. Words, Phrases, and Semantic Contagions

The semantics of the linguistic contexts in which frequently recurring words and phrases appear also contribute to how memorable they become among language-users, as noted by Jones et al. (2012) who observe that "contextual repetitions in language only increase a word's memory strength if the repetitions are accompanied by modulation in semantic context." This research highlights the significance of high frequency words, phrases, and expressions that are semantically assembled into *conceptual frames* within the linguistic content of tweets in contextually diverse ways (e.g., the same semantic frames assembled in different ways in different tweets) posted in a discourse thread on Twitter. To reiterate, by frames, I am referring to Fillmore's (2006: 373) definition as:

> Any system of concepts related in such a way that to understand any one of them you have to understand the whole structure in which it fits; when one of the things in such a structure is introduced into a text, or into a conversation, all of the others are automatically made available.

Thus, frequent repetition of concepts and ideas semantically assembled into *conceptual frames* within various tweets that modulate the semantic contexts in which the frames appear across the #SNCLavalin discourse helps entrench specific political ideas and concepts into the semantic memory of human users, making them more memorable. For example, the following tweet was circulated at a high frequency across the #SNCLavalin discourse between March 14 and April 9, 2019:

> *Please RT! The* ***RCMP must investigate*** *Justin* ***Trudeau's #SNCLavalin scandal*** *now. If you agree, please SHARE and SIGN our petition (Posted by independent news outlet: 03/13/2019; Retweeted by human users 112 times 03/14/2019; Retweeted by bots 31 times)*

The semantics of conceptual themes like 'RCMP investigating' and 'Trudeau's SNC Lavalin scandal' are repeated implicitly and explicitly in the following tweets:

> *TRUTH..... if the Liberal majority on the committee vote to keep @Puglaas out and all the people she named .....then we will all know for sure that there is a #Coverup of the #SNCLavalin going on* ***#Publiciquiry or @rcmpgrcpolice*** *will need to investigate. (Retweeted by human user: 03/14/2019 11:00)*
>
> *@JustinTrudeau So let me get this straight... as of today* ***nobody is investigating*** *the* ***#SNCLavalin #Corruption #Obstruction matter****, not the Justice Committee, not the* ***RCMP*** *and now not the Ethics watchdog probing SNCLavalin affair taking 'prolonged' medical leave. Hmmm! (Posted by human user: 03/14/2019 04:42:41; Retweeted 4 times on the same day)*
>
> *GOOD POINT HERE! ADD to this, #SNCLavalin has yet* ***ANOTHER RCMP investgtn*** *in Montreal/poss charges. #Trudeau wld know that..Wld this wld be* ***2 CRIMNL TRIALS BACK*** *TO BACK for #SNC MannyMontenegrino on #SNCLavalinScandal Trudeau tried to* ***"manipulate justice"*** *(Posted by human user: 03/14/2019 03:03; Retweeted by human user 03/14/2019 07:03:03)*

Word and phrase composites in the language embedded in tweets posted by bots and humans can also help point analysis toward potential areas in discourse where words and phrases are assembled into *semantic contagions* that may serve to *conceptually frame* and assemble several concepts into cohesive wholes representing an entire idea or concept. For example, in the following tweet:

> *Total* ***#CoverUp*** *by* ***Trudeau's MP majority*** *at #****JusticeCommittee*** *like today's meeting is exactly why our #CPC Senate Opposition introduced motion for #SenCA Legal committee to* ***investigate #SNCLavalin scandal****. LISTEN to my Senate speech on why this must happen (Posted by Senator Denise Batters on 03/14/2019 14:57; Retweeted by human users 11 times on 03/14/2019)*

The words 'Trudeau's MP majority' in the context of this tweet appearing in a thread of other tweets containing similar assemblages of words, phrases, and expressions (e.g., which also features the words 'cover up,' and 'investigate the SNC Lavalin scandal' – also present in the tweet cited above – and 'Justice Committee') have the potential to create *frames* representing whole concepts like 'abuse of power,' and 'criminal activity.'

High frequency of semantically assembled words, phrases, and expressions that are conceptually compressed into *semantic frames* gradually cultivate *prototype effects* within the *mental structures* of human users' minds. These *prototype effects* may then culminate into *idealized cognitive models* of political information that is mentally classified and categorized as common political knowledge,

which eventually, with protracted use, behave as *semantic contagions* both in terms of the ways in which words are lexically organized and how they generate change and adaptation in meaning (Ross 2009). In the process, relationships of equivalencies between two categories are drawn (e.g., 'Trudeau's concentration of power' and the 'SNC Lavalin scandal' in the tweet cited above) appearing in "adjacent textual positioning contributing to this equivalency" (Charteris-Black 2006: 574).

Several 'adjacent textual positionings' of words and phrases whose combination shaped adaptations in meaning appear across tweets belonging to the astroturfing bot corpus, Twitter bot corpus, and the HT1 corpus. Some of the most frequently used examples include 'RCMP must investigate,' 'Trudeaus' SNC Lavalin scandal,' 'Liberal majority,' 'use their majority,' 'blatant abuse of majority power,' 'Trudeau-whipped Liberals,' and 'shutting down [the justice committee].' Frequently recurring collocates help identify areas where assembly of words and phrases likely represent conceptual classifications and categorizations that incite *prototype effects*. The prototypical quality of word assemblages used repeatedly across the #SNCLavalin discourse results in their consolidation into *idealized cognitive models* within the minds of Twitter users, which then becomes "relatively stable background knowledge structures with respect to which lexical concepts are relativized" (Evans, Bergen, and Zinken 2008: 12, paraphrasing Lakoff 1987).

Closer examination of collocates within the context of the astroturfing bot corpus, the Twitter bot corpus, and the HT1 corpus (March 14, 2019) reveals areas where the combination of words into composite phrases are likely to create adaptations in meaning, thus producing relationships of equivalency in the process while inciting the entrenchment of phrases and expressions functioning as *semantic contagions* within human memory.

WORD	*COLLOCATES*					
SCANDAL	RCMP	Investigate	Trudeau's	Justin	Now	#SNClavalin
JUDGE	wrongful	conviction	claims	SCC	legal	former
JUSTICE	Obstruction	Whipped	#LavScam	MPs	committee	Liberal
LEGAL	tells	sought	outside	SCC	JWR	judge
PM	Coverup	force	majority	use	---	---

Tables 5.13 Words collocated with high frequency words from the Astroturf Bot corpus

> *Please RT! The **RCMP** must **investigate Justin Trudeau's #SNCLavalin scandal now**. If you agree, please SHARE and SIGN our (Posted by independent news outlet: 03/13/2019; Retweeted by human users 112 times 03/14/2019; Retweeted by bots 31 times)*

*Gee, now **JWR tells** us she **sought outside legal** advice from a **former SCC judge** on **wrongful conviction claims**. And we'd been told she was such an experienced former prosecutor she didn't need such advice on #SNCLavalin. (Posted by human user: 03/28/2019; Retweeted by human users 46 times between 03/28 – 03/29/2019; Retweeted by bots 20 times)*

*Despicable, shameful, anti-democratic behaviour by #Trudeau-**whipped Liberal MPs** at Justice **committee**! They don't want to #LetHerSpeak, and they use their **majority** to **force** #PMOCoverUp on #SNCLavalin to continue (Posted by Senator Denise Batters 03/13/2019 13:21; Retweeted by human users 33 times on 03/143/2019; Retweeted by bots 8 times 03/14/2019)*

*Justin Trudeau broke law by kicking former ministers out of caucus, says Jane Philpott #Trudeau #SNCLavalin **#LavScam** #JanePhilpott #JWR (Posted by independent media outlet: 04/09/2019 11:06; Retweeted by bot: 04/09/2019 16:06)*

WORD	COLLOCATES				
SCANDAL	Ottawa	RCMP	investigate	Trudeau's	gov't
CORRUPTION	BCNDP	BCLP	BCGreens	JanePhilpott	FreedomOfSpeech
JUSTICE	Obstruction	LavScam	Committee	Further	reappear
GOVERNMENT	defensive	thoroughly	disgusted	Trudeau's	I'm
PM	repeated	officials	discussions	Coverup	top
POLITICAL	Future	Getting	EdTheSock	---	---
TESTIMONY	committee	revelations	later	confirmed	top
JUDGE	wrongful	conviction	claims	legal	SCC

Table 5.14 Words collocated with high frequency words from the Twitter Bot corpus

Several themes embedded in tweets posted in the HT1 corpus (March 14, 2019) are also posted by Twitter bots. For example, several themes contained in the following tweet:

*Please RT! The **RCMP must investigate Justin Trudeau's #SNCLavalin scandal now**. If you agree, please SHARE and SIGN our petition (04/08/2019 23:57:11)*

Were also reflected in other tweets posted in the Twitter bot corpus (see Table 5.14 above):

@rcmpgrcpolice alleges that #SNCLavalin was involved in bribery and corruption related to the company's business in Libya from 2001 to 2011. How do you think this criminal case in Canada will impact Justin Trudeau's government? Tweet us your thoughts. (Posted by independent media outlet: 04/08/2019 22:00; Retweeted by bot: 04/09/2019 03:00:00; Retweeted by human user 04/09/2019 18:27)

THIS IS MY OPINION... #Canadians CANNOT LET THEM SHUT THIS DOWN, WE DONT KNOW ANYMORE TODAY THAN WE DID AFTR JUSTICE COMMITTEE SHUTDOWN! #SNC #SNCLavalin ***DONT LET HIM SLITHER OUT OF THE TRUTH! #RCMP Is*** *#Trudeau hiding something worse in #Lavscam rift? (Posted by human user: 04/09/2019 10:41; Retweeted by human users twice 04/09/2019; Retweeted by bot: 04/09/2019 15:09)*

The tweet containing the collocates 'thoroughly' and 'disgusted,' with the word 'government' was also posted in the HT1 corpus (see Table 5.15 below):

Blatant abuse of their majority power. I'm ***thoroughly disgusted*** *by this* ***governmen****t. They are incorrigible... Every last one of them.* 😡 *#SNCLavalin #JustinCommittee #****Coverup*** *(Retweeted by human user: 03/14/2019 00:05; Retweeted by human users 29 times: 03/14/2019; Retweeted by bots 12 times)*

And related conceptual themes showcased in the following tweets:

Getting political w/ #EdTheSock "War On Stupid" Ep.03. ***The Liberal gov't scandal*** *in Ottawa #Politics #****Corruptio****n #SNCLavalin* ***#Trudeau*** *#FreedomOfSpeech * @womenandroads powers our weekly #podcast rant! (Retweeted by bots 6 times: 03/28 – 03/29/2019)*

Gee, now JWR tells us she sought ***outside legal advice*** *from a former SCC judge on* ***wrongful conviction claims****. And we'd been told she was such an experienced former prosecutor she didn't need such advice on #SNCLavalin. #cdnpoli (Posted by human user: 03/28/2019; Retweeted by human users 46 times between 03/28 – 03/29/2019; Retweeted by bots 20 times)*

Are repeated in HT1 corpus (see Table 5.15):

WORD	COLLOCATES					
JUSTICE	Committee	committee	reappear	opportunity	testimony	further
SCANDAL	investigate	RCMP	Trudeau's	Justin	now	SNCLavalin
MPS	whipped	Liberal	Justice	committee	easily	Unceremoniously
GOVERNMENT	thoroughly	disgusted	I'm	hesitate	your	resources
PARLIAMENT	protocol	deceive	openly	trying	committee	---
PROTOCOL	deceive	parliament	committee	---	---	---
TESTIMONY	further	justice	before	committee	responding	Minister

Table 5.15 Words collocated with high frequency words from the HT1 corpus

The following tweet reflect the collocation of words 'scandal,' 'investigate,' 'RCMP,' Trudeau's,' 'Justin,' 'now,' and 'SNCLavalin:'

> *Please RT!* ***The RCMP must investigate Justin Trudeau's #SNCLavalin scandal now****. If you agree, please SHARE and SIGN our petition at https://t.co/EuhU0EyMLs | #cdnpoli #hw #ONpoli #ABpoli (First posted on 03/14/2019 at 00:04:24; Retweeted 112 times throughout the day, representing 9% of the entire corpus)*

The semantic assembly of the words 'RCMP must investigate' and 'Trudeau's SNC Lavalin Scandal' represent potential sites where collocation may point to instances where concepts are assembled into *semantic contagions*, which then become framed in the minds of Twitter users, who then replicate them in their own tweets. We can observe potential evidence of such framing effects in subsequent tweets posted across the HT1 (March 14, 2019) corpus:

> *GOOD POINT HERE! ADD to this, #SNCLavalin has yet* ***ANOTHER RCMP investgtn*** *in Montreal/poss charges.* ***#Trudeau*** *wld know that..Wld this wld be 2 CRIMNL TRIALS BACK TO BACK for #SNC MannyMontenegrino on* ***#SNCLavalinScandal Trudeau tried to "manipulate justice"*** *(Posted by human user: 03/14/2019 07:03:03)*
>
> *TRUTH..... if the* ***Liberal majority*** *on the committee vote to keep @Puglaas out and all the people she named .....then we will all know for sure that there is a* ***#Coverup of the #SNCLavalin*** *going on #****Publiciquiry*** *or @****rcmpgrcpolice will need to investigate****. (Posted by human user: 03/14/2019 04:11:28)*
>
> *@****JustinTrudeau*** *So let me get this straight... as of today nobody is* ***investigating the #SNCLavalin #Corruption #Obstruction matter****, not the* ***Justice Committee****, not the* ***RCMP*** *and now not the Ethics watchdog probing SNCLavalin affair taking 'prolonged' medical leave. Hmmm! (Posted by human user: 03/14/2019 04:42:41; Retweeted 4 times on the same day)*

Originating from the Astroturf Bot corpus (see Table 5.14 above), the following tweet containing the collocates 'whipped,' 'Liberal,' 'Justice,' and 'committee' with the word 'MPs' is repeated in the HT1 corpus (see Table 5.15 above):

> *Despicable, shameful, anti-democratic behaviour by* ***#Trudeau-whipped Liberal MPs at Justice committee!*** *They don't want to* ***#LetHerSpeak****, and they use their* ***majority*** *to force* ***#PMOCoverUp*** *on #SNCLavalin to continue. (Posted by Senator Denise Batters 03/13/2019 13:21; Retweeted by human users 33 times on 03/143/2019; Retweeted by bots 8 times 03/14/2019)*

And the last two collocates 'easily,' and 'unceremoniously' with the word 'MPs' point inquiry to another tweet belonging to the HT1 (March 14, 2019) corpus (see Table 5.14 above) that potentially also contains

semantic contagions conceptually framed to represent 'abuses of power' and 'corrupt political activity' enacted by the Liberal Party:

> ***Shutting the committee down*** *so quickly and* ***unceremoniously*** *is not something* ***Opposition MP****s are letting go easily. The issue now escalates even further #cdnpoli #SNCLavalin (Posted by human user: 03/14/2019 03:14:12)*

These *semantic contagions* are repeated in the following tweets belonging to the HTI corpus (again, see Table 5.14 above):

> *Blatant* ***abuse of their majority power****. I'm* ***thoroughly disgusted*** *by this* ***government****. They are incorrigible... Every last one of them.* 😡. *0* ***#SNCLavalin #JustinCommittee #Coverup*** *(Retweeted by human users 30 times: 03/14/2019; Retweeted by bots 12 times)*
>
> *CPC @PierrePoilievre says* ***Trudeau*** *sent in his* ***Liberal majority committee members to shut down debate****. #cdnpoli #SNCLavalin (Posted by human user: 03/14/2019 01:09:02)*
>
> *Total #****CoverUp*** *by* ***Trudeau's MP majority at #JusticeCommittee*** *like today's meeting is exactly why our #CPC Senate Opposition introduced motion for #SenCA* ***Legal committee*** *to* ***investigate #SNCLavalin scandal****. LISTEN to my Senate speech on why this must happen (Posted by Senator Denise Batters on 03/14/2019 14:57; Retweeted by human users 11 times on 03/14/2019)*

Tweets belonging to the HT2 corpus (March 28-29, 2019 – see Table 5.16 below) contain different words assembled into phrases and composites than those appearing in the HT1 (March 14, 2019) corpus, the Twitter bot corpus, and in the astroturfing bots corpus (as suggested by the chi-square test), but there is a good amount of overlap in the linguistic patterns and themes of tweets posted in the HT3 (April 8-9, 2019) corpus (see Table 5.17 below) and the Twitter Bot corpus (see Table 5.14 above). For example, the assemblage of words 'Justice committee shutdown,' '[Trudeau and Liberals] slithering out of the truth,' 'shut down of inquiries,' 'Canada ethics commission investigation,' and 'Trudeau's SNC Lavalin scandal' all contribute to adaptations in meaning that create relationships of equivalency based on the adjacent textual positioning of words, phrases, and expressions to one another.

WORD	COLLOCATES					
SCANDAL	Inquiry	LYING	FUCKING	becuz	STOP	He's
SUING	Scheer	inquiries	becuz	'to	Sun	LYING
PM	immediately	brings	notice	still	libel	can't
DEFAMATION	pale	beyond	'inquiries'	o	evidence	crimes
CORRUPTION	stop	press	corporate	hold	talking	people
CRIMES	o	evidence	becuz	accusing	defamation	w
ELECTION	before	bonkers	occur	all	right	cdnpoli
SUE	prepare	lawyer	AndrewScheer	LavScam	cndpoli	Threatening
PRIME_MINISTER	---	---	---	---	---	---
POLITICAL	Future	Excuse	Choice	Behaviour	When	JustinTrudeau?s
LAWYER	prepare	sue	AndrewScheer	cndpoli	ruthmkb	called
CRIMINAL	Rhetoric	Mastermind	Line	Type	conspiratorial	case

Table 5.16 Words collocated with high frequency words from the HT2 corpus

*I still can't get over the **PM's libel notice**. If @AndrewScheer immediately brings a motion to have the suit dismissed, he gets a **cross-examination** of the PM and a court appearance within 60 days, **so this would all occur right before an election**. Bonkers. #SNCLavalin #cdnpoli (Posted by human user: 04/07/2019; Retweeted by human users 45 times between 03/28 – 03/29/2019; Retweeted by bots 4 times)*

today on @AJStream, we discuss the #SNCLavalin scandal threatening Canadian Prime Minister @JustinTrudeau's political future. Tweet us your thoughts on the importance of the issue and how you think it should impact #Trudeau and the Liberal Party. (Posted by independent media outlet: 04/08/2023 17:46; Retweeted by human user once: 04/09/2023: 04/09/2019 15:57)

*@EdtheSock: Front page of The Sun today says #**Trudeau** is suing #Scheer to **'to shut down inquiries about the #SNCLavalin 'scandal'**. STOP.FUCKING.LYING. He's suing becuz Scheer is accusing him of **crimes w/o evidence**. That's defamation. **That's beyond the pale of 'inquiries'! #fishwrapping** (Posted 04/08/2019 22:26; Retweeted by human users 77 times between 04/08 – 04/09/2019; Retweeted by bots 3 times)*

*we discuss the #SNCLavalin scandal threatening Canadian Prime Minister **@JustinTrudeau's political future**. What do you think is the significance of the resignations of two female Cabinet members? (Posted by human user: 04/08/2019 23:00:55)*

*Well, right now, "winning" would be @AndrewScheer and the @CPC_HQ ceasing talking as if the **PM** is some type of **conspiratorial criminal mastermind**. If this line of **rhetoric** stops, it's pretty much an admission of guilt. #CdnPoli #SNCLavalin (Posted by human user: 04/08/2019; Retweeted by human users 16 times between 04/08 – 04/09/2019; Retweeted by bots 6 times)*

Canada's ethics commissioner launched an investigation into political interference allegations in the #SNCLavalin case at the center of a scandal threatening Prime

Minister @JustinTrudeau's government. How do you think this will affect the political future of the Liberal Party? (Posted by independent media outlet: 04/09/2019 9:00; Retweeted by human user once: 04/09/2019 18:26; Retweeted by bots twice)

*Is **Canada's PM @JustinTrudeau's political future in jeopardy**? @AJStream explores how the **#SNCLavalin scandal** could possibly threaten his bid for re-election. Join the conversation live on YouTube (Posted by independent media outlet: 04/09/2019 15:30; Retweeted by human users 04/09/2019; Retweeted by bots twice)*

However, the themes embodied by collocations within the tweets identified above are not reflected across the BOTS, ASTRO, HT1, or HT3 corpora, as would be expected according to the results of the chi-square test for independence for the corpus-pairs representing tweets posted between March 28-29, 2019, which did not reject the null hypothesis:

WORD	COLLOCATES					
SCANDAL	GropeGate	Pressuring	Accused	Sermon	Three	preaching
JUDGE	wrongful	conviction	claims	legal	SCC	advice
LEGAL	outside	sought	tells	judge	SCC	advice
POLITICAL	those	arguments	side	pass	junkies	clerk
PROSECUTORS	federal	Bill	arguments	difference	Morneau	pass
SCANDALS	GropeGate	India	---	---	---	---
WRONGFUL	conviction	claims	judge	SCC	former	---
JUSTICE	ObstructionOfJustice	Minister	TelfordWives	TelfordOpEd	PMOLeaks	AdmiralNormanTrial

Table 5.17 Words collocated with high frequency words from the HT3 corpus

Themes represented by the words 'scandal,' 'GropeGate,' 'pressuring,' 'accused,' 'sermon,' and 'preaching' represented across the HT3 corpus (see Table 5.17 above) can be read in context in the following tweets:

*Meanwhile, this morning in Ottawa...#TelfordOpEd #TelfordWives #AdmiralNormanTrial #SNCLavalin #JusticeJoyal #PMOLeaks #**GrassyNarrows** #**ThankYouForYourDonation** #cdnpoli (Posted by human user: 03/28/2019 11:17:06)*

*Wernick for those who aren't political junkies is the Clerk of the Privy Council who resigned in the wake of the SNC-Lavalin scandal after **@Puglaas accused him of pressuring her** and threatening her and some controversial testimony at #JUST #cdnpoli #MarkNorman **#SNCLavalin** (Posted by human user: 03/28/2019 17:26:55)*

***Three clowns preaching** the same **fake scandal sermon**. #SNCLavalin #cdnpoli #cdnmedia (Posted by human user: 03/28/2019 19:49:46)*

*@**JustinTrudeau** Its beginning to make me wonder if a $1500 donation from **#GrassyNarrows** will be his downfall. Rather than the **#SNCLavalin**, #MarkNorman,*

> ***#LetHerSpeak**, **#GropeGate scandals**? Thank you **Justin** for showing your true colours. And to those applauding in the crowd, shame on you. (Posted by human user: 03/28/2019 22:21:13)*

As can the themes 'wrongful,' 'conviction,' 'claims,' and 'legal advice,' which are prevalent in the following tweet:

> *Gee, now JWR tells us she sought outside **legal advice** from a former SCC judge on **wrongful conviction claims**. And we'd been told she was such an experienced former prosecutor she didn't need such advice on #SNCLavalin (Posted by human user: 03/28/2019; Retweeted by human users 46 times between 03/28 – 03/29/2019; Retweeted by bots 20 times)*

We can conclude, therefore, that since human users reproduced the concepts and themes represented most prevalently in tweets posted by bots, bots serves some degree of influence on the formation of public opinion among human users engaging with the #SNCLavalin Twitter discourse on March 14th and between April 8-9 in 2019, but much less so between March 28-29, 2019.

5.2.3.2. Social Psychology

Insights from social psychology can help articulate how and why certain words and phrases embedded in tweets posted by Twitter-bots may resonate with human users on a socio-cognitive level. The *reading goals* of human users according to their political sympathies, for instance, determine which words and phrases the minds of human users are most likely to pay attention to. The content that human minds are motivated to pay attention to also informs which information becomes entrenched in long-term memory, which fundamentally contributes to the mental scripting of schemas and heuristic habits in reasoning. This dynamic also informs how human minds proverbially 'fill in the blanks,' as described by *Gestalt* theory.

The politically oriented *reading goals* of human Twitter users also impacts how frequently recurring words and phrases embedded in tweets posted by Twitter-bots come to function as *prime lures* and how saliently they are likely to activate *semantic priming effects* in the minds of Twitter users. Sections 5.2.3.2.1 and 5.2.3.2.2 below articulate this social psychological dynamic further.

5.2.3.2.1. Reading Goals of Twitter Users and Interpretation of Tweets

Studies in social psychology (e.g., White et al. 2015) suggest that the reading goals (e.g., unconscious skimming for specific information) of Twitter users also regulate the integration of frequently recurring and semantically assembled words and phrases into semantic memory. Thus, semantically assembled word and phrase composites that align most closely with the reading-goals of Twitter users enhance word recognition by stimulating the mind's associative memory. Based on these premises, for the purposes of this dissertation, I examined words and phrases recurring most frequently in the tweets posted across the

#SNCLavalin Twitter discourse and I analyzed their semantic composition to understand how their assembly constituted meaning in ways that generated *semantic contagion effects*, and how resulting *semantic contagions* contributed to the cultivation of political and ideological frames.

Skimming linguistic representations on Twitter according to one's reading goals compels the mind to quickly identify words and phrases that have become familiar with prolonged and frequent exposure on twitter, which thus facilitates the entrenchment of *semantic contagions* into *conceptual frames* and categories within memory. In this way, the minds of Twitter users are compelled to mentally 'fill in' proverbial gaps in knowledge while skimming content, thus activating the unconscious assembly of gestalts in long-term memory, which fundamentally informs the schemas of heuristic reasoning when the mind is exposed to the same *semantic contagions* during future Twitter skimming sessions. These are ideal cognitive conditions for the cultivation and reinforcement of confirmation biases, existing prejudices and stereotypes within the minds of human Twitter users.

The memorability of the most frequently recurring words, phrases, and expressions embedded in the linguistic content of tweets containing the word 'scandal' across the #SNCLavalin Twitter discourse of 2019 is, thus, supported by the reading goals of human Twitter users. Examining recurring words and phrases in the context of #SNCLavalin tweets reveals a good deal about the reading goals of human Twitter users. For example, the hashtags #coverup, #corruption, and #Obstruction (of justice) are networked most prominently around and alongside metaphoric themes that characterize Prime Minister Trudeau and the Liberal party as disingenuous actors orchestrating a spectacle from the centre of a circus ring. These tweets are likely to target constituents with more Conservative political sympathies or 'swing-voters' whose online behaviours suggest that they are likely to hold less Liberal beliefs and values. For example, Table 4.18 in Chapter 4 shows that in several tweets posted by bots, Liberal MPs are metaphorically described as 'ringmasters' of the justice committee overseeing the SNC Lavalin scandal. This metaphor is repeated within the discourse patterns of HT1 (human-generated tweets that took place on March 14 – see Table 5.15) and of HT3 (human generated tweets that took place between April 8-9 – see Table 5.17) and is also represented in characterizations of Prime Minister Trudeau as a 'clown' in HT3 (see tweet 3.22 in Table 4.21 in Chapter 4, for example).

5.2.3.2.2. Semantic Priming and Prime Lures

Semantic priming research also contributes to describing the 'contagious' qualities of words, phrases, and expressions that activate *prototype effects*. For instance, a recent study found that *semantic priming* effects can generate mental sensations of 'aha' moments among text readers – also known as the *Eureka Heuristic* (Laukkonen et al. 2018) – by use of *prime lures* (associative cues) within visually familiar conditions. Studies have also shown that *semantic priming* can activate the *Eureka Heuristic* among text readers in

ways that engender the propagation of 'false insights.' False insights activated by the *eureka heuristic* using *prime lures* can also generate false memories for those *prime lures* (Grimmer et al. 2022), which suggests that *semantically priming* constituents on Twitter using *prime lures* within a thread of social media discourse can incite *discovery misattribution effects* (Dougal Schooler 2007), thus activating false feelings of insight, which supports the entrenchment of false information in memory (see Subsection 3.2.1.3 in Chapter 3 for more detail).

For example, from the perspective of a right-wing sympathizer, the reading goals of a Twitter user may bias their reading of the following tweet:

> *Let's not let Trudeau think for 1 second Canadians have forgotten how he broke the law and tried to pressure the AG into helping his rich friends avoid prosecution. #cdnpoli #LavScam #SNCLavalin #SNCLavalinScandal #JustinTrudeau #AndrewScheer (Posted by human user: 04/09/2019 15:01)*

The conceptual effect of this tweet – especially with previous exposure to the visual and semantic cues presented in the tweet illustrated below (see Image 5.1), posted 124 times on 03/14/2019 – on the minds of Twitter users with right-leaning sympathies could produce *prime lures* that activate the *eureka heuristic* or an 'I knew it!' sensation which, in consequence, guides users' interpretation of the tweet.

Activation of a *eureka heuristic* could also potentially incite a *discovery misattribution effect*, persuading the Twitter user to unconsciously entrench *semantic contagions* embedded in tweets into the mental structures of semantic memory.

Image 5.1 Image of Justin Trudeau included in Twitter post within the #SNCLavalin discourse of 2019

Justin Trudeau broke law by kicking former ministers out of caucus, says Jane Philpott #Trudeau #SNCLavalin #LavScam #JanePhilpott #JWR (Posted by news media outlet: 04/09/2019 11:06; Retweeted by human users 5 times: 04/09/2019; Retweeted by bots twice: 04/09/2019 16:26:12)

Thus, *prime lures* and *semantic priming effects* that activate *discovery misattribution effects* through the psychological sensation of 'aha' moments created in the context of tweets that circulate and amplify *semantic contagions* represent powerful cognitive phenomena that persuade text readers to accept false information as inherently accurate and true. The social significance of this phenomenon is particularly salient in the digital age since it fuels the kinds of conspiracy theories that culminated in the January 6th attack on the Capitol Building in Washington, D.C. in 2021. Conspiracy theories, as an intergroup phenomenon, can be highly destructive to social cooperation and cohesion since they often undermine the integrity of governance, promote racism, catalyze extremist views, and stymie public health initiatives, as the world recently witnessed across the COVID-19 pandemic. Add to all this the use of *psychometric profiling* and deep learning algorithms on Twitter, which supplies political intermediaries with ample information pertaining the intimate intricacies of Twitter users' potential *reading goals* based on information generated by algorithms about each user's personality profile.

Accordingly, frequent embedding of *semantic contagions* across Twitter discourse in conceptually diverse ways could potentially integrate false information with existing knowledge in semantic memory, especially if they accommodate Twitter users' *reading goals*. Additionally, they could activate *discovery misattribution effects* that 'aha-moments' incite, which is problematic since they "operate as a heuristic – a mental shortcut for deciding which ideas to trust. Central to this view is the idea that feelings of insight are driven by past knowledge, and therefore if past knowledge is incorrect, then so too will be the insight" (Laukkonen et al. 2020).

Using Hjelmslev's *Glossematics* model (see Figure 5.2) helps illustrate *how discovery misattribution effects* may become activated in the minds of human users, which could lead to a false sense of insight. For example, frequently recurring words and phrases posted by Twitter-bots operate representationally at the level of *matter* (grains of sand) on the *plane of expression* and are assembled into ideological narratives about political leaders according to the logic of algorithmic computation and political electioneering agendas at the level of *form* (bucket) on the *plane of expression*. The assembly of frequently recurring words and phrases posted by Twitter-bots culminates into tweets that can be visually perceived and interpreted at the level of *substance* (sandcastle) on the *plane of expression*.

On the *plane of content*, the political biases, worldviews, and partialities (etc.) of Twitter users affects what frequently recurring words and phrases come to signify, and thus how they become *semantically contagious* on the level of *matter*. The ways in which frequently recurring words and phrases

embedded in tweets posted by bots are conceptually assembled are contingent on the *reading goals* of human Twitter users, which define how words and phrases operate as *prime lures* that activate *semantic priming effects* at the level of *form* on the *plane of content.* The efficacy and ideological currency of frequently recurring words and phrases posted by Twitter-bots informed by the *reading goals* of human Twitter users culminated as public opinion about Prime Minister Trudeau and the Liberal Party on the level of *substance* on the *plane of content* (see Figure 5.2 below).

Fundamentally, the *reading goals* of human Twitter users (which can be *psychographically* measured and identified by deep learning algorithms according to recent research outlined in Section 4.2 in Chapter 4) are informed by the political ideas, biases, assumptions, prejudices, and discriminations that human users already ascribe to, which determines how words and phrases operating as *semantic contagions* gradually stabilize into the *mental frames* and *idealized cognitive models* of *mental structures*, which guide *heuristic* modes of reasoning. This process leads to further entrenchment of ideological beliefs, values, and worldviews about politics and political leaders within the minds of human Twitter users, which subsequently shapes how their *reading goals* inform the efficacy of *prime lures* embedded in the tweets of political Twitter discourse yet to manifest.

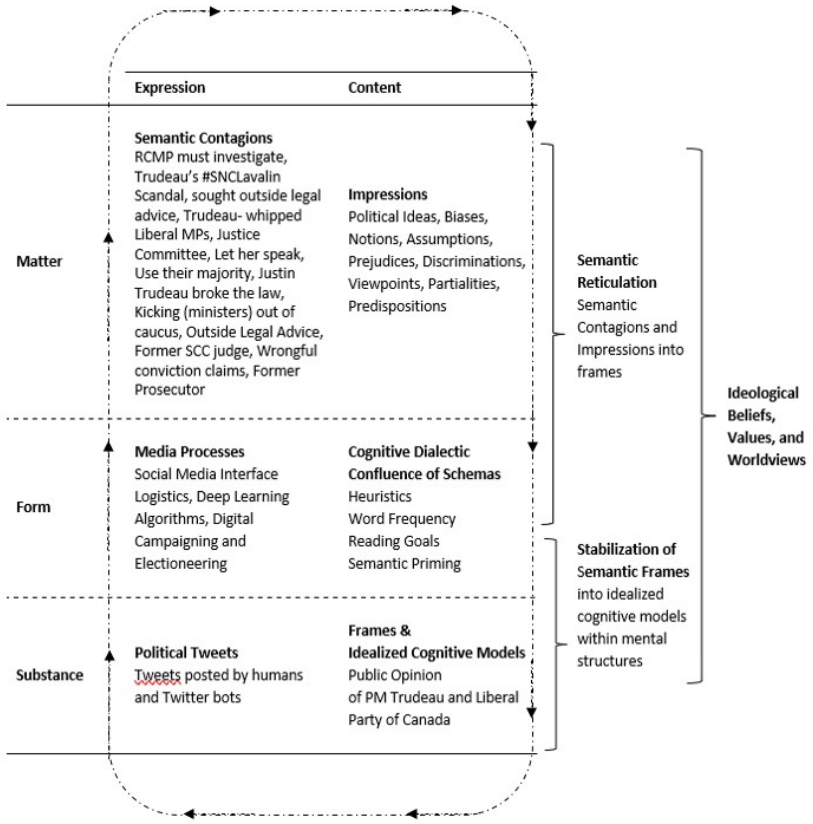


Figure 5.2 Use of Hjelmslev's Glossematics to illustrate the fomentation of words and phrases into prime lures and semantic contagions

The following section presents research findings derived while applying CDA to examine the impact of frequently recurring words and phrases embedded in tweets making up the #SNCLavalin Twitter discourse that likely accommodated the *reading goals* of human Twitter users and the formation of ideological beliefs, values, and worldviews within the recesses of semantic memory.

5.2.3.3. Critical Discourse Analysis of Semantic Contagions

Critical Discourse Analysis (CDA), as articulated by Hart (2014: 2), is a branch of applied linguistics used to uncover the ideological and persuasive properties of discourse that may not be evident without systematic analysis. The critical iterations of CDA are informed by social theory developed by critical scholars like Bakhtin, Bourdieu, Habermas, and Foucault, who aim to critique several facets of power within social relations (Billig 2003). Fundamentally, in CDA research, "discourse and social action are held to exist in a dialectical relation," which contributes to "the formation of social systems, situations, institutions, and ideologies" (Hart 2014: 3). Thus, CDA is often applied to evaluate how language contributes to the construction of social relations and social reality (as well as the normalization and legitimation of ideologies) that come to inform our worldviews in ways that shape and reinforce power-relations (Hart 2014).

Ideology, as framed by CDA, is construed within "normalized patterns of belief and value" (Hodge and Kress 1993, paraphrased by Hart 2014: 3) that cumulatively "carries a pejorative meaning and is applied to perspectives promoted in the interests of specific social groups" (Eagleton 1991: 29). According to Van Dijk (1998), the formation of ideologies within discourse often generates an 'us' vs. 'them' dichotomy in social relations, inciting positive sensibilities towards those belonging to the 'us' category and negative sensibilities towards those belonging to the 'them' category, which guides social actions that contribute to inequalities, injustices, and abuses of power (see Section 3.4. in Chapter 3 and Subsection 4.4.5. in Chapter 4 for further discussion).

While scholars of CDA integrate several branches of cognitive linguistics, including *cognitive grammar*, *conceptual blending*, and *viewpointing*, *cognitive semantics* and *frame semantics* are rarely explored within the ambit of CDA. Agnieszka Sowińska (2012) identifies the neglect of semantics within CDA research as a theoretical gap that, if filled, offers more axiological analysis of the formation of ideology in discourse (see Section 3.4. in Chapter 3 for a more detailed description of this theoretical gap). The CDA analysis conducted for this dissertation, therefore, adopts perspectives from semantic priming research, and cognitive linguistic perspectives on *semantic frames*, *prototype effects*, *categorization*, and *semantic contagions*, which are all discussed in detail in Chapters 3 and 4, and in section 5.2.3.3 of this chapter.

5.2.3.3.1. Structural Analysis

As outlined in section 4.4.5.1. in Chapter 4, CDA structural analysis entails the excavation of latent semantic structures and meaning-making processes in textual data, thus revealing relationships between texts, discourses, and context (Wodak and Meyer 2015; Aranda et al. 2021). This involves looking at the schematic organization of words, phrases, and expressions with one another at the sentence level and the semantics of macrostructure defining the ideological stance of discourse as a whole.

Structural analysis of the most frequently recurring word and phrases composites embedded in tweets containing the word 'scandal' (see Tables 4.18-4.21 in Chapter 4) across the #SNCLavalin discourse revealed several instances where politically salient semantic categories were constructed and where one word classified some ideological attribute of another word representing a political issue, entity, or actor (namely, within the scope of this study, this second word often related to Prime-Minister Trudeau or the Liberal Party of Canada). In several of these cases, frequently recurring words and phrases became assembled into conceptual classifications and categories. Recurring frequency and exposure to the ways in which words were assembled within each tweet transformed their conceptual classifications and categories into *semantic contagions*, both with respect to the adaptive meanings generated within the assembly of word and phrases into composites and by the adjacent textual positioning of concepts within each individual tweet and across the #SNCLavalin Twitter discourse.

Semantic contagions function as *prime lures* in the context of Twitter because they incite *prototype effects* that foment within human minds as *idealized cognitive models* that *semantically frame* what Twitter users believe to be true and accurate. For example, in the following tweets:

> *Despicable, shameful, anti-democratic behaviour by* ***#Trudeau-whipped Liberal MPs*** *at* ***Justice committee****! They don't want to #****LetHerSpeak****, and they use their majority to force* ***#PMOCoverUp*** *on #SNCLavalin to continue. (Posted by Senator Denise Batters 03/13/2019 13:21; Retweeted by human users 33 times on 03/143/2019; Retweeted by bots 8 times 03/14/2019)*
>
> *Please RT! The* ***RCMP*** *must* ***investigate Justin Trudeau's #SNCLavalin scandal*** *now. If you agree, please SHARE and SIGN our petition at https://t.co/EuhU0EyMLs | #cdnpoli #hw #ONpoli #ABpoli (First posted by independent news outlet on 03/14/2019 00:04:24; Retweeted by human users 112 times on 03/14/2019)*
>
> ***#bcliberals*** *also* ***deep in bed*** *with* ***#SNCLavalin*** *and others, but no other party has* ***obstructed justice*** *for SNC besides liberals, no other party wrote #TooManyDonationsToJail DPA law for & no other party likely to lose power over a* ***coveru****p for what they did #lavscam #cdnpoli (Posted by human user on 04/08/2019 15:29; Retweeted by bots once on 04/08/2019 20:29)*

Several instances may be detected across these tweets where political issues and actors belonging to the Liberal Party are directly or indirectly represented as being complicit with the SNC Lavalin corporate scandal. For example, word-pair collocates like 'Trudeau's' and 'scandal,' 'Prime-Minister (PMO)' and 'coverup,' 'obstructed' and 'justice,' and 'whipped' and 'mps,' semantically assemble facets of the Trudeau Government and affiliated members of parliament within tweets containing the word 'scandal' (see Tables 4.7-4.12 for more examples).

Frequent and recurring instances where words, phrases, and expressions are semantically consolidated alongside political concepts and actors, as well as their frequent and recurring positioning alongside other expository phrases and expressions like 'political interference,' 'concentration of power,' 'corporate corruption,' 'corporate handouts,' 'moral character,' justice committee,' 'Liberal ringmaster,' 'abuse of power,' 'PMO coverup,' and 'let her speak' gradually cultivates *prototype effects* that transform information mentally organized into *idealized cognitive models* and *mental frames* into *semantically contagious* (Charteris-Black 2006) relations of conceptual equivalency. Moreover, relationships of conceptual equivalency between Prime Minister Trudeau and the Liberal Party with the SNC Lavalin scandal formed within the mental structures of Twitter users may also serve to legitimize ideological assumptions about this political and legal issue (see Section 4.4. in Chapter 4).

A comparative study of the most prevalent words, phrases, and expressions used in tweets containing the word 'scandal' across the #SNCLavalin discourse of 2019 revealed that the themes 'investigation,' 'corruption,' and 'coverup' were repeated across the BOTS, HT1, and HT3 corpora, which suggests potential areas within the corpus where tweets posted by bots were likely associated with those posted by humans (in instances where the null hypothesis was rejected, identified through the chi-square test for independence – see Graph 5.1 below).

5.2.3.3.2. Interactional Analysis

Interaction analysis is conducted from the premise that both interaction and communication are grounded in social structures and intersubjective relations between social groups (Myer and Wodak 2015:70). The contexts, conditions, and platforms used for communicative purposes determine whether discourse unfolds within synchronous interactions (e.g., direct messaging) or asynchronous interactions (e.g., tweets), which also influences the coherence of interdiscursive relationships between linguistic elements and concepts, as well as the relationships between texts, discourses, and contexts (see Section 4.4.5.2. in Chapter 4 for further elaboration). The #SNCLavalin Twitter discourse of 2019 unfolded asynchronously, and several other interactional features used on the Twitter platform contributed to the interactional quality of the discourse itself. For example, hashtags are used on Twitter to network several discourse threads together,

to draw attention to a particular topic or issue, to establish associations among topics, and to amplify networks of engagement across platforms like Instagram, Snapchat, TikTok, Facebook, and YouTube (to name but a few). By collecting hashtags that appeared within tweets containing the word 'scandal,' I discovered interactions between the #SNCLavalin discourse thread and other discourse threads circulated on Twitter and on other social media platforms, such as Instagram, Snapchat, TikTok, Facebook, and Youtube, etc. (see Tables 4.22-4.25).

Mapping the frequency of hashtags embedded in tweets containing the word 'scandal' exposed the conceptual ecologies of networked interactions with the #SNCLavalin Twitter discourse in 2019. This analysis also demonstrated how Twitter users made use of the platform's technical affordances to connect the #SNCLavalin discourse with the meaning and significance of other hashtags embedded in other tweets. Finally, analysis of hashtags embedded in tweets containing the word 'scandal' also uncovered some thematic concurrence between tweets posted by bots and those posted by humans. For example, #Coverup and #Lavscam appear in tweets circulated by Twitter-bots and were also prevalent in the HT1 (March 14, 2019) and HT3 (April 8-9, 2019) corpora but less so in the HT2 (March 28-29, 2019 – see Tables 5.15 to 5.17 above) as suggested by the findings produced by the chi-square test of independence (see Subsection 5.2.2.1. above). The hashtags #Liar, #Threaten, and #Loblaws are outliers that are most prevalent in HT3 (April 8-9, 2019) but are much less so (if at all) in the bot-corpus as well as HT1 (March 14, 2019) and HT2 (March 28-29, 2019), which suggests that tweets containing these hashtags were likely circulated exclusively by human Twitter users to engage in a unique theme across hashtag discourses online.

Interactional analysis of the #SNCLavalin hashtag ecology networked by tweets containing the word 'scandal' evinces that Prime Minister Trudeau and Attorney General (Jody) Wilson-Raybould were the political actors that tweets posted by bots targeted most prominently using hashtags. Astroturfing bots focused primarily on Prime Minister Trudeau and Wilson-Raybould, as well as the Liberal Party. Hashtags serving semi-descriptive functions within the bot and astroturfing corpora include #Corruption, #Coverup, #Obstruction, #LavScam, and surprisingly, #Indigenous. Hashtags referencing Trudeau and Wilson-Raybould were evident in all 3 corpora of tweets posted by humans, but the hashtags #Coverup and #Lavscam were more marked in the HT1 (March 14) and HT3 (April 8-9) corpora.

Hashtag networks also thematically highlight which political issues are conceptually drawn together on Twitter and across social media platforms. For example, tweets containing the word 'scandal' within the HT1 (March 14, 2019) corpus featured the hashtags #Coverup, #LavScam, and #LetHerSpeak most prominently, while those within HT2 (March 28-29, 2019) featured the hashtags #Obstruction, #GrassyNarrows (representing Prime Minister Trudeau's misstep in addressing a protestor about the First Nation logging blockade took place in 2002), #GropeGate (representing sexual assault allegations made

against Prime Minister Trudeau in 2018), #Liar, #Threaten, #LavScam, #LetHerSpeak, #Indigenous, and #Loblaws (though, the hashtags with the most traction in HT2 are #Obstruction, #GrassyNarrows, #Gropegate, #LavScam, and #LetHerSpeak). HT3 (April 8-9, 2019) featured the hashtags #Corruption, #Coverup, #Obstruction, #Liar, #LavScam, #Loblaws, and #Indigenous.

When comparing hashtags applied most prominently in tweets posted by humans with those posted by Twitter bots containing the word 'scandal,' parallels between tweets posted by bots and those posted by humans becomes increasingly apparent. Hashtags included within tweets posted by bots (BOTS corpus) between March 14 and April 9 of 2019 included #Corruption, #Coverup, #Obstruction, #LavScam, and #LeHerSpeak. Astroturfing bots (ASTRO corpus) were even more focused on the circulation of tweets containing the hashtags #Coverup, #LavScam, and #LetHerSpeak between March 14 and April 9, 2019. Tellingly, tweets posted by humans containing the word 'scandal' included hashtags make reference to the CPC and its members as well as the New Democratic Party (NDP) in addition to those referencing the Liberal Party of Canada and its members whereas tweets posted by bots (BOTS and ASTRO) did not include hashtags referencing the CPC or its members but included several instances making reference to the LPC, to the NDP, and to its membership. This suggests that the mobilization of tweets posted by bots containing the word 'scandal' within the #SNCLavalin Twitter discourse of 2019 were likely initiated by political representatives from the CPC, its sympathizers, or its proponents (see Graph 4.2 below).

5.2.3.3.3. Interdiscursive Analysis

Results from the interactional analysis (illustrated in Graph 4.2 in Chapter 4) also reveal that on March 14, human Twitter users incorporated the hashtags #Coverup, #LavCcam, and #LetHerSpeak within tweets containing the word 'scandal.' The conceptual themes represented by these hashtags suggest that human users were most significantly focused on Trudeau's alleged violation of Canada's *Conflict of Interest Act* in the middle of March in 2019. Similar themes are paralleled in bot-circulated tweets around the theme 'coverup,' as shown in Table 4.27 in Chapter 4.

At the end of March 2019 (HT2 corpus), the hashtags used by human Twitter users in tweets containing the word 'scandal' indicate that they were engaged in discourse focused on allegations of Trudeau's illicit misconduct, including his alleged obstruction of justice (#Obstruction), distressed political relations with First Nations communities (#GrassyNarrows, #LetHerSpeak, and #Indigenous), sexual assault (#GropeGate), and breach of trust (#MarkNorman). Worth noting is that most of these themes represented by hashtags in tweets posted by humans were not mirrored in tweets circulated by bots, which suggests that tweets posted by bots were unlikely to have influenced the kind of tweets that humans posted between March 28-29, 2019. This observation aligns with findings established by the chi-

square test of independence (see Table 4.6 in Section 4.2 of Chapter 4 and Section 5.22 above), which did not reject the null hypothesis between the BOTS and ASTRO corpora and the HT2 corpus (bot-circulated and human-generated tweets did not correlate).

By mid-April 2019, Twitter users' focus shifted toward the characterization of Prime Minister Trudeau's moral character as a political leader represented by #Loblaws, #Liar, #Threaten, and #LavScam. Themes in these tweets also cited corporate privileges allotted to large corporations like SNC Lavalin and Loblaws as evidence of the Prime Minister's corruption (see Graph 4.2 and Table 4.27 in Section 4.4.6 of Chapter 4). The themes between April 8-9 are also mirrored in Twitter-bot corpora, paralleling with empirical findings where the null hypothesis was rejected between tweets posted by Twitter bots (BOTS) and those posted by humans in the HT1 (March 14) and HT3 (April 8-9) corpora, and are, thus, likely representative of the convergence in semiosis between human minds, digital algorithms, and political intermediaries across the #SNCLavalin Twitter data in early 2019.

5.3. Inconsistencies, Discrepancies, Unexpected Findings

Outlier results where the null hypothesis was not rejected between corpus pairs HT1 (+) with BOTS (+), and HT3 and BOTS represent anomalies in findings derived from the chi-square test for independence. Instances where the null hypothesis was not rejected between HT2 and BOTS /ASTRO tweets (March 28-29, 2019) may be attributed to the ways in which Twitter's 're-engagement' algorithms adapt to the gradual depreciation in interest on a given topic by generating, recirculating, and amplifying related content on people's Twitter feeds, thus recalibrating interest on a given subject in a specific way (Nair and Gupta 2020). Though re-engagement campaigns are difficult to observe and analyze, they likely account for the sudden disappearance of correlation between tweets posted by bots and those posted by humans between March 28-29, 2019 (between the HT2 and BOT / ASTRO) and the reappearance of correlation by April 8-9, 2019 (HT3 and ASTRO), HT1(-) with BOTS (-) and HT3 (-) and BOTS (-), which produced p-values of < 000.1, thus supplying empirical results that suggest that bot-generated content was associated with human-generated content.

A discrepancy, or perhaps more accurately, a 'limitation' in the empirical portion of this research is the operationalization of WMatrix5's demarcation for antonymic qualities between positive (+) and negative (-) poles. Using these features to further qualify each word semantically tagged according to a given discourse field (see Archer et al. 2003 for further elaboration) does expand analysis across discourse fields between bot-circulated and human-generated tweets, allowing for more granular and detailed analysis. However, it is still limited to binary and dichotomized representations of meaning, thus lacking in semiotic salience.

An unexpected finding discovered while conducting the structural and interactional analyses for the critical discourse analysis is that tweets posted by bots containing the word 'scandal' used hashtags targeting the Liberal Party of Canada and its members as well as the NDP but did not use hashtags mentioning the Conservative Party of Canada and its members. This finding aligns with research that has found that the language used by conservatives tends to be more caustic, angry, and negative whereas the language used by liberals tends to be more benevolent (Sterling 2020). However, early research suggests that 'attack' posts targeting political opponents on social media platforms like Twitter have become common practice for online electioneering (Boulianne et al. 2023). Thus, while this is an interesting and unexpected finding, further investigation would be necessary to confirm the explicit purpose of bot-circulated tweets across the #SNCLavalin Twitter discourse of 2019.

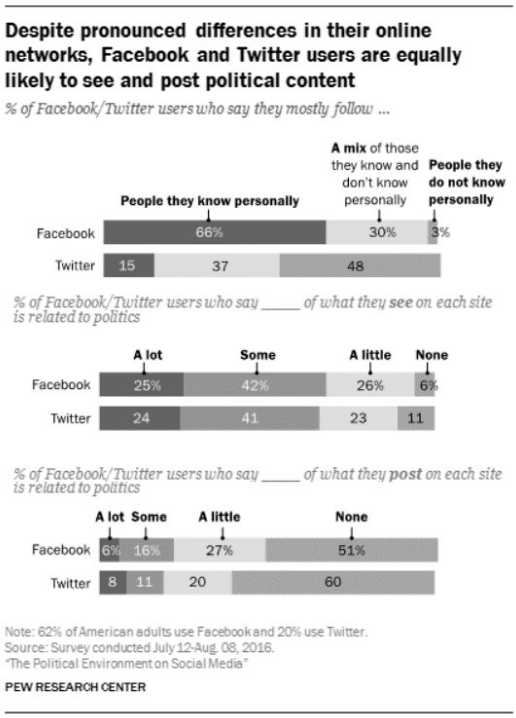
Finally, while the chi-square test for independence pointed qualitative inquiry toward instances across the #SNCLavalin discourse where some degree of association between tweets posted by bots and those posted by humans was likely, further substantiation for the nature of this association would necessitate a more focussed temporal analysis of the sequence that tweets posted by bots and humans appear. Empirically, the analysis could be taken one step further to compute ø (phi) coefficient, which is the correlation between two dichotomous variables.

5.4. Summary and Concluding Remarks

The chi-square test for independence rejected the null hypothesis in 6 of 12 cases, inferring the possibility that tweets posted by bots are related in some way to the language that human users incorporated in their tweets when posting on Twitter. These findings offer important insight into instances in which the digital mobilization of bots adversely fractures the public sphere and polarizes constituents around important political issues. These findings are not representative to a 'niche' sample of the constituency given that Twitter is among the 4 most prominently used social media platforms in Canada (The Global Statistics). Indeed, what is more, a study conducted by Walter and Ophir (2019) found that Twitter has become one of the most important communication tools used by political candidates during electoral campaigns in recent years. Provided that 'attack posts' receive more engagement on Twitter than interaction posts (Boulianne and Larsonn 2023), divisiveness and polarization within contemporary politics can be the only anticipated outcome of *botaganda* on Twitter.

Beyond Canada's borders, a Pew study (Bestvater, Shah, Rivero, and Smith 2022) found that one-quarter of American adults use Twitter, and that one-third of tweets produced by American adults are political in nature. Another Pew study (Duggan and Smith 2016) confirmed that Facebook and Twitter are social media spaces where users are most likely to be exposed to political content (see Figures 5.1 and

5.2), which suggests that a healthy portion of political information that politically engaged segments of the population both consume and generate is formed within the mediated spaces of Twitter's interface.



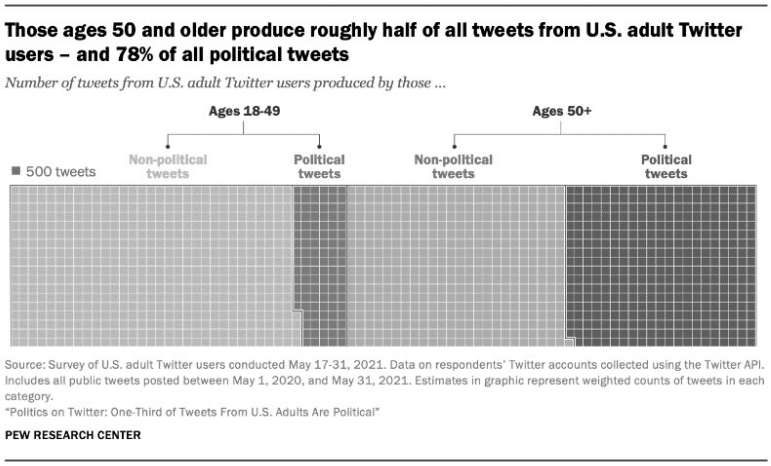


Figure 5.2 Demographic distribution of Twitter users for political purposes

Figure 5.1 Overview of political exposure on Facebook and Twitter[25] [26]

Correlation between bot-circulated and human-generated tweets is also significant because the algorithms programmed to circulate political content on Twitter are informed by Twitter users' digital footprint. When we consider findings generated by this dissertation's empirical study through the lens of Matz, Kosinski, and Stillwell's body of research (Kosinski et al. 2013; Matz et al. 2017; Matz, Appel and Kosinski 2020; Kosinski 2023), which has established that the psychological profiling and microtargeting of constituents on social media "makes it possible to influence the behavior of large groups of people by tailoring persuasive appeals to the psychological needs of the target audiences," the significance of possible association between bot-circulated and human generated tweets and the formation of *botaganda* on Twitter becomes clearer. Specifically, the convergence of semiosis between human thought, algorithmic

[25] Duggan, M., & Smith, A. (2016, October 25). The Political Environment on Social Media. Pew Research Center: Internet,Science & Tech. https://www.pewresearch.org/internet/2016/10/25/the-political-environment-on-social-media/

[26] Ibid. public opinion, and the public sphere in the digital age by distorting our shared ideas about the world in ways that instrumentalize irrational habits in thinking among the public for political ends (Lebow 2019).

computation, and political electioneering into a collaborative mode of reasoning on Twitter shapes politics, political communication, and public opinion in the digital era.

Another striking feature about the formation of a *botaganda* among human minds, digital algorithms, and political intermediaries on social media platforms like Twitter is that the automation of psychological profiling and microtargeting by way of digital algorithms – which contributes to the personalization of our social media content – generates 'echo chambers' and 'filter bubbles' that discipline human thinking into particular modes of interpreting political issues (based on Lebow's [2019] application of Adorno and Horkheimer's conception of dialectic reasoning).

Moreover, since several political entities likely use some form of digital electioneering to psychologically profile and micro-target constituents (Koed Madsen 2019), the contraposition of several modes of semiosis on social media intrinsically fuels competing modes of political reasoning, thus provoking deep polarizations and bipartisan animosities. Therefore, findings obtained through the chi-square test for independence suggest the possibility that tweets posted by bots are related in some way to the kind of content that humans post, though as previously mentioned, further statistical analysis is required to substantiate the strength of correlation and to test for causation in future research.

However, qualitative analysis does supply evidence supporting the hypothesis that the linguistic content of tweets posted by bots likely incited *linguistic* and *interactive alignment* – as qualified by social psychologists Garrod and Pickering (2004) – among human Twitter users who replicate semantic patterns in the assembly of words and phrases into *semantically contagion* composites within the tweets that they post. Furthermore, these findings contribute to substantiating the manifestation of *botaganda* within the convergence of human thought, algorithmic computation, and political electioneering on Twitter, thus offering more insight into how political communication on Twitter shapes public opinion and the public sphere in the digital era.

In this chapter, I have employed a cognitive linguistic analysis of language embedded in the tweets posted by humans and by bots across the #SNCLavalin discourse of 2019. I explored how the semantic assembly of words belonging to the 'Government & the Public Domain' (G) and 'Emotional Actions, States & Processes' (E) discourse fields across #SNCLavalin Twitter discourse shaped political meaning within the digital public sphere. I also analyzed how words, phrases, and expressions were semantically assembled in tweets posted by bots and how those assemblies were reproduced in tweets posted by humans, thus describing the *prototype effects* of *semantic contagions* that *semantically primed* human minds to mentally classify and categorize political ideas and concepts within memory. I also explored how the linguistic attributes of tweets posted by bots induced *interactional linguistic alignment* among human users on Twitter.

To produce more 'thick descriptions' of the potential associations between tweets posted by bots and those posted by humans, and to further explore how the linguistic content of tweets posted by bots may have induced *interactional linguistic alignment* among human users in greater detail, I relied heavily on cognitive linguistics and critical discourse analysis. The word 'scandal' was the single word that manifested in high frequency across all corpora analyzed for this dissertation. For this reason, I used it as my point of departure for deciding which tweets to focus my analysis on most prominently. Frequency and prevalence of the word 'scandal' across all corpora are important factors in analyzing correlation because machine learning algorithms like TextRank (which is based on the PageRank algorithm), which are programmed specifically to "spread the weight of keywords," thus propagating that spread by amplifying word frequency (Xiong et al. 2021). What is more, current research into *word frequency effects* on lexical and associative recognition, free recall, cued recall, and source memory (summarized by Shen et al. 2018 and Popov and Reder 2020) concludes that these three high-level principles determine the effects of word frequency on memory and recall, including probe dependency (the principle that traces of memory consisting of high frequency words are easier to recall), dual process (familiarity and recollection), and resource demands (Popov and Reder 2020).

The next chapter supplies an in-depth discussion of this dissertation's findings in relation to its overarching research goals, research questions guiding inquiry, and theoretical framework. I will offer further elaboration of the central themes 'corruption,' 'obstruction,' and 'coverup' in the context of tweets containing the word 'scandal' across the #SNCLavalin Twitter discourse of 2019. The chapter will also identify patterns and themes detected within this dissertation's results and findings and I will situate them in the context of literature reviewed in Chapter 2 as well as findings established by similar studies. I then conclude by revisiting how this dissertation contributes to existing academic discussions about media effects, politics, political communication, public opinion, and the public sphere in the digital age, how it contributes to research conducted within the framework of cognitive linguistic and CDA, and how it establishes precedence for regulating the use of digital algorithms for online electioneering purposes during political campaigns.

Chapter 6: Discussion

6.1. Introduction

This dissertation has addressed how the formation of *botaganda* – that is, the decussating of three different modes of semiosis among human minds, digital algorithms, and political intermediaries on Twitter – is cultivated online, thus rendering human thought and judgement vulnerable to the cognitive interference of *priming lures* and *semantic contagions* circulated by Twitter bots. As argued in Chapter 2, human psychology remains an important phenomenon in understanding how and why communication technologies contribute to the propagation of conspiracy theories in the digital age, which fundamentally convolutes public opinion and the public sphere in the process. In Chapter 3, several theoretical perspectives from communication and media studies, semiotics, cognitive linguistics, CDA, and social psychology were drawn upon to describe how the cognitive conditions formed among human minds, digital algorithms, and political intermediaries alter the nature of semiosis and meaning making online, compromising the cogency and reliability of political communication in the digital age. Likewise, within the context of political electioneering, we can discern the ways in which political intermediaries weaponize human cognition by leveraging the computational agency of digital algorithms, which I contend violates Canadian citizens' fundamental rights to the freedom of thought, judgement, and conscience according to section 2 of the *Canadian Charter of Rights and Freedoms.*

Subsequently, analyzing the convergence of human thought, algorithmic computation, and electioneering on Twitter permits greater understanding of how human minds become induced to conceptually, ideologically, socially, and *interactively align* with the underlying signification of tweets posted by Twitter bots. The cognitive conditions generated within this dynamic, which I call *botaganda*, determine whether the mental effects of linguistic *prime lures* embedded in tweets posted by Twitter bots cognitively enhance their entrenchment and whether such enhancements are reinforced as *prime lures* come to behave as *semantic contagions*. With prolonged exposure to, and with pronounced engagement with *semantic contagions*, *prime lures* can become entrenched into the recesses of long-term memory, which fundamentally affects what users pay attention to, how they interpret what they pay attention to, and the kinds of beliefs and values that manifest in consequence.

Frequently repeated words and phrases assembled into composites within the same communication context on Twitter come to behave as *semantic contagions*, cultivating *false insights* and *misattributions* about important political information posted on Twitter, consequently shaping and reinforcing *ideological heuristic biases* about Prime Minister Trudeau and the Liberal Party across the #SNCLavalin Twitter discourse. Hjelmslev's *Glossematics* was used to help map out the cultivation of *semantic contagions* on Twitter and to delineate how they manifested within the convergence of semiosis among human minds, algorithmic computations, and political electioneering on Twitter. This line of

inquiry also describes how the cognitive conditions generated by *botaganda* confound the schematics of reason in ways that make conspiracy theory appear rational and reasonable in the digital age. Like grains of sand on a beach being pressed into a bucket to make a sandcastle, data (individual measurable units), words (language), and concepts (political ideas) are caught up in the flow of code, grammar, and human reason and become assembled into digital representations, political communications, and coherent thoughts and ideas about the world. The convergence of code, language, electioneering, and human reason on Twitter generates a form of reticulated semiosis, which comes to conventionalize *semantic contagions* and generalizations into *mental frames*, resulting in the stabilization of ideologies, beliefs, values, worldviews, and, potentially also, conspiracy theories within the mental structures of human cognition.

Because language is a common system of meaning for organizing information prevalent to human thinking, algorithmic computations, and political electioneering, it served as my primary target of investigation across this dissertation. Accordingly, corpus analysis of the language posted by humans and bots on Twitter using computational tools, empirical research instruments, and qualitative linguistic methods facilitated a broad examination of *ideological, social, political* and *interactional alignment* between human minds tweets posted by bots. This analysis fundamentally identified instances where tweets posted by humans were likely associated in some way with those posted by bots in several instances and qualified the significance of keywords and phrases operating as *semantic contagions* and *primes lures* across the #SNCLavalin Twitter discourse, thus drawing human minds into *interactive alignment* with the political and conceptual value of tweets posted by Twitter bots.

Cognitive linguistic analysis of language-use on Twitter further substantiated the significance of *semantic contagions* and *prime lures* in inducing *interactional* and *ideological alignment*, as conceived by Garrod and Pickering (2004), between human minds and tweets posted by Twitter bots. Critical discourse analysis of the #SNCLavalin Twitter discourse found that the platform is often used as a virtual site where political power relations, ideological conditions, and political identities can be discretely imposed on human minds in ways that heighten polarization among citizens, amplify the expression and sensation of moral outrage, and intensify bipartisan incivility.

6.1.1. Summary of Key Findings

Overall, this dissertation established that political intermediaries' use of deep learning neural network algorithms on social media sites like Twitter enhances the likelihood that human minds will *interactionally, ideologically*, and *socially align* with tweets posted by Twitter bots. It also identified several instances where words and phrases frequently recurring in the same political context across the #SNCLavalin Twitter discourse of 2019 functioned as *semantic contagions* that, with repeated and protracted recurrence, operated as *prime lures* that incited *interactional alignment* between human Twitter

users and the content of tweets posted by bots. Thus, political intermediaries' use of digital algorithms for political electioneering purposes represents an antecedent for the fragmenting of the public sphere, political polarization, bipartisan incivility, and sustained affective transmission of moral outrage among the public around political issues.

Empirical data suggests that the nature of online electioneering practices using digital algorithms to psychologically profile and micro-target facets of constituents' personality generates ideal cognitive conditions for *interactional* and *ideological alignment* between human minds and tweets posted by Twitter bots. Furthermore, the electioneering goals held by politicians who commission the creation and mobilization of psychological profiling and micro-targeting algorithms likely determines the kind of content that is most likely to be distributed by content curating algorithms. We can therefore presume that the content curated by Twitter bots is meant to foment moral outrage among constituents toward the official opposition. Thus, data supporting correlation between tweets posted by humans and those posted by bots feasibly implies that *interactional*, *ideological*, and *linguistic alignment* between human minds and the content of tweets posted by Twitter bots agitates political polarization and bipartisan incivility among constituents frequently engaged in political discourse on social media platforms like Twitter, as inferred by proponents of cultivation theory.

Word frequency analysis revealed that the word 'scandal' appeared most prominently across all corpora, and thus pointed inquiry toward important semantic areas of interest within the discourse, and the word 'scandal' appeared most prevalently across all corpora as an important conceptual component forming the frequently repeated combination of words 'SNC Lavalin Scandal' functioning as a *semantic contagion* across the discourse. Further exploration of the linguistic contexts within which the word 'scandal' and the *semantic contagion* 'SNC Lavalin scandal' appeared uncovered two distinct conceptual patterns related to Prime Minister Trudeau:

1) The word 'scandal' was frequently used adjectivally to describe Trudeau's character (as in, 'Trudeau is scandalous')

2) 'Scandal' was frequently used as an object that Trudeau possesses (as in 'Trudeau's SNC Lavalin scandal')

Close examination of the words and phrases frequently assembled alongside the word 'scandal' uncovered several interrelated conceptual themes including: the necessity for investigation Trudeau (e.g., 'RCMP must investigate'), his abuse of power, obstruction of justice, corruption, and coverup. According to the principles of *frame semantics*, *priming effects*, *word frequency effects*, and *gestalt theory*, frequent repetition of keyword and phrase composites across a thread of Twitter discourse likely resulted in those linguistic representations becoming entrenched in the *mental spaces* of cognition in such a way that exposure to one of the concepts belonging to the conceptual assemblage activated interpretations of the

entire linguistic text in which it appeared most prevalently, according to Fillmore's conception of *frame semantics*.

According to Ross' iteration of *semantic contagions*, frequent repetition in the appearance and assemblage of words and phrases into conceptual wholes influenced the signifying role that each word served in constituting the meaning of the whole. In this way, the context made the meaning of each word belonging to the whole '*contagious*,' in that the appearance of a single word as one part of the whole in the same context within which it was initially assembled with other words and phrases eventually activated reference to the whole automatically and without cognitive effort. Because the boundaries between the categories of words and phrases making up the conceptual whole were *fuzzy*, particularly within the transient conditions of social media, their meaning became subject to *pragmatic traction*, which facilitated the culmination of the conceptual whole into *semantic frames* and conceptual categories of political import within the minds of Twitter users.

Based on Charteris-Black's iteration of semantic contagion, words and phrases making up a *semantic frame* in the mind of Twitter users may generate *prototype effects* that gradually draw conceptual categories into relations of equivalency within a common *semantic field*. In this way, the phrase 'SNC Lavalin scandal' as one *semantic contagion* is drawn into a relationship of equivalency with the phrases 'Trudeau broke the law,' 'Trudeau-whipped Liberal MPs,' and 'jail Trudeau,' thus implying Trudeau's culpability in the scandal as a whole rather than his actual culpability within the political and judicial response to the scandal in his role as prime minister. In this way, the scope of Trudeau's culpability becomes distended, embellished, distorted, and contrived. As observed in Chapter 5, this is not to trivialize or minimize Trudeau's culpability in his dealings with the political and judicial processes. Rather, the purpose of this observation is to point out that the discursive dynamic formed among human minds, digital algorithms, and political intermediaries on Twitter lends to the distortion of political knowledge and public opinion in ways that conflate fiction with reality.

Interaction analysis of the hashtags used most frequently within tweets containing the word 'scandal' revealed strong representation of hashtags referencing Trudeau, Wilson-Raybould, and the Liberal party among tweets posted by astroturfing and regular Twitter bots with no reference to the words 'Harper' (Canada's former conservative prime minister), 'conservative,' or 'CPC' (Conservative Party of Canada), which were incorporated into hashtags posted exclusively by humans. This dynamic suggests that the integration of Twitter bots into the #SNCLavalin Twitter thread was likely to have been initiated by members of the CPC or their sympathizers to frame the nature of discourse about Trudeau and the Liberal Party's involvement in the SNC Lavalin scandal in the spring of 2019. This assertion is also premised by several tweets posted by conservative Senator Denise Batters, and retweeted by astroturfing

and regular Twitter bots using several of the keywords and phrases that have been assembled into *semantic contagions* embedded across the following tweets:

> ***Liberal MPs*** *at #JusticeCommittee today who voted to #**CoverUp** the #**SNCLavalin scandal**: Ali Ehsassi, Francis Drouin, Linda Lapointe, Mark Gerretsen & all the way from BC to vote "yes" to **cover up** after 24-minute meeting: Ron McKinnon. **Liberal ringmaster** chair: Anthony Housefather. (Posted by Senator Denise Batters on 03/13/2019 18:56; Retweeted by human users once on 03/14/2019 00:23; Retweeted by bots 2 times on 03/14/2019)*
>
> *Despicable, shameful, anti-democratic behaviour by #**Trudeau-whipped Liberal MPs** at **Justice committee**! They don't want to #**LetHerSpeak**, and they use their majority to force #**PMOCoverUp** on #SNCLavalin to continue. (Posted by Senator Denise Batters on 03/13/2019 13:31; Retweeted by human users 33 times on 03/14/2019 13:31; Retweeted by bots 8 times on 03/14/2019)*
>
> *Total #**CoverUp** by **Trudeau's MP majority** at #**JusticeCommittee** like today's meeting is exactly why our #CPC Senate Opposition introduced motion for #SenCA Legal committee to investigate #**SNCLavalin scandal**. LISTEN to my Senate speech on why this must happen (Posted by Senator Denise Batters on 03/14/2019 14:57; Retweeted by human users 11 times on 03/14/2019)*
>
> *Andrew Coyne on #**SNCLavalin** #**PMOCoverUp**: "The irony is suffocating. **Concentration of power** is very much at the root of this **scandal**....And yet the same **concentration of power** makes it all but impossible to get to the bottom of it." (Posted by Senator Denise Batters on 03/14/2023 04:59; Retweeted by human users 16 times on 03/14/2023; Retweeted by bots 5 times on 03/14/2019)*
>
> *The Senate CAN deal with #**LavScam**! **Trudeau's** "Independent" senators just need to be ACTUALLY independent, and support our #CPC #SenCA motion to get the real answers on #**SNCLavalin #PMOCoverUp** Canadians are demanding. Here's my Senate speech (Posted by Senator Denise Batters on 04/07/2019 17:03; Retweeted by human users 4 times between 04/08 - 04/09/2019)*
>
> *Canadians Deserve Answers on #SNCLavalin #**PMOCoverUp**! My #SenCA speech about #**LavScam** and the Senate **Legal committee**'s unique interest in getting to the bottom of this #**Trudeau Govt scandal**. When did **PMO** pressure start on Jody Wilson-Raybould? (Posted by Senator Denise Batters on 03/10/2019 11:03; Retweeted by human user once on 04/08/2019 16:12)*

In the sample of tweets initially posted by Senator Denise Batters and retweeted by Twitter-bots presented above, a thematic pattern in the use of the hashtags *#PMOCoverUp*, *#SNCLavalin scandal*, *#LavScam*, and *#LetHerSpeak* alongside the words and phrases *Trudeau Govt scandal*, *Liberal ringmaster*, *Trudeau-whipped Liberal MPs*, *despicable, shameful, anti-democratic behaviour*, and *concentration of*

power begins to construct an anti-Trudeau and anti-Liberal narrative that becomes amplified by digital algorithms that automate the recirculation of these tweets.

Finally, the *semantic contagions* circulated in tweets posted by political leaders and retweeted by Twitter bots are reflected in the interactional and interdiscursive analysis of hashtags (see Section 5.2.3.3.3. in Chapter 5) used in tweets posted by humans containing the word 'scandal,' which suggests that on March 14, human Twitter users were most concerned with Trudeau's alleged violation of the *Conflict of Interest Act* and general public opinion expressed across tweets during the period allude to the idea that Trudeau's attempted to 'cover up' public knowledge about his actions in pressuring Attorney General Wilson Raybould to use her position in persuading the judiciary to issue a DPA to SNC Lavalin.

Between March 28-29, human Twitter users appear to have been most concerned with allegations that Trudeau and the Liberal Party were obstructing justice by abusing their 'majority power' on the justice committee and by silencing Attorney General Wilson Raybould. This suggests that public opinion held that Trudeau breached the parameters of ethical behaviour in his position as prime minister by abusing his power and obstructing justice. Between April 8-9, human Twitter users appeared to be most concerned with perceptions of the Canadian government as corrupt in light of allegations that Trudeau and the Liberal Party colluded with large corporations to support their re-election.

6.2. Interpretation of Findings

These findings align with existing research conducted within the scope of communication and media studies on the public sphere that contemplates the effects of technology, media, culture, and society on political communication and public opinion (Slack and Wise 2015). This dissertation further elaborates on the ways in which *technological culture* and what I refer to as *botaganda* formed among human minds, digital algorithms, and political intermediaries on social media has led to the fragmenting of our public sphere, resulting in several disjointed post-public spheres (Schlesinger 2020).

For example, in the following tweets extracted from the #SNCLavalin corpus, a large portion of them can be discerned as expressing more right-wing sympathies and more anti-Liberal sentiments:

> *Despicable, shameful, anti-democratic behaviour by #**Trudeau-whipped Liberal MP**s at Justice committee! They don't want to #LetHerSpeak, and they use their majority to force #**PMOCoverUp** on #SNCLavalin to continue. (Posted by Senator Denise Batters 03/13/2019 13:21; Retweeted by human users 33 times on 03/14/2019; Retweeted by bots 8 times 03/14/2019)*
>
> *Please RT! The **RCMP must investigate** Justin **Trudeau's #SNCLavalin scandal** now. If you agree, please SHARE and SIGN our petition at https://t.co/EuhU0EyMLs | #cdnpoli #hw #ONpoli #ABpoli (First posted on 03/14/2019 at 00:04:24; Retweeted*

*112 times throughout the day, representing 9% of the corpus) Blatant **abuse of their majority power**. I'm **thoroughly disgusted by this government**. They are incorrigible... Every last one of them. 😡. 0 #SNCLavalin #JustinCommittee #Coverup (Retweeted by human user: 03/14/2019 00:05; Retweeted by human users 29 times: 03/14/2019; Retweeted by bots 12 times)*

*CPC @PierrePoilievre says Trudeau sent in his **Liberal majority committee members** to **shut down debate.** #cdnpoli #SNCLavalin (Posted by human user: 03/14/2019 01:09:02)*

*Total #CoverUp by **Trudeau's MP majority** at **#JusticeCommittee** like today's meeting is exactly why our #CPC Senate Opposition introduced motion for #SenCA Legal committee to **investigate #SNCLavalin scandal**. LISTEN to my Senate speech on why this must happen (Posted by Senator Denise Batters on 03/14/2019 14:57; Retweeted by human users 11 times on 03/14/2019)*

Taken together, the tweets cited above contribute to anti-Trudeau and anti-Liberal sentiments characterizing *Trudeau* and his *Trudeau-whipped MP majority* on the *justice committee members* as *despicable, shameful, and anti-democratic* for unlawfully *shut[ing] down debate*, which the Liberal Party tried to *coverup*, and should, therefore, be *investigated* by the *RCMP*. The fact that these tweets were first posted by a Canadian Senator who is politically sympathetic to the Conservative Party of Canada (CPC) also reveals the potential motivation behind, and intent of this collection of tweets and it also suggests who the patrons of the Twitter-bots automating the recirculation of these tweets might potentially be.

Some tweets offered by seemingly more left-wing sympathizers appear to make effort to counter the impact of anti-Trudeau and anti-Liberal sentiments expressed across the discourse (though, given the tenor of the discourse, these tweets are much less prevalent across the #SNCLavalin Twitter discourse):

*According to the Conservative influenced Media in Canada the news of the #SNCLavalin *scandal* #SarcasmFont is what Canadians want 24/7. I disagree. **Canadians have other more pressing things to worry about** (Posted by a human user: 03/28/2019 19:58; Retweeted by human users 3 times: 03/28 – 03/29/2019; Retweeted by bot: 03/29/2019 03:47)*

*Ms. Wilson-Raybould had a far less than stellar track record as Justice Minister, yet @JustinTrudeau was vilified for trying to move her to another role. **The #SNCLavalin "scandal" is simply retribution for her bruised ego**. She said that nothing illegal occurred #cdnpoli #LPC (Retweeted by a human user: 03/29/2019 03:03; Retweeted by human users 6 times on 03/29/2019;)*

> *Amazing article about the* ***faux, media created molehill into a mountain #SNCLavalin scandal****. #cdnpoli #cdnmedia (Posted by human user: 03/29/2019 07:46; Retweeted by human users 8 times: 03/29/2019; Retweeted by bots 3 times)*
>
> *What ...I'm guessing the press NDP and CPC are all over this right ...one would have to think our AG at the time was fully aware of this and how badly it could hurt our fellow CDN workers and Senior retirement funds #SNCLavalin #SNCLavalinScandal #cdnpoli (Retweeted by human user: 03/29/2019 03:53; Retweeted by human users 4 times: 03/29/2019; Retweeted by bots 3 times)*

The more pro-Trudeau tweets featured above suggest that the CPC and NDP (National Democratic Party) were exploiting the complexities of the SNC Lavalin affair and its public exposure via *faux, media created molehill [turned] into a mountain*. These tweets also question the integrity of Attorney General (AG) Jody Wilson Raybould, who the tweets allege was *fully aware of this* [the SNC Lavalin situation] and that her political conduct in challenging Prime Minister Trudeau's limitations of power was *simply retribution for her bruised ego.*

Clear contrasts between these two sets of tweets punctuate the degree to which constituents are polarized and the salience of affective expression on both sides of the political divide around the same political topic. These findings have also produced further evidence that contradicts cyber-optimists' anticipation that the advent of social media would supply a public space for free expression and rational debate about political issues among social equals (Shirky 2011; Coleman 2017). This dissertation's findings supply additional support for the claim that interactions on social media have foreshortened argumentation and cultivated more pathos-based modes of reasoning through important political issues (Nussbaum 2018).

6.2.1. Colonization and Commercialization of Digital Public Sphere

Concerns expressed by Christian Fuchs (2022) that the digitized public sphere has become colonized and commodified by political and corporate entities resulting in the propagation of fake news and post-truth realities also complements this dissertation's analysis of the convergence of semiosis among human minds, digital algorithms, and political intermediaries on Twitter. This line of inquiry has revealed the ways in which the covert intervention of political intermediaries by way of digital algorithms in shaping public opinion has resulted in the splintering of public opinion within the public sphere in ways that interfere with constituents' ability to form the kind of independent thought and judgement about political issues necessary to participate in rational democratic debate among civic equals, as articulated by Chief Justice Dickson (1985).

For example, results from the chi-square test of independence suggest that the recursive relationship between tweets posted by bots and those posted by human Twitter users shaped ideological

conceptualizations of Prime Minister Trudeau and the Liberal Party's political conduct. Moreover, in depth 'thick analysis' of *word frequency effects* in augmenting the formation and function of *semantic contagions*, the efficacy of *semantic contagions* as *priming lures*, and the implications of *semantic priming* on the entrenchment of ideological beliefs among Twitter users (as evidenced by their replication of frequently recurring words and phrases operating as *semantic contagions* circulated by Twitter-bots) that had engaged with the #SNCLavalin Twitter discourse in 2019 infers that the degree to which keywords and phrases assembled into conceptual composites within tweets posted by Twitter bots were replicated in tweets posted by humans (see Chapter 5, Section 5.2.3).

This dissertation contributes to existing discussions on the formation of politics, of public opinion and the public sphere in the digital age while emphasizing the importance of paying attention to the ways in which linguistic representations online shape trends, patterns, and sequences in how people frame political and social knowledge. Moreover, the findings produced by the study conducted for this dissertation emphasizes the importance of paying attention to the kind of interconnectivity and inter-relationality that is made possible within the convergence of semiosis among human minds, algorithmic computations, and political electioneering on social media. Introducing methodological approaches and theoretical perspectives gleaned from cognitive linguistics and CDA to examine ideological themes in political communication, public opinion, and the digitized public sphere folds the human subject and language use back into the analytical equation within the scope of communication and media studies research on digital mediation.

6.2.2. Posthuman Decentering of the Human

This dissertation's findings also substantiated my claim that rather than being relegated to the peripheries of obscurity in communication and media studies research, human minds and language should remain critical targets of investigation alongside non-human forces within digital new media scholarship. Rather than embracing rigid *object-oriented ontological* perspectives, I build on *posthuman* scholarship that approaches the study of communication, media, and technology in ways that include human relationship with non-human forces (see J.J. Sylvia 2021, for example) to understand the collaborative modes of cognition that unfold within the convergence of semiosis among human minds, digital algorithms, and political intermediaries on Twitter.

Given that my findings suggest that:

1) traces of linguistic content posted by Twitter bots are often replicated in tweets posted by humans,

2) that these traces of linguistic content tend to create predictable patterns in representation and meaning, and

3) that these patterns in representation and meaning are inherent to the semiotic capacity of human minds,

it is clear that there is no overcoming humanity when we study technological culture. Technology and culture, as Slack and Wise remind us, are two sides of the same proverbial coin. This is a perspective in the post-humanities shared among scholars like Rosi Braidotti (2012, 2013), Katherine Hayles (2017), and Donna Haraway (2016), whose work demonstrates the value of critical inquiry into the relationships between human and non-human entities while remaining attentive to the anthropocentric blind spots created within more traditional perspectives of humanism.

Indeed, as Bona (2017) noted, modifying and critically reassessing existing approaches to scholarship in the humanities does not necessarily imply the complete rejection of the humanities. Bruno Latour's ANT, for example, though problematic in its assignment of 'agency' to non-living things, was successful in introducing the notion that non-human forces influence the flow of social and non-social activities within networked interactions, processes, and behaviours to the social sciences (Latour 2007). This mixed human / non-human approach to social inquiry has certainly enriched our understanding of human social behaviour, especially considering the digital contexts that we encounter on a daily basis. However, revisions to how we understand the relationship between human minds, the technologies they invent, and the modes of mediation that they make possible should not involve the complete overhaul of what is already known about the human condition, especially since the human condition is fundamental to the creation of technology and media in the first place.

The research and line of inquiry conducted for this dissertation thus aligns more closely with Ferrando's (2013) assertion that to focus analysis on the effects of science and technology does not necessarily mean that they are the primary focus of reflection. It also ascribes to Herman Dooyeweerd's (1953) *cosmonomic philosophical theory*, which posited that meaning making is a universal force in all things, which indirectly insinuates the continued relevance of humanity to critical analysis of technology and mediation.

At the same time, the revisionist fervour of the canon debates and posthuman philosophies in the mid-to-late twentieth century outlined in Section 2.2 in Chapter 2 did offer critical reconsideration of several assumptions and perspectives from the humanities that were no longer relevant or cogent, thus prompting new consideration of the role that non-human processes, transactions, interactions, and coordination served in both the human and non-human scope of existence. Latour's (2005) *Reassembling the Social*, for instance, introduced novel insight into the dynamics of science and technology in shaping the social world of humans. Though the notion of scientific and technological processes having 'agency' presents several problems, Latour's point that scientific and technological entities merit further consideration when analyzing human existence is well taken. Accordingly, I opted to adopt Sylvia's

(2021) *ontology of rationality*, which is elaborated in more detail in Section 2.2.5 in Chapter 2, while conducting research for this dissertation according to my conceptualization of *botaganda* and its impact on public opinion.

6.2.3. Rejection of Structural Linguistics in the Digital Post-humanities

From within the purview of the canon debates, Deleuze and Guattari introduced a philosophical perspective lamenting the tyranny and imperialism of the signifier, qualifying the linguistic signifier more particularly as the despotic "overcoding of the territorial chain" (2004: 228). This criticism of the linguistic sign implies that language is merely a human-made tool designed to constrict all of existence into measurable and classifiable units, including the human condition. To some extent, these observation bear weight since findings produced by this dissertation suggest that political intermediaries can successfully shape political communication and public opinion by using deep learning neural network algorithms that engage human minds by manipulating linguistic features. On the other hand, this explanation is far too simplistic and requires more investment in exploring how and why the language circulated by digital algorithms within the mediated conditions of Twitter induces human minds to *interactively align* with the content of tweets posted by Twitter-bots in ideologically and linguistically salient ways. This kind of investigation requires insight into human thought and behaviour from the social sciences.

Posthuman critique of structuralist and humanist perspectives developed in the 1960s and 70s are echoed in more contemporary work critiquing text-focused research in communication and media studies, which is said to prioritize linguistic and social aspects of meaning production at the expense of material and technological processes that facilitate the production and distribution of signs (e.g., see Langlois 2014). In response, I return to Ferrando's call for "a deeper reflection on the ontological significance of relationality" and Dooyeweerd's (1953) claim that meaning making is the universal force, which I contend includes systems of linguistic production and its influence on human and non-human existence.

Moreover, word pattern and corpus analyses, such as those conducted by Hancock et al. (2013) can produce incredibly useful insight into the nature of relationality among human and non-human codes, signs, processes, transactions, interactions, and coordination, as also demonstrated throughout this dissertation. For example, by synthesizing perspectives and approaches to cognitive linguistic and critical discourse analysis, I was able to investigate digital electioneering techniques as they manifested within the computations of deep learning neural network algorithms and by examining patterns and themes in language-use between human users and bots on Twitter. This analysis, as described above in section 6.2, suggests that:

1) As *botaganda* formed within the convergence of semiosis among human thought, algorithmic computation, and digital electioneering online, human users likely *interactively aligned* their linguistic constructions with the language contained in tweets posted by Twitter bots (in 6 of 12 corpus pairs studied, as inferred by the results of the Pearson chi-square test of independence – see Chapter 5, Section 5.2.2).

2) The assembly of keywords and phrases into composite wholes alongside other words and phrases contained in the same tweet gradually cultivated *semantic contagion effects* that fundamentally produced relationships of equivalencies between the concepts being assembled, as suggested by cognitive linguistic analyses outlined in Chapter 5, Section 5.5.2.

3) With frequent and prolonged exposure to *semantic contagions* circulated by content curating, psychological profiling, and micro-targeting algorithms within the same digital context of Twitter, *semantic contagions* likely became entrenched in memory and scripted into *mental schemas*, and thus also came to function as *semantic primes* that shaped the ways in which human users *semantically framed* political knowledge. Several words and phrases assembled into *semantic contagions* within tweets posted by Twitter bots were reproduced in tweets posted by humans, suggesting that *semantic contagions* activated *alignment effects* among human Twitter users (see tables Chapter 4, Tables 4.18-4.21 and Chapter 5, Section 5.2.3.).

4) *Semantic framing* of *semantic contagions* within the mental spaces of cognition suggests that exposure to parts of a linguistically assembled *semantic prime* within the context of the #SNCLavalin Twitter thread activated the meaning of entire conceptual composites in the minds of human users (for example, the reappearance of 'SNC Lavalin' within the #SNCLavalin Twitter discourse of 2019 automatically activates the word 'scandal' following prolonged and frequent exposure to their combination on Twitter).

5) All components making up *botaganda* on Twitter – human minds, digital algorithms, and political intermediaries – contributed to the convergence of semiosis that shaped and normalized the political meaning-making practices that unfolded on Twitter across the #SNCLavalin discourse.

6) Language was the central informational unit exploited collaboratively among human minds, digital algorithms, and political intermediaries in shaping political communication and public opinion on Twitter and was thus an integral target for analyzing the consequences of *botaganda* formed through the convergence of human thought, algorithmic computation, and digital electioneering practices on Twitter.

6.2.4. Further Synthesis of Cognitive Linguistics and Critical Discourse Analysis

Christopher Hart's (2019) work advocates for the integration of cognitive linguistics and critical discourse analysis based on his determination that their unity produces an optimal analytical tool for studying the mediating force of language in shaping ideology in discourse. Because amalgamation of these two perspectives "represents both a 'social,' or more specifically a 'critical' turn in cognitive linguistics as well as a 'cognitive' turn in critical discourse analysis, which has traditionally adopted more social science-based methodologies" (Hart 2019: 81), Hart's application of the two paradigms directly informs this dissertation qualitative model. Accordingly, my approach to analyzing the ways in which *semantic contagions* were formed across the #SNCLavalin Twitter discourse, how their combination with other words and phrases into similar textual categories on Twitter caused them to function as *prime lures*, and how *prime lures* incited *interactive*, *ideological* and *linguistic alignment* among human minds with the content of tweets posted by Twitter bots.

Influenced by perspectives aggregated from CDA, the cognitive linguistic corpus analysis conducted for this dissertation offered further insight into how ideologies became encoded into *semantic contagions* furtively embedded in tweets that were posted – in ways that were indistinct to human users – by Twitter bots across the #SNCLavalin Twitter discourse, which revealed instances where political power, dominance, and inequality were produced, reproduced, and enacted. Moreover, as Hart notes, analysis of highly mediated political discourse can uncover ways in which patters of conceptualization embedded in language can function ideologically (Hart 2019: 81).

As a model for studying human conceptualization in language use, cognitive linguistics guided my analysis of the cognitive processes involved as human users interpret content posted by bots, and my general approach to uncovering the ideological and persuasive qualities of Twitter discourse. CDA enabled me to integrate critical sociological considerations in describing how human minds cognitively conceptualized the social reality that they crafted into existence across the #SNCLavalin Twitter dsicourse using language (Williamson et al. 2018).

6.3. Summary and Concluding Remarks

In this chapter, I have offered a discussion about this dissertation's key findings, and I have situated these findings alongside insights offered by other scholars studying similar social phenomena online. The digitization and commodification of the public sphere, for example, has resulted in the surge of misinformation, alternative facts, and post-truth realities that have become normalized online, according to Christian Fuchs (2022). This dissertation expanded upon Fuch's thesis by fleshing out the intricacies of meaning-making and semiosis that unfolds within the convergence of human thought, algorithmic computations, and political electioneering.

This chapter also challenged rejections of structural linguistic analysis in the Digital Humanities on the premise that linguistic representation remains a significant common denominator through which human thought, algorithmic computation, and political electioneering unfolds on Twitter. Moreover, I challenge post-human proponents of decentering the human from inquiry since sign-production remains primarily a human act within online spaces since only human minds are imbued with the capacity for abductive reasoning required to assign social meaning to representation, which is intrinsic to the production of misinformation, post-truths, and alternative facts on social media.

The research conducted for this dissertation also substantiated the value of cognitive linguistics, social psychology, and CDA in studying online discursive phenomena that fundamentally shape public opinion and political communication in the digital era. My research has demonstrated how ideological language cultivated on Twitter becomes encoded with *semantic contagions* that influence the ways in which human minds think abouts politics, which ultimately shapes relations of political power, dominance, and inequality produced, reproduced, and enacted through *botaganda*. The next chapter revisits this dissertation's key findings, the limitations encountered while conducting this research, this dissertation's contributions, and recommendations for future research.

Chapter 7: Conclusion

7.1. Introduction

This chapter begins by providing a summary of findings central to this dissertation's thesis, which posits that the flow or semiosis within the *convergence* of human thought, algorithmic computation, and political electioneering on Twitter induced human minds to *interactionally align* with the content of tweets posted by Twitter bots. This dissertation has endeavoured to produce empirical and qualitative evidence that characterizes the nature of *interactive alignment* in shaping public opinion in the minds of Twitter users. In what follows in Section 7.2, I will first review and summarize this dissertation's key findings as they relate to the aims, goals, and research questions outlined in Chapter 1. Section 7.3 will examine some of the limitations encountered in conducting this research followed by an account of the contributions that this dissertation makes to communication and media studies, cognitive linguistics and CDA research on the social impact of digital discourse. I will also review how this research produced potential 'real-world' precedence for amending existing Canadian legislation in Section 7.4. Sections 7.5 provides recommendations for future research followed by concluding observations in Section 7.6.

7.2. Summary of Findings

This dissertation aimed to empirically investigate whether tweets posted by human Twitter users were associated in some way with the tweets posted by Twitter bots. It was anticipated that empirical evidence suggesting association between the two samples of tweets would substantiate my thesis that the flow of semiosis through the convergence of human thought, algorithmic computation, and political electioneering on Twitter compels human minds to *interactively align* (Garrod and Pickering 2004) with the linguistic representations embedded in tweets posted by Twitter bots, thus influencing the tenor of politics, political communication, public opinion, and the public sphere, writ large.

This dissertation also aimed to analyze word and phrase composites frequently assembled into the same textual contexts in tweets posted by bots to determine whether those composites were replicated within the content of tweets posted by humans. It also endeavoured to ascertain whether those word and phrase composites functioned ideologically in some way within the #SNCLavalin Twitter discourse in the spring of 2019 by employing insights and principles gleaned from cognitive linguistics and CDA. In articulating the deleterious consequences of using digital algorithms for political electioneering purposes on politics, human thought, public opinion, and the coherence of a robust public sphere (and thus for democracy), I contend that the use of digital algorithms to psychologically profile and micro-target facets of constituents' personality to curate content that is most likely to influence their political judegement violates their right to the freedom of thought, judgement, and conscience according to section 2 of the *Canadian Charter of Rights and Freedoms*.

Accordingly, this dissertation sought to determine whether the content embedded in tweets posted by bots in some way influenced the kind of content that humans posted across the #SNCLavalin Twitter discourse of 2019 and what that influence might signify. I endeavoured to evaluate patterns and themes around words and phrases most frequently assembled into the same collocates and textual schemas within tweets posted by bots. If composites of words and phrases circulated by Twitter bots were found to be replicated in the tweets posted by humans, I set out to evaluate whether they functioned as *semantic contagions*, and if so, whether they also operated ideologically in ways that compelled human minds to *interactively align* (Garrod and Pickering 2004) with their political views promoted by tweets posted by bots.

The empirical study conducted for this dissertation rejected the null hypothesis in half of the corpus pairs of tweets posted by humans and those posted by bots using Pearson's chi-square test for independence (see Section 5.2.2 in Chapter 5 and Table 4.5 in Chapter 4). Corpus analysis of the corpora to identify the most prevalently recurring words in each corpus established that the word 'scandal' appeared in all corpora being evaluated in high frequency (see Tables 5.7-5.11 in Chapter 5). Closer examination of words and phrases combined into composites within tweets containing the word 'scandal' revealed several instances in which the same words and phrases assembled into composites were frequently positioned in syntactic proximity with others, potentially cultivating relationships of conceptual equivalency through *pragmatic traction* within the tweets in which such assemblies appeared across the #SNCLavalin Twitter discourse. Prevalence of word and phrase composites situated in syntactic proximity to others did, in fact, produce *semantic contagions* of ideological significance, as confirmed by their replication in the content of tweets posted by human Twitter users within the #SNCLavalin Twitter discourse (see section 5.5 in Chapter 5).

These results indicate that the flow of semiosis within the convergence of human thought, algorithmic computation, and political electioneering on Twitter did cultivate *botaganda*, which induced human Twitter users to *interactively align* (Garrod and Pickering 2004) with the content of tweets posted by Twitter bots across the #SNCLavalin Twitter discourse of 2019. Closer examination of the content of tweets posted by bots and those posted by humans appears to suggest that the frequent recurrence of keywords and phrases assembled into composites situated in syntactic proximity with others induced *pragmatic traction* between the conceptual representational values of each, producing *semantic contagion* effects in the process. This finding appears to confirm that *semantic contagions* of ideological significance embedded in tweets posted by bots were the driving force behind *interactive alignment* between human minds and bot-circulated content. Replication of *semantic contagions* circulated by bots within the content of tweets posted by human Twitter users suggests that they did, indeed, shape human Twitter users' perception of Prime Minister Trudeau and the Liberal Party's involvement in the SNC Lavalin affair in

2019. Thus, we may conclude that the use of digital algorithms for political electioneering purposes does, in fact, influence the ways in which constituents think about important political issues, thus shaping politics, public opinion, and the public sphere in the digital era. Thus, the use of digital algorithms for electioneering purposes violates Canadians' right to freedom of thought, judgement, and conscience according to section 2 of the *Canadian Charter of Rights and Freedoms*.

7.3. Limitations

While this dissertation forwards our understanding of how and why the integration of Twitter bots within political Twitter discourse is problematic for the coherence of political governance, the reliability of public opinion, and the integrity of a democratic public sphere, it remained subject to limitations. For instance, while the chi-square test for independence rejected the null hypothesis in several instances, suggesting some degree of relationship between tweets posted by human Twitter users and those posted by bots across the #SNCLavalin discourse, the strength of that association cannot be ascertained using the chi-square test, nor can causation. While this research does reveal a good deal about the nature of semiosis within the convergence of human thought, algorithmic computation, and political electioneering across the #SNCLavalin discourse, it does not necessarily substantiate that tweets posted by Twitter bots 'caused' human minds to *interactively align* with the content of tweets posted by bots on Twitter. Future research computing the ø (phi) coefficient could reveal correlation between tweets posted by bots and humans as two dichotomous variables will reveal the degree to which the two correlate. Moreover, a cross-lagged panel analysis could also be employed in future research to ascertain causation between the two variables. Examination of *interactive alignment* in different political contexts using other case studies could also further establish that this phenomenon is generally prevalent within Twitter discourse.

Another limitation encountered while conducting the empirical analysis for this dissertation lies in the distinction between causation and correlation as they relate to my claim that human minds were compelled into a state of *interactive alignment* with the content posted by bots. Confirming causation in this scenario would necessitate the use of another statistical instrument, such as regression analysis. This is another direction that could be pursued with further research into interactive alignment between human minds and the content posted by bots on social media platforms like Twitter. However, since online data can be 'noisy' in that the presence of several confounding variables could complicate the validity of findings established using a regular regression analysis independently, other mitigating statistical models such as multivariate modeling will have to be explored. Moreover, to substantiate the strength of the relation between the 'Government and Public' and 'Emotions' semtags as the two categorical variables belonging to the bot and human corpora, the ø (phi) coefficient would have to be explored.

Moreover, to establish that the dynamics of Twitter discourse was specifically responsible for the conflation of Trudeau's breach of political ethics and the corruption of SNC Lavalin's corporate conduct and embellishments of Trudeau's and the Liberal Party's degree of culpability in the SNC Lavalin case, one would have to study and compare the formation of ideological perspectives within public opinion about the political conduct of former Canadian prime ministers who have also breached the ethical standards of political conduct. However, such lines of inquiry are limited by the fact that Twitter was not in operation when several former prime ministers were found to have breached political ethics in previous years, as well as the nature of political communication in the context of pre-Internet broadcast media, in that the visibility of public input was predominantly absent.

Logistically, the use of the Botometer API to identify tweets posted by Twitter bots as well as the nature of human data circulating on the Internet more generally present their own set of challenges. Like human behaviour, human input on social media is highly complex and diverse, even with the deductive computational intervention of software and code, which is designed to make human input increasingly legible and predictable for deep learning neural network algorithms. However, as Botometer's creators, Yang, Ferrara, and Menczer (2022), have noted, all computational tools are always subject to limitation. For example, various considerations like the presence of inactive accounts that do not produce any data or new accounts with novel behaviour patterns that the API's dataset has not been trained to account for can result in false positive identifications of bots. Moreover, the use of secondary datasets or algorithms that have not been trained via the API's machine learning protocol can also result in faulty bot detections. Yang, Ferrara, and Menczer thus recommend manual coding and annotation of the Twitter data to adjust the data according to these limitations. Manual coding and annotation of 68,409 tweets was not feasible for this study, and I was, therefore, forced to limit the number of tweets evaluated for this study to a sample of 6,000 tweets. Moreover, while several falsely coded and suspended accounts were eliminated from the sample of 6,000 tweets during the process of manually coding and annotating the corpus, thus further reducing the volume of my sample.

Finally, the use of WMatrix5's politics and emotions semantic tags as quantifiable variables for crosstabulation, while providing quantifiable categorical variables for the chi-square test of independence, also limited the scope of the empirical test for correlation according to the semantic fields of emotions and politics. It is very possible that several other dimensions of the corpora may also be explored to explain correlation, potentially in more significant ways. Unfortunately, the scope and limitation of time allocated for this research did not permit further analysis, but other directions may be explored in future research.

7.4. Contributions

From a pragmatic point of departure, the findings established by this dissertation bolster existing premises that support recommendations to amend the *Canada Elections Act* in ways that may curtail the use of digital algorithms for electioneering purposes during electoral campaigns. Section 2 of the *Canadian Charter of Rights and Freedoms* may be incited as further substantiation for such amendment. This is an important consideration toward protecting free and fair elections in Canada as well as citizens' right to freedom of thought, judgement, and conscience according to the Charter, which inherently contributes to the protection of democracy more generally in Canada.

By exploring language use on Twitter as the primary specimen for analysis, and by making human thought central to analysis, I have demonstrated how and why both human behaviour and language remain relevant to posthuman inquiry in the digital age. In fact, though I am in congruence with scholars who propose that researchers consider scientific and technological forces when examining mediational phenomena, I also suggest that such lines of inquiry should not exalt the significance of science and technology over the significance of human dynamics fundamentally responsible for advancing and mobilizing scientific and technological agency while conducting posthuman research. As demonstrated across this dissertation, examining language-use on the Internet can offer important insight into how the flow of semiosis across the digitally mediated dynamics generated within the convergence of human thought, algorithmic computation, and political electioneering on Twitter affects various facets of real-world phenomena in ways that cultivate significant consequences for human and non-human life and existence across the planet.

In line with Slack and Wise (2015), I contend that since culture has always been technological and technology has always been cultural, humans remain the common denominator to both technology and culture. Thus, investigating the nature of mediated phenomena requires a discursive approach that remains committed to accounting for the contributions of human agency as a significant collaborative force in the dynamic of digital mediation and political electioneering in the digital age. Decentering the human from inquiry into digital mediation in posthuman research represents, I contest, a fallacy in reasoning and an unnecessary pejorative in communication and media studies research.

This research has also leveraged several fruitful perspectives, approaches, and insights on the contingencies between language, cognition, and human thought propounded within the scope of cognitive linguistics. Borrowing from cognitive linguistic principles related to the use of language to conceptually categorize phenomena perceived in the world within human cognition, I have demonstrated that human language is the medium through which semiosis flows within the convergence of human thought, algorithmic computation, and political electioneering on Twitter, thus influencing the tenor of politics,

political communication, public opinion, and the public sphere in the digital era. To date, this has not been a dynamic examined within the ambit of cognitive linguistics.

Finally, this research underscores the value of critical discourse analysis to the examination of digitally mediated socio-linguistic phenomena in the digital age. Using existing studies like Ruth Breeze's (2020) analysis of how political leaders deploy the affective influence of anger on Twitter to shape populist public opinion and Bouvier and Machin's (2018) examination of how we formulate the relationship between text and ideology within the consumption of news information posted on social media, this dissertation introduces discursive considerations to CDA that investigates the flow of semiosis within the convergence of human thought, algorithmic computation, and political electioneering on Twitter. Moreover, this dissertation leveraged Hart's enterprise in synthesizing facets of cognitive linguistics and CDA, and I applied it toward examining the cultivation of ideological worldviews through the frequent and recurring assembly of words and phrases into composite wholes situated in syntactic proximity with others via the content of tweets posted by Twitter bots in ways that shape and reinforce existing power relations between politicians and the public. I also introduced the evaluation of *semantic contagions* as *priming lures* to cognitive linguistics and CDA research. I demonstrated how tweets posted by bots often contain words and phrases that are assembled into composite wholes in ways that likely compel human minds to *interactively align* with the content of tweets posted by Twitter bots on Twitter.

To summarize this dissertation's contributions and findings, empirical analysis conducted for this study suggests that the content of tweets posted by Twitter bots was associated with with the content of tweets posted by humans in some way in half of the corpus-pairs studied. Corpus and text analyses established that the word 'scandal' recurred most frequently across all corpora of tweets studied for this dissertation, and that recurrent patterns of other words and phrases positioned in syntactic proximity to those composites generated *semantic contagions* that drew conceptual relationships of equivalencies through *pragmatic traction* across tweets posted by bots. In several cases, *semantic contagions* embedded in the content of tweets posted by bots were replicated in several tweets posted by humans. This replication supplies evidence that human minds were likely compelled to *interactively align* with the content of tweets posted by bots as thought they were posted by 'virtual peers' across the #SNCLavalin Twitter discourse, thus influencing human thought about Prime Minister Trudeau and the SNC Lavalin scandal, which fundamentally shaped public opinion and the public sphere. This suggests that the nature of online electioneering practices using digital algorithms to psychologically profile and micro-target facets of constituents' personality generated ideal cognitive conditions for *interactional* and *ideological alignment* between human minds and tweets posted by Twitter bots, which violates Canadians' right to freedom of thought, judgement, and conscience.

7.5. Recommendations for Future Research

To better understand the implications of these results, future studies could address other cognitive linguistic dynamics of Twitter discourse beyond the embedding of *semantic contagions* within the content of tweets posted by Twitter bots. For example, research could potentially expand upon our understanding of how other facets of language use on social media platforms like Twitter could also induce *social alignment* between human minds and Twitter bot tweets. Conceptual metaphors (Lakoff and Johnson 1980) could be examined to determine how they operate within composites of words embedded in the content of tweets posted within political discourse threads on Twitter, or how human users creatively contribute to metaphors propagated by Twitter bots. Moreover, conceptual metaphor analysis could also facilitate the mapping out of how rhetoric is used to promote particulate ideological conceptions about important political information. Such analysis could inform our understanding of how metaphors influence the ways in which human Twitter users structure thought while making sense of conceptual references made, for instance, between something concrete (e.g., a wall) in the world to qualify something abstract (e.g., border security), and to ideologically qualifying political knowledge accordingly.

Cognitive grammar may also enable further expansion in our understanding of how conventions in the use of grammar to construct, assemble, and symbolize words as meaning units that represent the conceptual categorization of knowledge within human cognition, which could reveal how human minds use political knowledge embedded in tweets posted by bots to make sense of the world (Langacker 2008).

Future research could also make use of other semantic fields programmed into WMatrix5's API besides 'politics' and 'emotions' to explore other potential conceptual areas of interest in articulating the nature of social psychological phenomenon of *interactive alignment* between human minds and the content of tweets posted by Twitter bots. For example, testing for correlation between tweets posted by bots and those posted by humans by quantifying semantic tags related to 'psychological actions, states, and processes' and 'social actions, states, and processes' may reveal other dimensions of *interactive alignment* on Twitter that 'emotions' and 'government and public' semantic fields did not reveal about the #SNCLavalin Twitter discourse.

Further research is needed to determine whether political discourse on Twitter was central to the conflation of Trudeau's breach of political ethics and the corruption of SNC Lavalin's corporate conduct, as well as the embellishments of Trudeau's and the Liberal Party's degree of culpability in the SNC Lavalin case. For example, similar analysis of tweets posted around the time that former Prime Minister Harper's prorogued parliament in 2007 – before deep learning neural network algorithms were introduced into the common regulation of social media content – could reveal differences in patterns of the

language used to discuss the proroguing of parliament on Twitter compared with patterns in language use in the #SNCLavalin Twitter discourse analyzed for this study.

Further empirical investigation into whether Twitter bots 'caused' human users to *interactively align* with the content of automated tweets using regression analysis and cross-lagged panel analysis could also further support the crux of this dissertation's thesis that the inclusion of Twitter bots by political candidates for electioneering purposes produces *botaganda* that fundamentally violates Canadian's freedom of thought, judgement and conscience according to Section 2 of *Canada's Charter of Rights and Freedoms*.

Finally, as computational technologies continue to improve, the efficacy of Botometer's API in detecting Twitter bots may improve as well, thus eliminating the necessity to manually code and annotate twitter data. These kinds of advancements in computational text and corpus analysis tools will permit analysis of more robust datasets, which may point inquiry toward other interesting areas of analysis.

7.6. Conclusions

Given the critical importance of freedom of thought, judgement, and conscience to our democratic political conditions, as emphasized by Chief Justice Dickson in 1985, the use of digital algorithms for political electioneering purposes on Twitter represents a clear violation of Canadians' rights and freedoms according to the *Charter*. This dissertation has shown that politicians' use of Twitter bots during electoral campaigns to influence the ideological views of constituents likely induces human minds to *interactively align* with the content of tweets posted by bots, and the replication of ideologically salient *semantic contagions* embedded in tweets posted by bots in the tweets posted by humans suggests that human Twitter users do, in fact, *interactively align* with the ideological concepts represented by *semantic contagions.*

This chapter has supplied a summary of these findings, it has outlined the limitations of the study conducted for this dissertation, it has articulated this dissertation's contributions in relation to the research aims and questions and has made recommendations for future research. Notably, the imperceptible presence of Twitter bots and the operating of deep learning neural network algorithms that psychological profile and micro-target facets of constituents' personality in the background of Twitter's user interface were found to act as the primary antecedents for the convergence of human thought, algorithmic computation, and political electioneering on Twitter, which ultimately cultivated ideal cognitive conditions for *priming* human thought, compelling human minds to entrench the ideological concepts associated with *semantic contagions* embedded in the content of tweets posted by bots. Based on these findings, I contend that the *Canada Elections Act* should be amended to restrict the use of digital algorithms on Twitter for political electioneering purposes since such use violates Canadians' right to

freedom of thought, judgement, and conscience according to the *Canadian Charter of Rights and Freedoms*. Even more importantly, the violation of these rights and freedoms obviates "the ability of each citizen to make free and informed decisions [about political candidates during elections, which] is the absolute prerequisite for the legitimacy, acceptability, and efficacy of our system of self-government" (Dickson 1985).

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