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A Network Text Analysis of *Fight Club*

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Abstract—Network Text Analysis (NTA) involves the creation of networks of words and/or concepts from linguistic data. Its key insight is that the position of words and concepts in a text network provides vital clues to the central and underlying themes of the text as a whole. Recent research has used an inductive or bottom-up approach to the question of theme extraction. In this paper we take a top-down or deductive approach in that we first establish prior expectations as to the key themes to be found in the text. We then compare and contrast the results of our network analysis with the results of literary and cultural analyses of the film *Fight Club* as reported in over four dozen other peer-reviewed publications. While our results are remarkably consistent with and complementary to results in those studies, our analysis permits something the others do not—an analytical framework for relating those underlying and central themes to one another.

Index Terms—network text analysis, social network analysis, *Fight Club*, Chuck Palahniuk, film criticism, semantic network

I. INTRODUCTION

Network text analysis (NTA) involves the identification of important lexical relationships among words and concepts in a text and their subsequent representation in the form of a network or map (Popping, 2000). Like other methods of content analysis, NTA operates on the assumption that the structure of a text encodes its meaning (Fischer-Starcke, 2009). Its major point of differentiation—perhaps its defining difference—is how it defines that structure. The most widely employed methods of content analysis—ones employed in corpus linguistics, corpus stylistics, and computational linguistics—establish structure from the frequency with which certain key words appear in the text and/or the frequency with which those words co-occur (Stubbs, 2005; Popping & Roberts, 1997). Several approaches to NTA have been developed in the last five decades. These include *mental models* (Collins & Loftus, 1975), *knowledge graphs* (Bakker, 1987), *concept maps* (Novak, 1990), *map comparison/ analysis* (Carley & Palmquist, 1992), *word network analysis* (Danowski, 1993), *semantic networks* (Sowa, 1992), *functional depiction* (Popping & Roberts, 1997), *sociocognitive networks* (Carley, 1997; Diesner, 2013), *semantic grammars* (Roberts, 1997), *centering resonance analysis* (Corman, Kuhn, McPhee, & Dooley, 2002), *semantic webs* (van Atteveldt, Kleinnijenhuis, & Ruigrok, 2008), and *morpho-etymological networks* (Hunter, 2014a, 2014b). While each of these methods defines textual structure in a different manner, they all share two explicit assumptions. The first is that otherwise invisible properties of texts can be identified when words and concepts are represented and understood as networks (Diesner & Carley, 2005). The second is that a text's key themes are associated with the words and concepts that occupy the most influential positions in the network. Despite sharing these foundational assumptions, approaches to NTA vary along at least two key dimensions. The first concerns the specific lexical or conceptual item to be studied, as well as the nature of the relationship that joins them. Variation in the choice of item and relationship is what produces variation in the definition of the text structure. A second concerns the level of automation or computer-support (Diesner & Carley, 2005). Despite these differences, the four fundamental steps in all network text analyses are the same (Diesner, 2012). They are the *selection* of certain words or concepts in a text for subsequent analysis, the *abstraction* of these words or concepts to higher-level conceptual categories, the identification of a *relationship* that can be used to connect the conceptual categories to one another, thereby forming a network, and the *extraction* of meaning and key themes from the most influential nodes (concepts) in that network.

Several recent studies have focused on the latter of these four stages, i.e. the extraction of key themes. These include network text analyses of *screenplays* (Hunter, 2014a), *mission statements* (Grbic, Hafferty, & Hafferty, 2013), *newspaper articles* (Tambayong & Carley, 2013), *presidential inaugural addresses* (Light, 2014; Chung & Park, 2010), and *extremist propaganda* (Morris, 2014). Despite the wide variety of texts and research questions, all of these studies derived the themes inductively, i.e. from the bottom-up. That is to say, the analysts approached the texts *without* strong prior assumptions or expectations as to what the themes would or should be. Typical of the bottom-up approach is Hunter (2014a) who created text networks for seven recent, Academy-Award winning, best original screenplays—*Little Miss Sunshine*, *Juno*, *Milk*, *The Hurt Locker*, *The King's Speech*, *Midnight in Paris*, and *Django Unchained*. In five of the seven networks he reported that key themes of the story were clearly associated with the most influential nodes in the network. For example, in the text network of the Iraq-war-themed *The Hurt Locker* he found the following words

and concepts associated with the most influential nodes in the network—*army-issue*, *body armor*, *fireball*, *gunfire*, *gunshot*, *HUMVEE*, *IED (improvised explosive device)*, *machine gun*, *shell-shocked*, *suicide bomber*, and *USA*. In the screenplay for *Milk*, biopic about the openly-gay mayor of San Francisco who was infamously assassinated by a fellow politician, words and concepts associated with the most influential nodes in the network included *AIDS*, *elected official*, *public office*, *city council*, *city hall*, *city-wide*, *civil rights*, *town hall*, *manslaughter*, *congressman*, *human rights*, *right wing*, *nationwide*, and *statewide*. Similarly, while Grbic, Hafferty, & Hafferty (2013) hypothesized that the mission statements of public and private medical schools, as well as those of social-mission vs. research-focused medical schools, would have different text networks, they did not specify *a priori* the content of those differences or the network positions of key differentiating concepts. The current study is the first of which we are aware that takes a deductive or top-down approach. That is to say, unlike the aforementioned studies, we first develop strong priors about the key themes that should be found in our text, the screenplay of *Fight Club* (Uhls & Palahniuk, 2000). Those expectations are developed by a review of over four dozen published, peer-reviewed journal articles that analyzed the movie *Fight Club* and/or the novel from which the screenplay was adapted (Palahniuk, 1996). We then perform a network text analysis on the screenplay and see whether the results match our expectations.

II. TALKING ABOUT FIGHT CLUB

Fight Club was the first published novel by American Chuck Palahniuk and it appeared in 1996. In 1999 a film by the same name was released starring Brad Pitt as the antagonist, Tyler Durden, and Edward Norton Jr. as the unnamed Narrator and protagonist. According to director David Fincher, Norton's unnamed character is an "everyman" who we discover is very discontented, even "emasculated" by his white collar job and consumerist lifestyle (Smith, 1999). To escape these doldrums, he eventually forms a club with a soap-maker partner (Tyler Durden) where men fight recreationally. The novel earned moderate critical acclaim garnering its author both the Pacific Northwest Booksellers Association Award and the Oregon Book Award for Best Novel in 1997. The film adaptation initially disappointed at the box office, earning only \$37 million during its U.S. and Canadian theatrical run versus a production budget of \$63 million. The film did eventually turn a profit because foreign box office receipts pushed the total to just over \$100 million (Box Office Mojo, 2014). But despite the initially poor box office showing, imagery and dialog from the film leapt immediately into the mainstream of popular culture. Perhaps the most famous—or infamous—line from the film concerns the club's rules—"The first rule of fight club is you do not talk about fight club."

And if the measure of performance of the film and novel was the degree to which people have ignored that rule, then both the novel and film—but especially the latter—have been an enormous success. Debates began in earnest shortly after the film's world premiere at the Venice Film Festival and continued unabated through its US theatrical release. The film also became somewhat notorious for its influence in the popular culture with many fight clubs being formed around the US (Crowdus, 2000). Academics and culture critics have done their fair share of talking about *Fight Club* too. Perhaps as a result of its cultural impacts of the film, critics of popular culture and the arts were among the first in academia to analyze both *Fight Club*. Our research identified over 100 articles about the film and/or novel that were published in peer-reviewed academic journals between 1999 and 2014. Of those written in the humanities, subject matter of the journals includes literature, film studies, gender, religion, popular culture, social theory, psychology, post-modern studies, Gothic studies, the sociology of sport, and race, media and culture, communication, and trauma.

III. METHODS & DATA

A. Identifying the Key Themes

The first task in the analysis was to determine the major themes of the novel and film, as articulated by academic analysts and critics. The authors met four times to make these determinations. The first meeting concerned reconciling our selection of the peer-reviewed journal articles that would form the basis of our subsequent analysis. Prior to this meeting each author separately used the *Google Scholar* search engine to generate a list of citations using search terms that include the phrase "Fight Club" plus the name of either the film's director (David Fincher), the screenplay's author (Jim Uhls), or the author of the novel (Chuck Palahniuk). The first author separately saved all citations to journal articles to his own Google Scholar library. The second author saved all relevant citations directly to her hard drive. When we met we discovered that the major differences in our selection concerned three issues: whether or not to include book or movie reviews that appeared in peer-reviewed journals (we decided not to); whether and how to treat articles that did not have abstracts; and whether and how to accommodate articles that analyzed the film or book from the standpoint of film or narrative theory. Concerning the second issue, we decided to use only the text that appeared in the first paragraph of article. In those cases where it was not possible to obtain a copy of the paper, the article was excluded from consideration. Concerning the latter, we opted to eliminate all articles that were not expressly cultural or social analyses or critiques of the film. At the conclusion of this meeting we ended up with the 52 peer-reviewed articles listed in the Appendix. As shown in Table 1, several major and inter-related themes are evident in the academic literature over the fifteen years since the theatrical release of *Fight Club* and the nearly twenty years since the novel's publication.

At the second meeting the authors reconciled the first version of the categories of themes that were to be later used to code statements contained in the abstracts or lead paragraphs. Prior to the meeting each author separately reviewed different halves of the aforementioned 52 abstracts or lead paragraphs and created their own lists of major themes that were present therein. Specifically, each author highlighted key phrases and words used to describe the protagonist, the antagonist, the film, the novel, and/or the major themes of those works. Examples include phrases like “the films *Fight Club*... and *Memento* revolve around similar themes...the individual’s struggle with late capitalism in order to establish identity in a de-centered world” (Kravitz, 2004) and “...the *Fight Club* ethic...is rooted in guerilla-type resistance to commodity culture” (Del Gizzo, 2008). Each author separately abstracted all relevant terms in these statements and converted them into nouns, e.g. capitalism, identity, guerilla, resistance, commodification. When we met, we discussed the overlap and the differences in the two lists which contained a total of 41 such nouns. After agreeing on common names for highly similar terms the list was reduced to 26 nouns.

At the third and fourth meetings we jointly reviewed every statement that either author had previously identified and re-assigned each one to one or more relevant noun-themes. When and where it seemed appropriate, we reduced the number of noun-themes to create conceptually broader categories. Of course, this often necessitated re-naming of existing noun-themes. After several iterations we ended up with the following 12 noun-themes which, order alphabetically, are AGENCY, ANARCHISM, BODY, CAPITALISM, GENDER, IDENTITY, PATHOS, POWER, PSYCHOPATHOLOGY, RACE/CULTURE, SEX, and VIOLENCE. These appear in the first column of Table 1. The second column contains the noun forms of typical terms abstracted from the relevant phrases that we found in the abstracts and first paragraphs. The third column contains examples of the actual phrases contained in those abstracts and paragraphs.

The third and final step of the thematic analysis was to identify the most dominant themes in the literature. Rather than rely on the frequency with which the themes appear, we created a concept map of authors and themes. The result is shown in Fig. 1 where squares represent themes and circles represent authors. When a circle (author) appears between two squares (themes) it indicates that the author mentioned both of these themes in the abstract or first paragraph. For example, in the upper left corner we see that Slade (2011) is represented by a circle that is located between the themes GENDER and VIOLENCE whereas Burgess (2012) appears between the squares representing BODY and VIOLENCE. A view of the map as a whole reveals that the themes can be ordered from greatest number of links to the lowest as follows: GENDER, IDENTITY, CAPITAL, POWER and PSYCHOPATHOLOGY (tied), ANARCHISM, SEX and VIOLENCE (tied), PATHOS, RACE/CULTURE, BODY, and AGENCY. It is this ranking that we subsequently use to test whether the position of concepts within the text network can accurately ascertain key themes of the story as found in the adapted screenplay of *Fight Club* (Uhls & Palahniuk, 2000).

TABLE I.
KEY THEMES IN *FIGHT CLUB*

Theme	Terms	Example Phrases
AGENCY	self-help	<ul style="list-style-type: none"> • “it is...rebellng against a consumerist culture that dissolves the bonds of male sociality and puts into place an enervating notion of male identity and agency” (Giroux, 2001)
BODY	body, bodies	<ul style="list-style-type: none"> • “two identities inhabiting the same body” (Ta, 2006) • “the splitting of both the psyche and the body” (Ruddell, 2007) • “the film’s retrograde version of a violent masculinity rooted in the male body” (Robinson, 2011).
CAPITAL	capitalism, consumerism, globalization	<ul style="list-style-type: none"> • “Fight Club appears to offer a critique of late capitalist society” (Giroux, 2001) • “to reevaluate Fight Club’s representation of capitalism, to develop a value-theoretic account of trash” (Henderson, 2011) • “...its logic implies that action is required against the effects of globalized capitalism...” (Jordan, 2002)
ANARCHISM	anarchism, dystopia, nihilism, post-modernism	<ul style="list-style-type: none"> • “most people in the world...are attracted to dystopic stories about the end of capitalism” (McCullough, 2005) • “The characters in Fight Club avoid nihilism by acquiescing to love without fixed definition” (Aparicio, 2013) • “Fight Club tells the story of an unnamed narrator and the nihilistic Tyler Durden (Rehling, 2001).
GENDER	gender, masculinity, femininity, paternalism, virility	<ul style="list-style-type: none"> • “Fight Club tends to emphasize its relevance for the study of contemporary representations of gender and masculinity (Lizardo, 2007) • “Fight Club has provoked a great deal of theorizing about gender...” (Robinson, 2011) • “Fight Club was one of many contemporary films depicting masculinity in crisis...” (Rehling, 2001) • “Race and the Construction of White Masculinity in David Fincher’s Fight Club” (Locke, 2014) • “Fight Club as a foil against which we try to pin larger issues of masculinity and urban life” (Craine & Aitken, 2004)

IDENTITY-INDIVIDUAL	identity, identification doppelganger double self-consciousness self-help	<ul style="list-style-type: none"> • “Fight Club’s narrative logic and its complex, imaginative imbrication of identity and historical self-consciousness (Friday, 2003) • “Chuck Palahniuk’s <i>Fight Club</i> (1997) addresses the identity crisis of white, heterosexual, American men...” (Boon, 2003) • “Fight Club reflects the protagonist’s inability to establish an identity for himself” (Gunn & Frenz, 2010) • “...an extraordinary film that explores an often-violent intersection between the conditions of late-capitalist consumer society and contemporary masculine identities” (Iocco, 2003) • “...(he) is revealed as an individual who suffers from the actual medical disability, Dissociative Identity Disorder. (Ta, 2006)
IDENTITY-SOCIAL	male bonding homosocial relations class	<ul style="list-style-type: none"> • “the homoerotic attraction that lies just beneath the film’s celebration of homosocial bonding” (Westerfelhaus & Brookey, 2004) • “identifying himself as a product of consumer society” (Pettus, 2000) • “(the) protagonist will attempt to use his body to escape the control of society and re-establish his identity and will” (Kravitz, 2004) • “Through examining examples of “fighting” in <i>Fight Club</i>, the article will discuss male bonding through homosocial (and somewhat homophobic) relations” (Iocco, 2003) • “Fight Club provided a point of identification for its embattled white, middle-class, target audience” (Bedford, 2011)
PATHOS	anxiety, crisis, pain, suffering, distrust, malaise, disaffection, Gothic	<ul style="list-style-type: none"> • “Palahniuk dramatizes a situation in which contemporary culture is made responsible for a crisis in masculine identity” (Jordan, 2002) • “These people experience the real physical and psychological pain of approaching death where the protagonist does not...” (Schultz, 2011) • “Fight Club reworks the Gothic topos of the Doppelgänger in a twentieth-century American urban context (Stirling, 2004) • “In his attempt to heal himself of his malaise, (the narrator) encounters Tyler Durden...who seduces (him) into co-founding <i>Fight Club</i>” (Ta, 2006).
POWER	power, hegemony, domination, exploitation, victimization, resistance, persecution, fascism	<ul style="list-style-type: none"> • “...in Palahniuk’s <i>Fight Club</i>, the narrator is in a certain crisis of manhood as a result of his contradictory experiences of power under the impositions of hegemonic masculinity” (Vafa & Talif, 2011) • “...the film recommends violence as a solution to a perceived crisis in the lives of a generation of American men who lack the power to find meaning in the wastes of consumer culture” (Robinson, 2011) • “...(the club) rebels against a seemingly impersonal and feminized dominant culture by blowing up that very world... (Ta, 2006) • “All three movies exhibit a sense of victimisation, persecution and distrust...” (Yeo, 2014)
PSYCHO-PATHOLOGY	mental health, psychosis, schizophrenia, paranoia, narcissism, psychopathology, perversity, sado-masochism	<ul style="list-style-type: none"> • “...we argue that the film <i>Fight Club</i> can be understood as a mediation of a larger, cultural psychosis.” (Gunn & Frenz, 2010) • “Fight Club well represents the violent effects of capitalism on psychic structure ... (and)... the damaging effects of capitalism on the male psyche.” (Layton, 2011) • “...the narrative fits perfectly with the psychopathology model of cult recruitment” (Lockwood, 2008) • “...the Art/Politics of White Male Victimization and Reflexive Sadomasochism” (Kusz, 2002) • “...the Gothic movie renders its protagonist, the viewer, schizophrenic and paranoid as well” (Yeo, 2014) • “It was argued that Fincher’s version suffers from the same sense of schizophrenia as its protagonist.” (Bishop, 2006)
RACE-CULTURE	white, western, Asian, race, racism,	<ul style="list-style-type: none"> • “Offering a critical interrogation of white masculinity within David Fincher’s <i>Fight Club</i>” (King, 2009) • “This white, male, white-collar, and well-paid protagonist...” (Schultz, 2011) • “Palahniuk’s <i>Fight Club</i> (1997) addresses the identity crisis of white, heterosexual, American men...” (Boon, 2003) • “...issues raised in <i>Fight Club</i> about fighting are...powerfully relevant in white western industrialised context” (Iocco, 2003)
SEX	sexuality, homosexuality, homophobia, homoeroticism, heterosexuality, love	<ul style="list-style-type: none"> • “...the film’s narrative is structured around a quasi-religious ritual that reaffirms heterosexuality at the expense of homosexuality...” (Westerfelhaus & Brookey, 2004) • “Fight Club is clearly one of the films that are most often addressed by researchers and cultural critics wanting to probe the relationship between sexuality, politics and popular culture” (Lindgren, 2011) • “Fight Club’s DVD “extra text” dissuades the viewer from acknowledging the film’s homoerotic elements as representing homosexual experience” (Brookey & Westfelhaus, 2002)
VIOLENCE	violence, aggression, militarization, terror, terrorism	<ul style="list-style-type: none"> • “As a response, the narrator sets out a nostalgic backlash to grapple with the outlets of the crisis—buried feelings, homophobia and aggression” (Vafa & Talif, 2011) • “...a divided subject that seeks release in brute, regressive masculinity” (Ta, 2006) • “...it is about a man with multiple personality disorder who tries to fight his disillusionment by turning to violence and anarchy” (Bishop, 2006) • “...academics debated whether the film recommends violence as a solution to a perceived crisis in the lives of a generation of American men...” (Robinson, 2011) • “Initially panned by many critics for its violent content, David Fincher’s <i>Fight Club</i> may seem like the most unlikely film to incorporate the tenants of Zen Buddhism” (Reed, 2007).

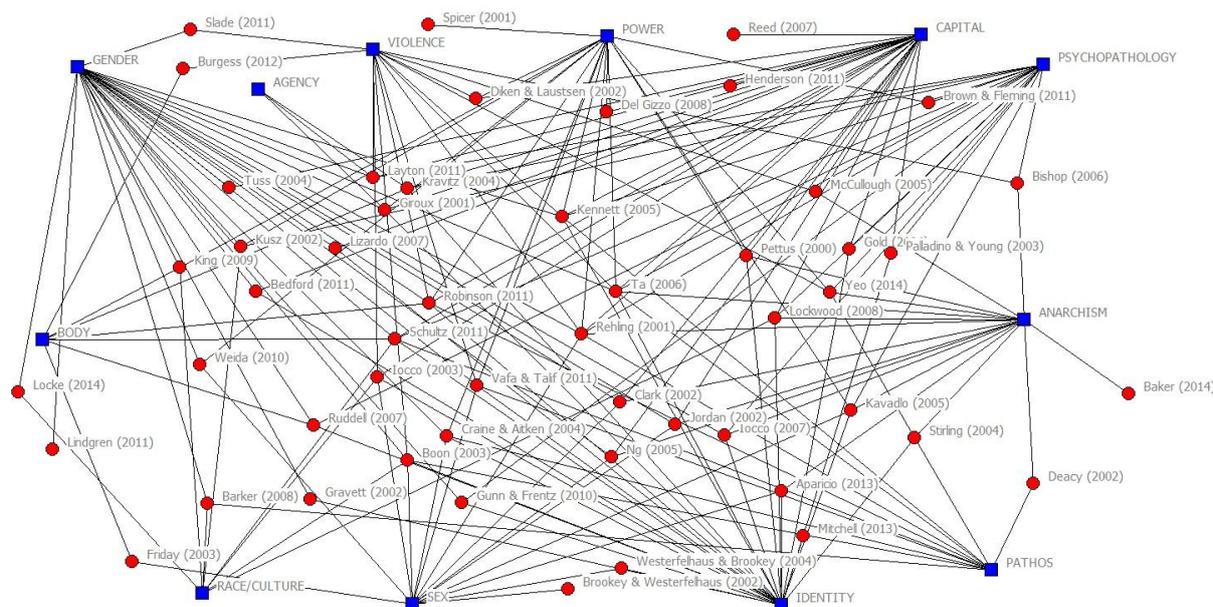


Figure 1. A concept map of authors vs. themes mentioned in fifty-two academic journal articles about *Fight Club*

B. The Selection of Words for Subsequent Analysis

Diesner (2012) identified nearly 20 distinct approaches for constructing text networks and compared and contrasted them along several dimensions. In this study we apply a novel method not included in Diesner’s review—the morpho-etymological approach recently developed by Hunter & Smith (Hunter & Smith, 2013; Hunter, 2014a; Hunter, 2014b). In that approach, a network is constructed from morphological and etymological relationships among words in the text. A hallmark of that approach concerns its *selection* rule—the first stage of a network text analysis. In short, only multi-morphemic compounds (MMCs) are retained for analysis. MMCs include abbreviations, acronyms, blend-words or portmanteau, selected clipped words, several varieties of compound words, examples of which are shown in Table 2.

TABLE II.
SELECTED EXAMPLES OF TEN TYPES OF MULTI-MORPHEMIC COMPOUNDS FOUND IN *FIGHT CLUB*

Type	Selected Multi-Morphemic Compounds in <i>Fight Club</i>
Abbreviations, Acronyms	TFM (task force man), SE (south-east), AR (automatic rifle), yuppie (young urban professional), IBM (international business machine)
Blend Words	laundromat (laundry + automatic)
Clipped Words	Microsoft (microcomputer + software), email, cybernetting
Closed Compounds	Jackhammer, headquarters, handgun, uppercut, airport, breadcrumbs
Conversion	Star-sixty-nined
Copulative	Walkie-talkie
Hyphenated Compounds	self-destruction, born-again, Psycho-boy,
Multi-word Compounds	Out-of-court, cry-for-help, death-warmed-over, merry-go-round
Open Compounds	Office park, orange juice, phone number, rock star, army surplus
Prefixed	Overhanging, overlap, overturned, underground, understand

We identified the MMCs in this study with the use of the “Concept List” routine in the CASOS Institute’s *Automap* software program (Carley, Columbus, & Landwehr, 2013). That routine output lists each unique word appearing in the text, along with each word’s frequency of occurrence. After eliminating stop-words known not to be MMCs, and including differences attributable to inflection, pluralization, and capitalization, there were approximately 1920 unique words in the list appearing almost 24,000 times in text of the screenplay. Each author read the entire list individually and identified the MMCs contained therein. After reconciling their coding we ended up with a list of 316 MMCs, about 1/6th of the number of unique words. Excluded from consideration were numbers that were spelled out, e.g. *eighteen*. However, we retained numbers that were part of compounds, e.g. *three-story*, as well as the adjectival forms of numbers when they appeared as part of an MMC, e.g. *second-hand*. We did not retain neoclassical compounds, e.g. *photograph* or *telephone* but did treat MMCs when the prefix was classical and its used implied a full word, e.g. *photocopy* as *photo* (graphic) *copy*. We also retained certain pseudo-compounds when the prefix was also a word that descended from the same root as the prefix, e.g. *understand* and *overwhelmed*.

A second routine in *Automap* called “Suggest N-Grams” was next employed to identify open compounds words in the text. The output of this routine contains a list of selected multi-word combinations which in our case consisted of 1511 n-grams. As above, both of the authors reviewed the list separately and later reconciled their selections. The result

was a list of 79 open compounds such as *bulletin board*, *dining room*, *parking lot* and *third world*. With the addition of these n-grams the total number of unique MMCs rose to 395. Table 2 contains examples of each type of 11 relevant categories of MMCs appearing in the screenplay of *Fight Club*.

C. Abstraction of Selected Words into Higher Order Conceptual Categories

Abstraction is Diesner's (2012) second stage of a network text analysis. One of the most widely-employed methods of abstraction is stemming, i.e. the reducing of words to their stem, base, or root forms (Stemming, 2014). In this study, we used etymological stemming. Specifically, each morpheme in a multi-morphemic compound is assigned to a category defined as its etymological root. Where possible, that root is Indo-European, as defined in the *American Heritage Dictionary of Indo-European Roots* (Watkins, 2011). Because no software exists for etymological stemming, the mapping had to be done manually. As previously, both authors mapped all morphemes separately and then later reconciled our coding. At the conclusion of this process the 395 MMCs were traced back to 384 unique etymological roots, 80% of which were Indo-European.

D. Connecting the Concepts

The third stage of a network text analysis involves establishing linking relationships between nodes. In the morpho-etymological approach, a pair of nodes is deemed connected when they co-occur in the same MMC. As shown in Figure 2, in our network the etymological roots **wer-2** (to raise, lift, hold suspended) and **pele-2** (flat; to spread) are connected because they co-occur in the compound *airplane*. Because the words *plastic* and *floor* also descend from the root **pele-2**, then it is also connected to the Indo-European roots **kae-id-** () and **de-** (to), and the Old English **bagge**, shown below as BAG. As shown in Figure 2, those nodes are connected by the multi-word expression **floor-to-ceiling** and the open compound **plastic bag**. Similarly, the words *mid-air*, *airline*, *airway*, and *airport*, link the root **wer-2** to four other Indo-European roots—**medhyo-** (), **lino-** (line), **wegh-2** (way, weight), and **per-2** (). Among the 384 nodes in the network, there were 441 such connected pairs. Although that may seem like a lot, the number of possible pairs is 97020 and 441 represents only 0.45% of that number—a mere fraction. That number is so small because MMCs comprise only about 2% of the number of words in the document and because *only* MMCs can create such connections across nodes in the network when those nodes are etymological roots. One implication of the choice to focus in etymological relationships is that many words that convey important information about the content of the story are necessarily excluded from the analysis.

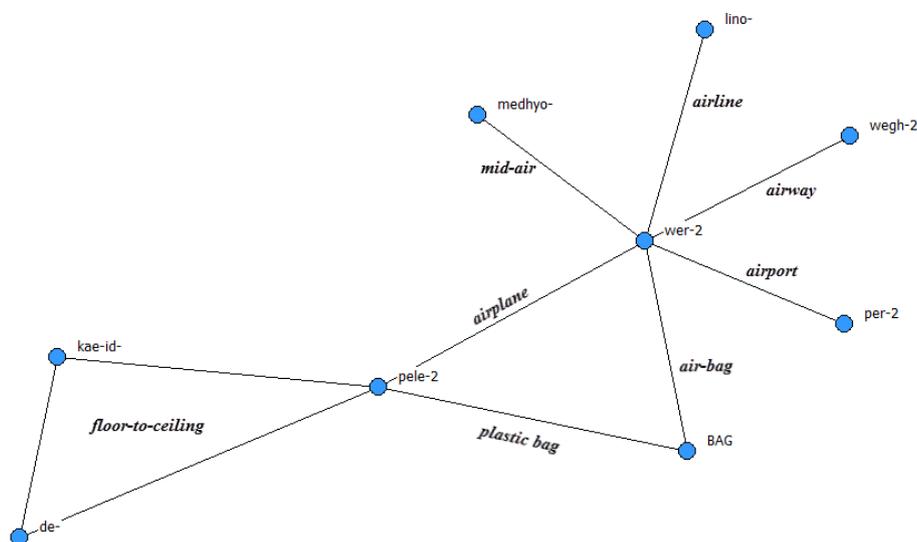


Figure 2. Sub-graph of the morpho-etymological text network for *Fight Club*

In social network analysis, the term “main component” is given to the largest portion of the network wherein all nodes are mutually reachable (Reachability, 2014). Of the 384 nodes in the text network for *Fight Club*, 296 were mutually-reachable. That is to say, there were one or more paths of varying lengths connecting every node (etymological root) to every other node. This network is presented in Fig. 3.

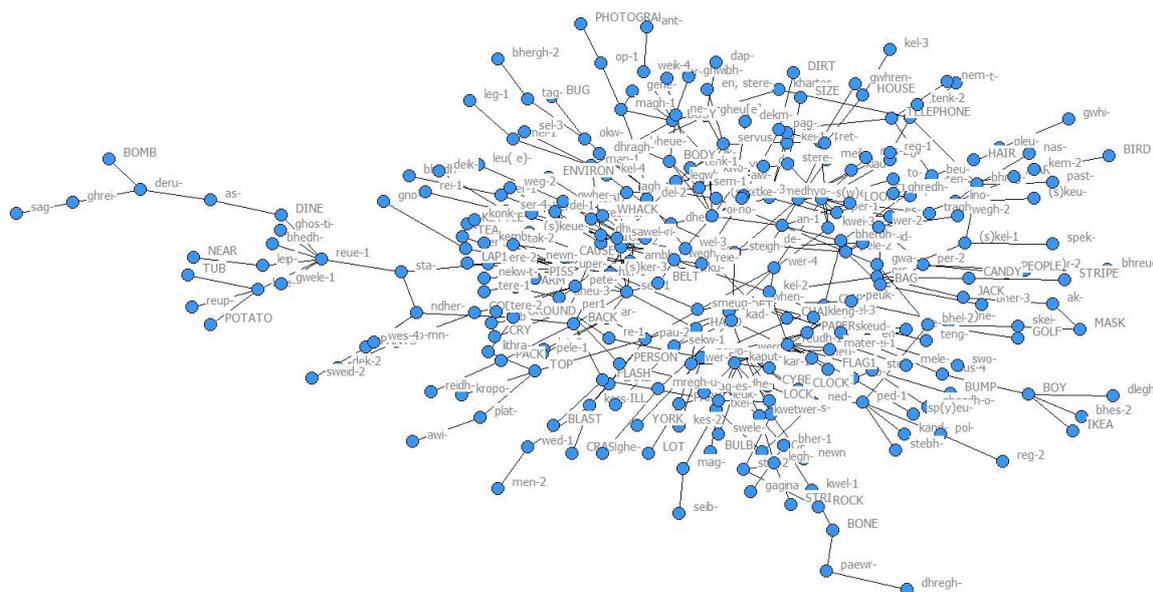


Figure 3. Main component of the morpho-etymological text network for *Fight Club*

E. The Extraction of Meaning

The last stage of a network text analysis involves the *extraction* of key themes from the text. As noted previously, this is typically accomplished through an analysis of the network’s most influential nodes. In small networks this can often be done with visual inspection. But with 296 nodes and 387 ties, this network is quite clearly too large and complex to analyze visually. To further reduce the complexity we identified a subset of the most influential nodes among those in the main component. This was accomplished by calculating two measures of network influence—degree centrality and constraint. The first is simply a measure of the number of links that a node has in a network (Wasserman, 1994). The second is the degree to which a node links otherwise disconnected segments of a network. The measure of this propensity is called constraint, and the lower a node’s constraint, the greater is its degree to serve as a connector between disparate sub-branches of a network (Burt, 2000). Fig. 3 below contains a reduced network of the one displayed in Fig. 2. It is comprised only of those 23 nodes that were in the top 10 in the whole network with regard to degree centrality and/or the bottom 10 with regard to constraint. The names and definitions of those nodes are displayed in Table III, along with examples of MMCs associated with those roots. The roots in the first column are order from the lowest to the highest value of constraint.

TABLE III.
SELECTED MULTI-MORPHEMIC COMPOUNDS ASSOCIATED WITH THE MOST CENTRAL
AND THE LEAST CONSTRAINED NODES IN THE MAIN COMPONENT OF THE TEXT NETWORK

Node (Definition)	Selected Multi-Morphemic Compounds
s(w)e- (self)	self-destruction, self-improvement, security guard
apo- (of, off)	show off, out-of-court settlement,
ud- (out)	whacked-out, burnt-out, outrage
werg- (to do; work)	Home Shopping Network, paperwork, sex organs, cyber-netting
wegh- (way)	freeway, superhighway, runway
uper- (over)	death-warmed-over, overnight, overturned
se-2 (side)	sidelong, sidewalk, broadsides, passenger side
sed-1 (seat)	out-of-court settlement, seat back, seatbelt
oi-no- (one, unity)	everyone, anyone, someone
upo- (up, over)	uppercut, upright, mixed-up, sit-ups
reudh-1 (red)	lipstick red, red blood cell, red-and-blue, red-faced, red flags, redhead
kaput- (head)	redhead, dickhead, headache, headlock, headquarters
bysig- (busy)	businessman, business card, business trip, IBM, BusinessWeek
an-1 (on)	onboard, one-on-one, onlookers
sem-1 (some)	single-serving, something
reue-1 (room)	stockroom, ballroom, hotel room, bedroom
gwhen- (to strike, kill)	chain-link fence, gunshot, gunpoint, handgun
dhwer- (door)	doorbell, doorframe, doorman, side door
medhyo- (middle)	mid-air, middle-aged, mid-town
wi- (with)	wide-eyed, goodbye (God be with you)
hand (hand)	second hand, handkerchief
wer-2 (to raise, lift)	airbag, airline, airplane, airport
per1 (prime, first, for)	cry-for-help, first person, doorframe

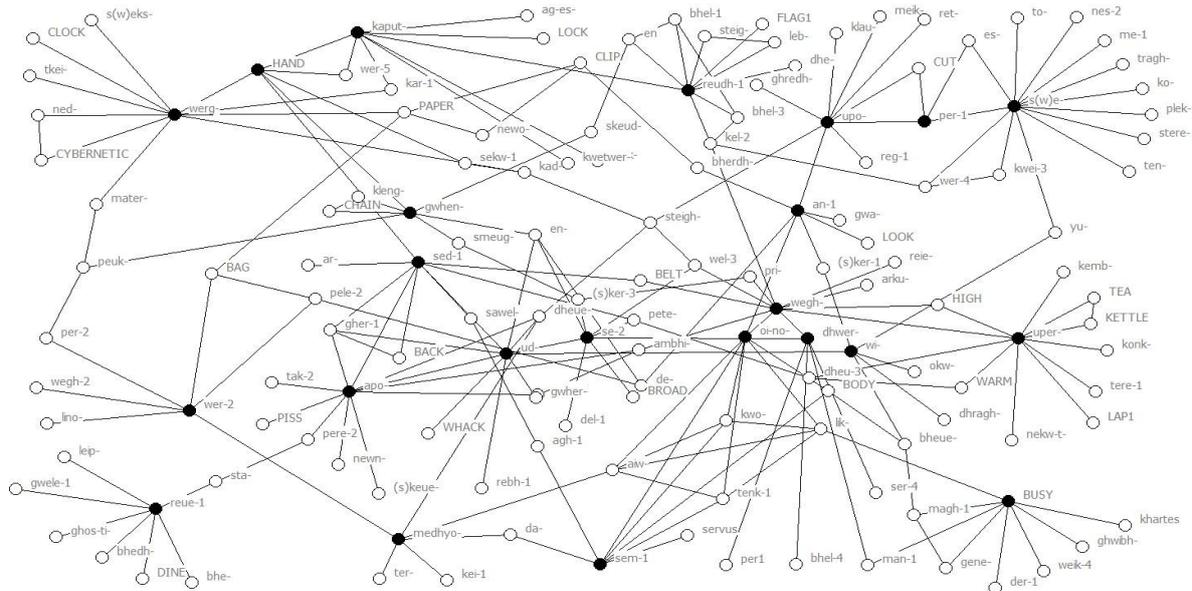


Figure 3. Morpho-Etymological Text Network Formed Only by the Most Central and the Least Constrained Nodes in the Main Component

F. Comparing Findings

Notably, the node with the both the lowest constraint score (0.107) and highest degree centrality (15) is the Indo-European root **s(w)e-** which Watkins (2011, p. 90) defines as a “pronoun of the third person and reflexive (referring back to the subject of the sentence); further appearing in various forms referring to the social group as an entity.” Words in the screenplay associated with this root include the reflexive pronouns *myself*, *ourselves*, *itself*, etc. as well as the words *security guard*, *self-contained*, *self-destruction*, *self-employed*, *self-improvement*, and *self-portrait*. Several other words descending from that root appear in the screenplay but are not part of MMCs. They are *severed*, *secret*, *sure*, *unsure*, *solitaire*, *desolate*, *customer*, and *sullen*. Other words descending from **s(w)e-** but not found in the screenplay are *secure*, *sedition*, *separate*, *sever*, *sure*, *ethnic*, *idiot*, *solo*, *desolate*, *custom*, *sullen*, and *solitude*. The meaning of this root, the words in the story directly tied to it, and the others that descend from it are clearly indicative IDENTITY—the second most influential theme identified in our prior analysis.

The Indo-European root **werg-** means “to do” (ibid, p. 103). It is one of two nodes with the third highest number of links (13). It and the root **bysig-**—shown in the graph as “BUSY”—both have the fourth lowest constraint value (0.153). Words descending from **werg-** and appearing in the screenplay include *Home Shopping Network*, *homework*, *network*, *organic matter*, *paper work*, *sex organs*, *case worker*, *clockwork*, *cyber-netting*, *handiwork*, and *hard-working*. Two other words descending from this root appear in the text but not in the network—*surgery*, and *boulevard*. One other descendant of **werg-** that does not appear in the screenplay is *ergonomics*, a word that the MacMillan Dictionary defines as “the study of the way that furniture, equipment, etc. can be designed so that it is easy and comfortable to use and produces the most benefits and the best working or living conditions.” This definition is noteworthy given the protagonist’s admission that he had “become a slave to the Ikea nesting instinct,” that he is depicted assembling Ikea furniture, and that his alter-ego Tyler mockingly refers to him as “Ikea-boy.” Words associated with **bysig-** include *IBM* (*International Business Machines*), *business card*, *business trip*, *BusinessWeek*, *Business-like*, *businessman*, and *businesswoman*. Clearly the bulk of these words relate to the third most influential theme identified earlier—CAPITAL.

Interestingly, none of the most central or least constrained nodes are strongly associated with the theme of GENDER. That is to say, none of their definitions are explicitly or implicitly gendered. Nor are any of the words that descend from them. In fact, we have to go to the 14th least constrained and 12 most central node to find the IE root **man-1** which means “man” (ibid, p. 52). Descending from that root are the words *businessman*, *madman*, *doorman*, *salesman*, and *TFM* (*Task Force Man*). Of these, only *doorman* and *businessman* appear in the reduced network formed by the top nodes. And there is also the word *businesswoman* which is associated with the root **bysig-**, as noted above. These three are hardly sufficient to say that the theme of GENDER—the most influential one identified above—is strongly emphasized in the text network. Notably, this conclusion has more support than there would appear at first glance. Although it is not easy to ascertain this from a visual examination of Fig. 1, fully 25 of the 52 journal articles—just short of half—made no mention whatsoever of gender related issues. Among those 25, the themes of IDENTITY and CAPITAL are the influential, followed very closely by ANARCHISM.

IV. CONCLUSION

The objective of the preceding study was to determine whether network text analysis could be used from the top-down, i.e. to confirm or disconfirm independently-obtained information concerning the key themes in a text. That

objective has been squarely met. We used 52 peer-reviewed journal articles about *Fight Club* to establish very clear, prior expectations about the themes that should be present in that text. The top three themes that we identified were GENDER, IDENTITY, and CAPITAL. Our network text analysis applied a novel approach—Hunter’s (2014a) morpho-etymological method. The contribution of the present study stems from the fact that this method—like many similar ones—has previously only been applied using a bottom-up approach, i.e. to identify and extract themes from in a text rather than to verify them. The results of the analysis conducted herein found the expected relationship between themes and influential nodes. In particular, we found that the most influential node—as measured by degree centrality and constraint—was **s(w)e-** which essentially means “self” and which is associated with the reflexive pronouns, e.g. *myself*, as well as several hyphenated compounds like *self-improvement* and *self-destruction*. These multi-morphemic compounds (MMCs) clearly spoke to the second most important theme that we identified—IDENTITY. We also found that two other highly influential nodes—**werg-** (to do) and **bysig** (busy)—were associated with a number of MMCs that were consonant with the third most prominent theme—CAPITAL. Notably, we found that none of the most influential nodes and related MMCs emphasized the most prominent theme—GENDER. But that is not as disconfirming of the method as it appears. Even though GENDER was the dominant theme, it was not identified in all of the studies—just a little over half (27 of 52). The remaining 25 that did not identify GENDER had IDENTITY and CAPITAL tied for the most prominent theme while ANARCHISM was the most influential. This indicates something very important. It shows that the method has revealed a major fault line in the academic literature, one that sees the story through the lenses of gender roles, masculinity, paternalism, virility and feminization, and another which emphasizes anarchism, nihilism, post-modernism, and a dystopian ethos. In short, one sees a crisis of masculinity while another sees men in crisis. But cultural criticism is inherently subjective, and so network text analysis can’t determine whether either of these perspectives is the correct one. What it can do—although we had not *planned* to do so—is show that differences exist even in the face of substantial agreement. What it allows is for an analyst to ascertain—in a quantitative and objective sense—what are the underlying dimensions of the field of study.

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APPENDIX. JOURNALS OF THE CORPUS

1. Aparicio, J. (2013). Your Heart Is My Piñata: Chuck Palahniuk’s Unconventional Love Stories. *ANQ: A Quarterly Journal of Short Articles, Notes and Reviews*, 26 (3), 210-5.
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