

# Analyzing the semantic content and persuasive composition of extremist media: A case study of texts produced during the Gaza conflict

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Published online: 5 October 2010  
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**Abstract** While terrorism informatics research has examined the technical composition of extremist media, there is less work examining the content and intent behind such media. We propose that the arguments and issues presented in extremist media provide insights into authors’ intent, which in turn may provide an evidence-base for detecting and assessing risk. We explore this possibility by applying two quantitative text-analysis methods to 50 online texts that incite violence as a result of the 2008/2009 Israeli military action in Gaza and the West Bank territories. The first method—a content coding system that identifies the occurrence of persuasive devices—revealed a predominance of moral proof arguments within the texts, and evidence for distinguishable ‘profiles’ of persuasion use across different authors and different group affiliations. The second method—a corpus-linguistic technique that identi-

fies the core concepts and narratives that authors use—confirmed the use of moral proof to create an in-group/out-group divide, while also demonstrating a movement from general expressions of discontent to more direct audience-orientated expressions of violence as conflict heightened. We conclude that multi-method analyses are a valuable approach to building both an evidence-based understanding of terrorist media use and a valid set of applications within terrorist informatics.

**Keywords** Extremist language · Content analysis · Influence tactics · Semantic tagging · Key concept analysis

## 1 Introduction

Online media that promote Islamic extremism are widely regarded in the academic literature as being influential in drawing people into terrorism (Awan 2007; Chen et al. 2004; Ulph 2005). While it is impossible to measure the extent of this influence, the growing prevalence and accessibility of extremist media (Atran 2005; MacEoin 2007) suggests it plays an important role in what the UK government has called a “battle of ideas” (HM Government 2006). As West (2008) argues, a key to reducing extremism is to “undermine the ideology of violent extremism” and “expose the weaknesses of al Qaeda’s ‘single narrative’.” To achieve such a goal, it is important for us to better understand the stories and issues behind the narratives (i.e., their semantic content) and the persuasive devices through which they are presented (i.e., their persuasive composition).

A number of researchers have examined how those seeking to promote Islamic extremism use online media. Some have undertaken qualitative analyses of the features inherent in extremist web sites and the tasks that such sites

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support (Tsfati and Weimann 2002). Others, notably in the computer sciences, have developed quantitative methodologies for examining the types of media available on extremist websites and the types of information that such media provides (Gerstenfeld et al. 2003; Zhou et al. 2005). Collectively this qualitative and quantitative research finds a diverse but sophisticated set of materials that often contains vivid imagery, efforts to enhance legitimacy, and many links to like-minded sites. For example, in one of the most comprehensive analyses to date, Qin et al. (2007) found that extremist groups use more sophisticated multimedia technology than government websites, particularly when it comes to technologies that allow interaction and feedback.

While existing research has improved our understanding of the variety and sophistication of extremist media, it provides fewer insights into the substance of its written and visual content. As a consequence, we have less empirical understanding of the issues, stories and narratives that predominate texts, and thus less understanding of what writers see as key to encouraging terrorism. Similarly, there are few analyses of how authors construct arguments within their texts, and thus less understanding of whether or not the use of certain types of argument can differentiate authors, or even serve as a measure of the risk posed by a piece of media. The research arguably closest to addressing these questions examine isolated assertions, such as predictions of apocalyptic times (Blazak 2001) or discussion of reward in the afterlife (Loza 2007). But these examples, while constructive, capture only the surface of the purpose and intent that structures extremist media. What existing analyses do not capture are the underlying structures within the data that are coded in textual patterns and associations of words and groups of words. These reflect more subtle patterns within the data, which must be ‘mined’ as they are not always accessible through qualitative analysis techniques.

One example of what may be learned from examining content comes from Hoskins and O’Loughlin (2009). Using a dataset of popular Jihadist websites and forums, as well as mainstream news stories, Hoskins and O’Loughlin examined how messages within this literature are used to legitimize the culture and ideology of Jihadism. Thus, while their research focuses specifically on the issue of legitimization, it begins to tease out some of the common arguments and concepts that authors use to promote their cause. A second indication of what this approach can offer is given by two studies (Smith 2004; Smith et al. 2008) that scored the use of value references (e.g., goals or standards aspired to) and motive imagery (e.g., the focus of underlying concerns) in terrorist literature. These studies show that terrorist literature contains more dominance, morality, and religion-based value references than the non-

terrorist literature, and that the references groups attribute to themselves differentiates whether or not the group engages in violence.

Collectively these studies illustrate that a theory-driven analysis of the content of extremist media may provide the first step in developing a larger content-driven application for examining intent. In this paper we explore this possibility by undertaking two complementary analyses on language use in a corpus of extremist media promoting violence in response to Israeli military action in Gaza. In the next section we describe our approach to examining the content and composition of media and situate this in the wider context of terrorism informatics research (Section 2). We then describe the dataset assembled for this study (Section 3), outline our methodology for assessing authors’ language use (Section 4), and describe the results of applying these methods to the Gaza data (Section 5). We end with some conclusions and a discussion of future directions (Section 6).

## 2 The information in media content

In this paper we explore the value of examining the language of extremist media using what we describe as a Content and Composition Analysis (CCA). CCA brings together two methods. The first method extends Smith’s (2004) analysis of imagery and value references by measuring the types of argument or persuasive devices that are employed in extremist media. We conceptualize persuasive messages as “message behavior(s) directed toward a recipient (e.g., a vulnerable young Muslim) that have the deliberate intention of altering the recipient’s attitudes and/or behaviors toward an issue” (Gass and Seiter 1999). By examining the types of persuasion that occur within the Gaza corpus, CCA seeks to measure the range of social and interpersonal ‘levers’ that authors of extremist media use. This should provide the basis of an empirical understanding of how authors perceive it best to construct their messages in order to persuade the reader. This form of analysis has proven valuable, for instance, in investigating the cross-cultural effectiveness of persuasion tactics in other law enforcement contexts (Beune et al. 2010; Giebels and Taylor 2009; Taylor et al. 2008).

The second method within CCA uses a contemporary corpus-linguistic technique—known as key concept analysis (Rayson 2008)—to provide a novel analysis of the common narratives and themes that appear in extremist media. By ‘key’ we refer to those words and concepts (groups of semantically related words) that occur significantly more often in one corpus relative to another corpus. This technique has been successfully used, for example, in the stylistic analysis of literature (Ho 2007; Wilson and Leech 1993), but

it has yet to be used for forensic purposes. We propose that these linguistic concepts or ‘themes’ in turn give us an insight into the belief system of the author. Through further analysis of examples, it should be possible to show how the ideas and beliefs that form extremist media are justified to, and enforced upon, audience members.

As will be apparent, CCA combines a manual and automated method of analyzing language use. We suggest that this approach affords at least two advantages to an approach that uses a single methodology. First, given the absence of current evidence within this area, combining the two approaches provides an efficient way of evidencing what might be gleaned from language use. This is particularly important here because we are concerned with aspects of the authors’ psychology (i.e., their intent; Taylor 2002), which may require a deeper, interpretative analysis of the text to derive a valid point of comparison. Second, using two approaches allows for comparative work. In this case the comparisons speak directly to the opportunities and limits afforded by using automated methods as tools for uncovering the intentions behind a piece of extremist media.

Finally, our study considers a set of data restricted in time and focus. Existing research on the content of online extremist media has tended to examine large collections derived from diverse sources and time periods. While this data is useful for deriving overall trends, it runs the danger of creating an analysis of heterogeneous messages that serve very different purposes within the new media ecology.<sup>1</sup> Consequently, to complement existing research, we focus our analysis on texts that were written during a defined period of time before and after a particular world event. Specifically, we examine texts that appear to provoke violence as a result of the recent conflict in Gaza, which took place over a period of three weeks, from late December 2008 until the agreement of a ceasefire on the 18 January 2009 (Economist 2009). This is one of a series of conflicts over territory that have occurred between Israel and Palestine since the United Nations partition plan of 1947, and Israel’s declaration of independence in 1948 (Taub 2009). The recent conflict followed an 18-month siege imposed on Gaza by Israel, after the Islamic resistance group Hamas were elected to power in Gaza in 2006; an election result which is also believed to have fuelled the re-ignition of violence in the region in 2009 (Economist 2009). Further, there was much media speculation in the UK that news of the conflict would radicalize Muslims, leading to violence; such reports presume an

audience for extremist media in the UK (e.g., BBC News 2009a, b).

### 3 The Gaza dataset

The data used in this paper were 50 texts drawn from a larger corpus of 264 pieces of offline and online media (containing approximately 500,000 words). This data originates both from the websites of specific extremist groups (such as Hamas’ Al-Qassam Brigades) and more general websites advocating extremism (such as Al-Fallujah forums). The texts were selected on the following criteria: i) the Gaza conflict was the main subject. Texts were excluded if Gaza was only mentioned in passing; ii) texts advocated the use of violence. Texts were not included if the author only expressed anger at the situation; iii) texts were no shorter than 185 words. This was to ensure the amount of data was adequate for quantitative analyses.

Of the 50 texts, half were written before the recent Israeli military activity in Gaza, specifically between 13 December 2000 and 12 November 2008 (amounting to 24,697 words). Our decision to incorporate texts from across this period was to provide a uniform baseline that would not be unduly influenced by the occurrence of another event, the nature and impact of which we could not determine. The remaining 25 texts were written after the initial military intervention on 28 December 2008, during the period 28 December 2008 and 29 January 2009 (amounting to 27,672 words). These ‘pre-’ and ‘post-’ subgroups will allow comparisons of the impact that Israel’s military action had on the content of the extremist media, thus allowing us to speak to the extent to which the narratives and persuasive strategies used by authors of extremist texts are driven by individual events.

### 4 Proposed methodology

We propose a Content and Composition Analysis (CCA) that explores the types of evidence that may be gained from analyzing authors’ language use with two forms of quantitative text analysis: a content analysis of the persuasive messages that authors use to compose their narratives; and a corpus-linguistics analysis of language use to identify the salient semantic concepts expressed recurrently within a particular corpus. We describe these techniques in the following sections.

#### 4.1 Analyzing persuasive design

To measure the use of persuasion in the texts, we adopted a content analysis method of coding persuasive content.

<sup>1</sup> We develop this term from media studies’ accounts (Cottle 2006; Fuller 2007; Postman 2000) of the global mediated environment within which geographically dispersed individuals can be connected, for instance producers of extremist media and their potential audiences.

Content analysis involves examining texts for the occurrence of a defined set of coding categories, which denote specific characteristics of a message. Coding text for occurrences of an eclectic mix of ‘features’ can be problematic when seeking to capture intention because it either fails to exhaust the possible variations found in the texts (and so is not generalizable) or it becomes too coarse to provide the measurement necessary to distinguish meaningful similarities and differences (see Krippendorff 1980; Smith et al. 2008). Consequently, we build our analysis around existing categorization schemes (particularly the “Table of Ten”; Giebels and Noelanders 2004; Giebels and Taylor 2009) and three conceptual distinctions that are fundamental to social scientific understanding of communication behavior and influence. Briefly, our categories incorporate distinctions relating to: i) the frame of the message in terms of whether it emphasizes instrumental (argument or substantive issues), relational (e.g., trust or power), or identity issues (e.g., personal identity or face); ii) the directness of a message in terms of whether it is a ‘hard tactic’ that forces an issue (e.g., sanctions) or a ‘soft tactic’ whose implication is subtle (e.g., reasoning); and iii) the locus of referent in terms of being an egoistic, moral, religious, social focus. For more details on these distinctions see Bruins (1999); Malhotra and Bazerman (2008); Taylor and Donald (2004, 2007) and White (1951). This research suggests that these distinctions will provide an exhaustive measure of authors’ attempts at influence.

The initial coding scheme was refined by reviewing the reliability of two coders’ application of the scheme to a set of texts. This refinement occurred across several iterations until the coding scheme was such that it achieved consensus agreement from the two coders across the categories. Table 1 shows the final coding scheme together with the theoretical factors that they attempt to measure. This scheme was then used (by SP) to code the 50 Gaza texts. Specifically, this coding first involved dividing the texts into a series of thought units (a linguistic unit that is operationally defined as an independent clause with a subject and an object, e.g., “I agree with you”) because this unit isolates single communicative acts, and so avoids the danger of overlooking smaller, but potentially significant components of authors’ behavior. These ‘unitized’ texts were then coded as one of the 9 persuasive devices, or as an ‘Other’ code to reflect no persuasive attempt.

To assess the extent to which the coding of the texts is reliable, ten of the texts were independently coded (by PT).<sup>2</sup> This coding was then compared to the original coding using

standard measures of reliability analysis. The coding was reliable, with 82% agreement (Cohen’s Kappa=.78; Cohen 1960).<sup>3</sup> Often coding of text can be subject to sequence effects, where coders apply the same category more readily when that category has been recently used. This sequencing bias can significantly affect a coding and any subsequent inferences, so it is important to assess for this bias in the developed scheme. We found the coding of the 10 texts was not biased in this way (Bakeman alignment Kappas,  $M=.79$ , Range .73–.81; Bakeman et al. 1997).

#### 4.2 Analyzing key concepts

We use the UCREL Semantic Analysis System (USAS) to automate the process of identifying patterns in the language of extremist literature. Integral to this analysis is the online corpus software program *WMatrix*,<sup>4</sup> which contains both an integrated part-of-speech tagger and a semantic tagger that classifies words according to the semantic field categories (i.e., concepts) that they suggest. For example, ‘Gaza’ is assigned to the category of ‘Geographical names’. Once uploaded to the software, corpus texts are fully searchable with the *WMatrix* online user interface. Amongst other things, this interface allows the user to derive a list of key concepts by comparing one set of texts against another. In this case, the pre- and post- initial military action texts were compared for key concepts. The term ‘key concept’ refers to those groups of semantically related words that occur significantly more in one corpus relative to a control corpus. In viewing the concepts that arise from this comparison, and with further analysis of examples, it becomes possible to identify and compare the salient linguistic themes used by authors to enforce their ideas, beliefs and ideology before and after a particular event (in this case the initial military action). One can then postulate as to the reasons why authors’ language use changed.

To help identify differences between two comparison texts (e.g., pre- and post- initial military action), *WMatrix* computes a log-likelihood statistic for the observed frequency of occurrence of an item in each text corpus relative to its expected (average normalised) frequency of occurrence across the corpora. In the current analysis, items with a log-likelihood value of +6.63 or above (i.e., at the level of  $p<.01$ ) were deemed to be ‘key’ items. Thus, using this criterion, these key items occurred more frequently in the corpus to a degree that has a <1% likelihood of being

<sup>3</sup> The reliability for the ‘pre-’ data coding was 80% ( $\kappa=.77$ ); the reliability of the ‘post-’ data coding was 86% ( $\kappa=.84$ ).

<sup>4</sup> Visit: <http://ucrel.lancs.ac.uk/wmatrix/> and <http://ucrel.lancs.ac.uk/usas/> for details of this software, including online access. The USAS pages also provide details of the full tag set, and details on how it is possible to make comparisons of composition between texts.

<sup>2</sup> PT also divided the ten texts into thought units, which we compared to the original coding using standard measures. The two coders were easily able to identify thought units within the texts reliably (Guetzkow score=.02).

**Table 1** Definitions and examples of nine persuasion behaviors as a function of theoretical categorization

Motivational Frame	Power Use	Imagery	Tactic	Definition	Example
Argument-related (Instrumental)	Hard	N/A	Direct Pressure	Pressure tactics that include commands, demands, forceful assertiveness, intimidation, and threats	“Raise your arms and fight to escape from this humiliation and shame!”
	Mid	N/A	Exchanging	Explicit or implicit promise that you will receive rewards or tangible benefits if you comply with a request or support a proposal. Can be associated with ‘scarcity’	“When the enemy targets our women and children we should target theirs”
	Soft	N/A	Persuasion	Argument that attempts to explain reasons, or presents information in support of a position. Includes (but not limited to) the use of logical arguments, factual evidence, and statements of ‘expertise’ (i.e., Because that’s the nature of things)	“Another obstacle is the need for advanced means of resistance to counter the occupation and defend the people and the land”
Audience-related (Relational)	Hard	Religion	Upward Appeals	Use of authority-based comparisons, which seeks to persuade you that a higher authority approves the action, or which link an issue idea or cause to another positive concept associated with an authority.	“Shaykh Ibn al Uthaymeen says: If the enemy kill our women and children it appears to me that we are allowed to kill their women and children”
	Mid	Society	Social Proof	Use of social comparisons, typically to groups, communities or societies rather than people (see above) in support of a viewpoint or argument. Includes comparison to cultural values, whereby the speaker indicates the value of art, history or traditions of one’s own group	“And our people in Palestine totally reject such a description along with our Arab and Muslim peoples”
	Soft	Morality	Moral Proof	Use of moral comparisons, either justifying the morality of a particular position or action, or highlighting immorality in the actions or positions of an out-group, including suggestions of double standards.	“If a herd of dogs and pigs had suffered a tenth of what the Palestinians in Gaza have suffered, all institutions of the non-believer West would have risen in protest”
Speaker-related (Identity)	Hard/Mid	Moral-Social (group unity)	Activation of commitments	Messages that remind listeners of their commitment to a position, group or action, or suggestion of a debt owed because of past events or actions of others. This can include arguments around building a coalition or single voice.	“It is incumbent upon us to use all our resources to confront the attack on our ummah”
	Hard/Mid	Egoistic	Inspirational appeals	Use of an emotional request or proposal that arouses enthusiasm by appealing to positive or negative self-feeling (e.g., you will feel better about yourself if you comply), altruism (e.g., I need your compliance very badly), or esteem (e.g., people will think better of you if you comply).	“And we will be the coming power insha’ Allah”
	Soft	Moral-social	Liking	Use of friendly or helpful messages by a speaker to put the listener in good frame of mind (e.g., Ingratiation). This might include recognizing the struggle of a particular group, or indicating allegiance with a group to improve credibility.	“For those who asked that I reconsider my view on this, I promise I will review it again”

observed by chance when the null hypothesis of no differences between the pre- and post- military action corpora is assumed.

The results of these comparisons between the corpora can be shown visually as ‘word clouds’ (see Figs. 3 and 4 below). A word cloud is constructed by *WMatrix* using the log-likelihood computations described above (Rayson and Mariani 2009). The cloud shows the most significant 100 key items for the corpus (i.e., the 100 items associated with the highest log-likelihood values) in alphabetical order. The larger an item appears in the cloud, the greater (i.e., more significant) its occurrence in the corpus being examined relative to the overall corpora. Thus, in the current analysis, a larger item reflects a greater difference in occurrence across the pre- and post- initial military action texts.

One advantage of *WMatrix* is it allows the user to explore the ‘qualitative’ substance behind the ‘quantitative’ differences presented in the word cloud. This is achieved by clicking on items within the clouds in the *WMatrix* online interface, which takes the user to a list of examples (known as concordance lines in corpus linguistics). Figure 1 shows an example of the list of concordance lines produced by *WMatrix* when the item ‘Unselfish’ was selected from the pre- initial military action corpus. By viewing these examples (using the ‘more’ option to the right for expanded context), a user can establish how a theme is being used by the authors of the texts under investigation. We explore this and other examples in Section 5.

## 5 Results

The 50 texts contained 52,369 words ( $M=1047.38$ ;  $SD=843.0$ ). The lengths of texts did not differ between those written before ( $M=987.88$ ;  $SD=827.5$ ) and after ( $M=1106.88$ ;  $SD=888.1$ ) the initial military action,  $t(48)=-.48$ , *ns*.

### 5.1 Use of persuasion in Gaza texts

The frequency of occurrence of the 9 persuasion behaviors across the texts is shown in Table 2. This Table shows the frequency of occurrence as a function of whether or not the texts were written before or after the initial military action. The frequencies in bold text indicate significant changes in use between the ‘pre-’ and ‘post-’ texts. For example, the use of Upward Appeals is found to be significantly more in texts written after Israel’s initial military action than before such action.

As can be seen from Table 2, over half the persuasive messages within the extremist literature are audience-related strategies of Upward Appeal, Social Proof, or Moral Proof. In particular, the strategy Moral Proof accounts for almost one quarter of messages within the texts. This typically appears as efforts to villainize the out-group (e.g., Israel, the United Nations Security Council, the West) as immoral and unjust in its treatment of the people of Gaza. Texts often contain paragraphs dedicated to arguing for the immorality of the out-group.

Authors of the extremist literature make less use of argument and speaker related strategies. Of these strategies, only two see anything but marginal use, namely, Persuasion and Activation of Commitment. Persuasion messages appear in the Gaza dataset as attempts to provide a rationale (legitimate or otherwise) for the position that is being taken. However, as might be expected, the degree to which this strategy is used contrasts sharply to its use within Western political and persuasive texts, where this strategy is often the most frequent (Giebels and Taylor 2009). Activation of Commitments messages appear in the Gaza dataset as efforts to rally the audience behind a single Arab/Muslim cause. Use of this form of message has almost doubled during the military action, with authors spending more time highlighting an obligation to help those in Gaza. The Gaza conflict is thus used by the authors as a way of discussing the importance of a “united people.”

<p>vers that their hearts in all intiqad.com/english/ Executed e of the mothers of the three l -- nine women have executed gades , which sent other five e second rank . They sent two at , the executer of the last he third rank . They sent one e only married woman amid the from the statistics that most they had intention to execute p are demanding to be sent on ther weapon . Therefore , the which were known through the by a motorbike . Later , the mplicated with respect to the offer the Palestinian female</p>	<p>humility Self-Sacrifice self-sacrificing self-sacrifice self-sacrificing self-sacrificing self-sacrifice self-sacrificing self-sacrificing self-sacrifice self-sacrifice self-sacrificing self-sacrifice self-sacrificing self-sacrifice self-sacrificing self-sacrificing self-sacrifice self-sacrificing self-sacrificing</p>	<p>should engage in the remembran Operations , Showed Her Childr martyrs who executed the opera operations since the beginning martyrs besides Wafaa . The la martyrs . They were : Hiba Dra operation of al-Quds brigades martyr . She was Reem al-Riyas martyrs . In her operation , s martyrs come from the West Ban operations -- whereas some wer operations against the Zionist operations were the beginning operation of Kfar Daroum(r) in operations followed in success darers , the Palestinian resis martyrs in nine operations , t</p>	<p>1 <a href="#">More</a>   <a href="#">Full</a> 2 <a href="#">More</a>   <a href="#">Full</a> 3 <a href="#">More</a>   <a href="#">Full</a> 4 <a href="#">More</a>   <a href="#">Full</a> 5 <a href="#">More</a>   <a href="#">Full</a> 6 <a href="#">More</a>   <a href="#">Full</a> 7 <a href="#">More</a>   <a href="#">Full</a> 8 <a href="#">More</a>   <a href="#">Full</a> 9 <a href="#">More</a>   <a href="#">Full</a> 10 <a href="#">More</a>   <a href="#">Full</a> 11 <a href="#">More</a>   <a href="#">Full</a> 12 <a href="#">More</a>   <a href="#">Full</a> 13 <a href="#">More</a>   <a href="#">Full</a> 14 <a href="#">More</a>   <a href="#">Full</a> 15 <a href="#">More</a>   <a href="#">Full</a> 16 <a href="#">More</a>   <a href="#">Full</a> 17 <a href="#">More</a>   <a href="#">Full</a></p>
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**Fig. 1** Concordance examples of the key concept ‘Unselfish’ in the pre- initial military action texts

**Table 2** Frequency of occurrence of 9 influence behaviors as a function of the timing of statements

Motivational focus	Influence behavior	Timing of statement		Total
		Pre	Post	
Argument Related	Direct Pressure	<b>37 (3%)</b>	<b>76 (5%)</b>	670 (22%)
	Exchange	37 (3%)	33 (2%)	
	Persuasion	216 (15%)	271 (17%)	
Audience Related	Upward Appeal	<b>173 (12%)</b>	<b>264 (17%)</b>	1579 (53%)
	Social Proof	<b>244 (17%)</b>	<b>172 (11%)</b>	
	Moral Proof	360 (25%)	366 (23%)	
Speaker Related	Activation of Commitments	<b>98 (7%)</b>	<b>168 (11%)</b>	480 (16%)
	Inspirational Appeal	85 (6%)	81 (5%)	
	Liking	33 (2%)	34 (2%)	
Other		153 (11%)	115 (7%)	268 (9%)
Total		1,436	1,580	3,016

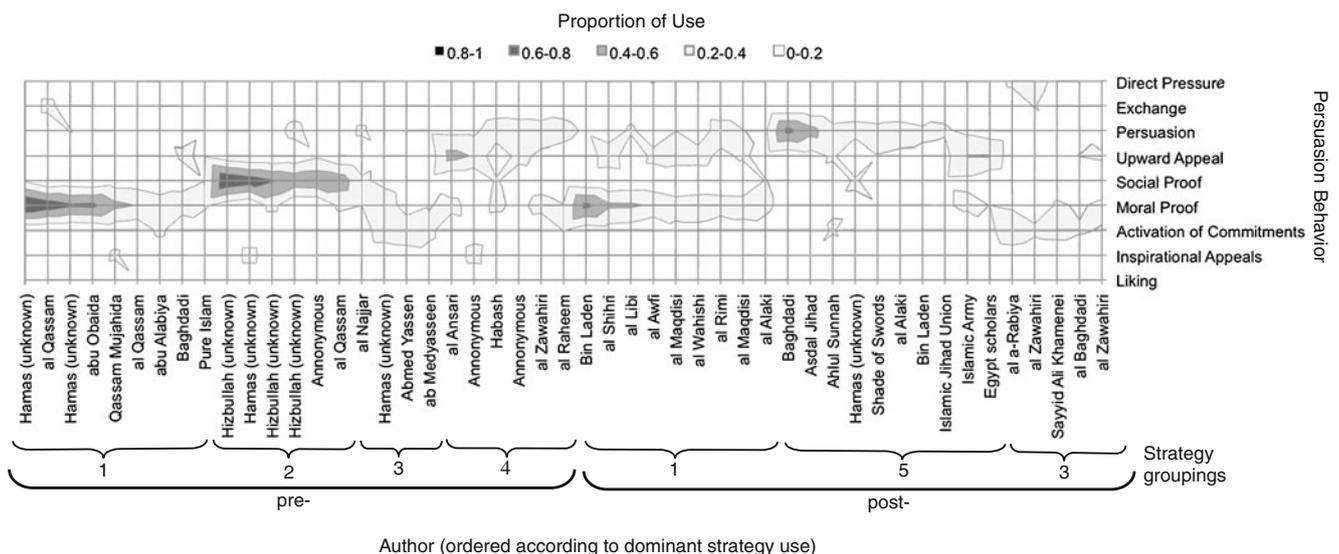
Frequencies in bold indicate chi-square comparison  $p < .01$

The dominance of Moral Proof as a strategy for promoting violence is interesting, and prompted us to investigate in more detail the extent to which the texts really are dominated by this strategy. To do this we represent strategy use graphically on a contour chart. In these charts, the proportion with which each text uses each of the nine types of persuasive message is represented by a row of colored terrain, where ‘peaks’ of bolder shades represent higher use of a particular strategy in that text. By examining the changing color of the terrain, it quickly becomes possible to identify trends in the use of persuasion strategies across the literature.

Figure 2 examines the extent to which authors of texts draw on more than one strategy. Each of the 50 individual Gaza texts are represented by a column, and the texts are ordered from left to right according to whether or not they

were written pre- or post- the initial military engagement. Within the pre- and post- groupings, they are further ordered from left to right according to the author’s dominant strategy use (which is outlined by the groupings marked underneath the author names) and the variability in strategy use, as measured by the coefficient of variation (Howell 1997). High variability (shown towards the left of Fig. 2) suggests that authors are using some strategies but not others; the extreme of which is use of only one strategy. Low variability suggests that authors are using each of the strategies equally.

The groupings in Fig. 2 allow us to identify the overall trends in persuasion pre- and post- the initial military action. As suggested previously, the majority of authors, including al Qassam, Bin Laden, and the majority of Hamas, build their arguments around morality and Moral



**Fig. 2** Use of 9 types of persuasion as a proportion of total strategy use. Texts are ordered pre- then post- initial military action then according to groupings of dominant tactic use

Proofs (Groups 1 on Fig. 2). This strategy appears in 18 (36%) of the texts, constituting over 60% of six of the texts, and at least 25% of the remaining twelve. It is the principal mechanism through which authors justify violence (i.e., violence to rectify or redress the immorality being afflicted on our people). Any actions by Western governments that can be conceived as ill treatment or double standards add to this argument.

A second subgroup in the pre-conflict group, largely influenced by Hezbollah writers, involve texts that are dominated by Social Proof arguments (Group 2). These texts are similar to Group 1 in their focus on a single persuasive device, but the focus of that device is directed towards social rather than moral comparisons. Two smaller subgroups in the pre-conflict group exist, and they build their texts around arguments of Activation of Commitments (Group 3) and Upward Appeal (Group 4). These kinds of messages are rare in the post-conflict group, with only a small group of authors drawing on Activation of Commitments. Instead, there are a significant number of texts using Persuasion (Group 5), which is a strategy rarely used prior to the initial military action.

In a small pilot data set such as this, it is not appropriate to argue that such a shift in strategy use is the result of the intervening event (i.e., Israeli military action). However, it is clear that some authors use a different approach to inciting violence, which raises questions about the relationships of their approach to their broader personality, experiences and motivations. It is also clear that some authors have changed their style since the recent Israeli military action (e.g., Baghdadi, at least as far as we can see from the exemplar statements in this dataset). These messages are ‘banging a different drum’ compared to the Moral Proof majority, and this may make them more or less effective in inciting violence. Identifying groups of texts

that contain qualitatively unique constellations of strategies, as achieved in Fig. 1, may allow for the assessment of relative threat, and may inform discussions about the purpose of different texts.

Recall that the groupings of authors in Fig. 2 are further ordered by the variation in an author’s relative use of the different strategies. Those authors falling towards the right-hand side of Fig. 2 thus used a wide range of strategies. A small number of authors use a wide variety of persuasion strategies in their statements compared to the majority. Principal among these is al Zawahiri. He intermixes demands and propositions (Direct Pressure and Exchange) with Moral Proof and Upward Appeals, using each message type with approximately equal frequency. Conversely, he almost never attempts to justify his propositions through persuasion, and does not use Social Proofs as a basis for encouraging violence. This heterogeneous use of persuasion is significantly different from the average profile of strategy use.

The possibility of identifying differences in authors’ use of persuasion highlights the possibility of identifying authors’ affiliations through the same means. Figure 3 shows the same Gaza data but grouped according to authors’ reported affiliations. Messages from al-Qa’ida and Hamas both use Moral Proof as their principle method of persuasion, but al-Qa’ida messages are distinguished from Hamas by their greater use of Upward Appeals. It is of note that most of the ‘Individual Authors,’ for whom affiliation was unknown, also fit this profile of using Moral Proof and Upward Appeal.

### 5.2 Corpus linguistic analysis

The results of the corpus linguistic analysis both support and, to a certain extent, expand on the findings of the persuasive composition analysis. Figures 4 and 5 show key

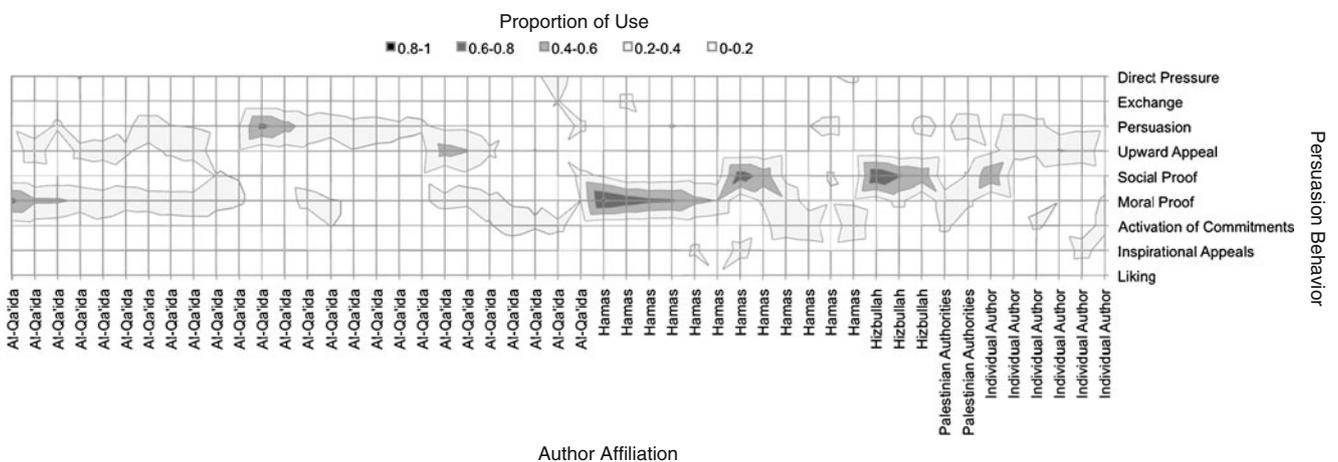
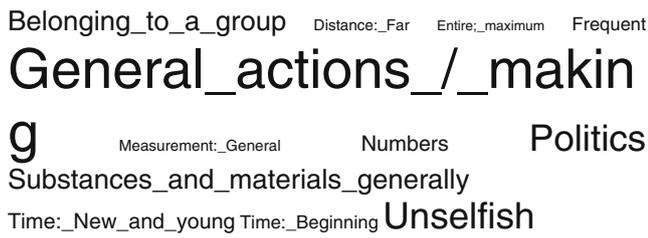


Fig. 3 Use of 9 types of persuasion as a proportion of total strategy use. Texts are ordered according to authors’ affiliations



**Fig. 4** Most significant key concepts from the pre- initial military action texts

concept clouds for the texts written pre- and post- military action in Gaza. Specifically, Fig. 4 shows those concepts that appear significantly more often in pre- military action texts, while Fig. 5 shows those concepts that appear significantly more often in post- military action texts. Comparing across these two Figures allows an examination of how the concepts utilized by authors changed as a result of the military action. The Figures show the ideas and beliefs that are prevalent in the authors’ writings (with larger text signifying greater prevalence) and so are arguably central to their current perception of the conflict. For example, in Fig. 4, the most popular concept is ‘General actions/making’, which refers to what actions have been taken by the main parties involved in the Gaza conflict (i.e., the Israelis and Palestinians) over the years. In Fig. 5, this concept no longer appears, and has been replaced by the predominant concept ‘Weak’, which refers to the weakness of the Palestinian people. This suggests a shift in perceptions from viewing the Palestinians as people who act, to people who are acted upon. (Note, as described above, the ordering of words in the clouds is alphabetical).

Through WMatrix’s online user interface it is possible to investigate the usage of key concepts and themes in more detail, which in turn enables a researcher to postulate about the reasons for their presence. For example, the appearance of the key concept ‘Unselfish’ in Fig. 4, which comes about due to terms such as ‘self-sacrifice’, ‘sacrifice’ and ‘self-sacrificing’, almost exclusively refers to martyrs. For example:

*“The Palestinian woman was unsatisfied; therefore, she was more **generous** to **sacrifice** herself on the battlefields of men, through jihad and martyrdom”*

The prominence of this concept suggests that authors are working to create a positive semantic prosody around martyrs. By semantic prosody we mean the ‘covert message’ that a word or phrase can carry (Hunston 2002). This links back to the persuasive strategies of Moral Proof and Social Proof discussed above, in that, by emphasizing the positive qualities of martyrs, their example could be seen as one to look up to, and therefore emulate. Likewise, an examination of examples in the category of ‘Belonging

to a group’ suggests that, before the recent conflict, authors were talking about the members of particular extremist groups and, as with martyrs, were holding these members up as examples of best practice to others. For example:

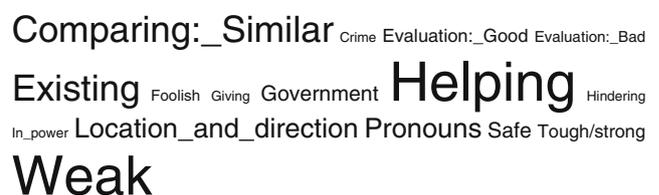
*“Here we send our thunderstruck thanks to the champions of Nahr el Barid, Muhajireen (migrants) and Ansar (hosts) who drew the best Islamic epic in the Levant with their blood, and proved that a small **group** of monotheists can make an incurable hurt in the body of disbelief.”*

This is consistent with our finding that both Moral Proof (which accounts for 25% of the pre-conflict data set) and ‘Social Proof’ (which accounts for 17% and shows a noticeable decrease following the military action) are prominent devices of persuasion.

A second noticeable aspect of Fig. 4 is the frequent references to ongoing concerns. For example, the category ‘Politics’ refers to the Zionist occupation, ‘Frequent’ refers to ‘recurrent’ events in the region, and ‘Substances and materials generally’ refers to the supply of ‘materials’ used in the manufacture of bombs. Aside from ‘Frequent’, there are a number of concepts that refer to some aspect of measurement, mostly to do with warfare. For example, ‘Numbers’ and ‘Measurement: General’ refer to ‘statistics’, (i.e., the number of Jihad operations and the number of people those operations have killed or wounded), while ‘Distance: Far’ refers to the range of the missiles used in combat with Israel. There is a sense from such concepts that authors believe the militants have the situation under control. This is done through emphasis on their accomplishments. For example:

*“This issue brought the rates of deaths on both sides closer. For instance, the number of Palestinian martyrs reached **3500** along with **thousands** of injuries and detainees, whereas the number of Zionist deaths reached more than **1018** according to Zionist statistics and **5598** were wounded. This issue has not been achieved by the Arabs since a long time”*

Finally, it is worth noting that there are frequent references made to the history of the Gaza conflict prior



**Fig. 5** Most significant key concepts from the post- initial military action texts

to the 2009 confrontation. The category of ‘General actions/making’ refers to the previous actions on both sides of the conflict, and ‘Time: Beginning’ refers to how and why extremism groups were formed in the region. Both of these suggest that providing a strong rationale as to why Islamic extremism has come to be is a significant component of the content of extremist media.

An analysis of the texts produced after the initial military action (Fig. 5) reveals a set of narratives and concepts that are distinct from those found in the ‘pre-’ texts. Figure 5 shows frequent references to concepts that could be described as seeking to activate the commitments of the audience by making requests for support (i.e., ‘Helping’ and ‘Giving’). This is consistent with the occurrence of Activation of Commitments devices, which were found to almost double in usage following the initial military action. The use of imperatives in such statements lends force to authors’ requests for compliance (Palmer 1986). For example:

*“O Muslims everywhere, fight the crusader-Zionistic campaign and strike its interests everywhere you can reach, **help** and **support** your Mujahed sons and brothers in its confrontation.”*

*“Today is your day, **provide** your brothers in Islam and kinship with all what they need of provisions and equipments, from the loaf of bread to the tank mine.”*

Notably, authors also add a sense of urgency to their requests for a response to the situation in Gaza, which is suggested by the presence of the key concept ‘Existing’. This concept arises due to descriptions of the situation in the present tense (‘is’, ‘are’) and in concrete terms (‘real’, ‘reality’). Unlike the pre-military action data, where authors describe the situation as being under Muslims’ control, there is a noticeable shift towards expressing need for assistance. One might speculate that they perceive the situation as one that is spiraling out of their control and, consequently, they have switched to more overt pressure tactics. This hypothesis is consistent with the occurrence of ‘Pronouns’ as a key concept, as these typically make narratives more audience focused (Jerit 2008). By including the audience in the text, such features function to draw the audience in, and remind audience members that the situation is also relevant to them. The fact that ‘Pronouns’ emerge as key is an interesting finding in itself, as, being function words, one would not expect them to occur significantly more in one setting as opposed to another (with, of course, the exception of academic writing where the passive is more commonly used).

A second trend in the post- data is the prevalence of concepts that serve to create an ‘in-group’ versus ‘out-group’ divide. Consistent with our analysis of persuasive devices, the key concept analysis also finds a focus on the

negative morality of the ‘other’. For example, the category ‘Evaluation: Bad’ is present not only due to a negative evaluation of the situation in Gaza, but also because of a negative evaluation of the West and neighboring Arab countries. For example:

*“The traitor Egyptian regime which had assaulted your dignity, honor and sanctities, is the same regime that is besieging your brothers in Islam and kinship in Gaza and colludes with Jews to killing them”*

*“the USA has sent warships to gaza! Instead of aid this is the only type of help we can expect from the west! the only people who can help our people is our people!!!!”*

Similarly, the category ‘Comparing: Similar’ arises due to authors linking the actions and characteristics of the West to those of Israel; ‘Crime’ refers to the actions of this ‘out-group’ against those in Gaza; ‘Foolish’ is present due to authors’ cynical assessments of the actions of the West and those who disagree with the authors’ ideology; ‘Hindering’ refers to Israel’s prevention of aid and fellow Arab states hindering Jihad efforts; and ‘In Power’ consists of words such as ‘domination’, ‘oppressors’ and ‘oppressive’, used to describe Israel’s attempts to control the region and criticisms of Arab leaders. In contrast, the concepts ‘Tough/strong’ and ‘Evaluation: Good’ refer to the ‘stronger’ ability and positive morality of Allah, who is described as a source of strength and authority. By extensively highlighting the negative morality of the ‘other’ through these concepts, and by highlighting a preferred in-group, authors of extremist media appear to attempt to further segregate their intended audience from ‘out-group’ members in the West and other Arab states that do not hold a similar ideology. In doing so, this allows the authors to justify the use of violence against the out-group (Levine 2002).

Finally, to further encourage compliance in acts of violence following the recent military action, authors make frequent compassionate appeals to their audience, as evidenced by the most significant post- key concept ‘Weak’, which appears due to words such as ‘weak’, ‘defenseless’ and ‘helpless’ (all used to refer to the people of Gaza), as well as the key concept ‘Safe’ which refers to the matter of Gazans fleeing for safety. For example:

*“All Palestinian Mujahids (fighters) and believers in the Islamic world are required to defend in any way they can the **defenseless** women, children and people of Gaza”*

This suggests a shift from a situation that is under control and where accomplishments are being made prior to the recent military intervention, to one in which the Palestinian people, and perhaps the militants themselves, are desperate for help and the aid of their audience.

## 6 Conclusions and future directions

In this paper, we undertook a systematic analysis of the semantic content and persuasive design of online extremist media. In doing so we were able to contrast a reliable human interpretation of message content (as defined through influence tactics) with an automated approach to document analysis that has its roots in corpus linguistics. This mixed-method approach harbors a number of advantages over studies that focus on a single approach. At a theoretical level, the undertaking of two complementary analyses, and the resulting overlap in findings, add weight to the validity of the conclusions. At a methodological level, the approach provided the opportunity to ascertain the extent to which the two techniques speak to the same aspects of the data. Finally, at a practical level, this approach meant we were able to determine in a comprehensive manner the utility that studying content may have to efforts to better understand terrorist use of the Internet. This ‘scene setting’ is the forerunner for more extensive work to develop a ‘content and composition’ application that provides a valuable assessment mechanism for user communities. This work might involve, for example, automating the content analysis through some word based modeling (e.g., N-gram modeling, Stolcke et al. 2000), or refining the scope of *Wmatrix* to capture something of the patterns revealed by the content analysis.

Consistent with research in other areas (Beune et al. 2010; Giebels and Taylor 2009), our theory-grounded content analysis of persuasion provided a reliable and intriguing look at how authors structure their texts to persuade others. Specifically, the analysis found systematic similarities and differences in the use of persuasive strategies across the texts. Perhaps the most striking similarity was the extensive use of audience related persuasion, particularly Moral Proof arguments that discuss moral aspects of the events that are occurring in Gaza. This contrasts markedly with the dominance of rationale persuasion in messages emerging from Western cultures (Taylor et al. 2008); a simple yet important finding that illustrates what might be gleaned from studying author construction of extremist media. The most striking differences relate to variations in strategy among individuals and among those with different group affiliations. For example, our analysis demonstrated that messages originating from supporters of al-Qa’ida take very different persuasive forms, which opens up the possibility that these forms might be targeting different audiences. Evidence for such targeted recruitment has been found in other areas of terrorism research (Jacques and Taylor 2008, 2009).

Our novel application of corpus-linguistics tools to the analysis of extremist media also proved successful. We were able to show, for example, that authors move from

expressing general contempt for Israel and admiration for martyrs, to more explicit, forceful and audience-orientated expressions of violence towards an expanded target (Israel and its allies). Authors attempt to justify their expressions of violence by playing on the conscience of audience members regarding their obligations towards those suffering in Gaza, and by consolidating an in-group/out-group divide. The implication of these findings is that, for audience members who may be persuaded by these messages, Gaza may be seen as a just cause for them to engage in violence against the out-group (i.e. Israel, neighboring Arab countries, and the West), thus presenting a potential threat to the safety and security of ‘out-group’ countries.

Beyond the individual approaches, it is encouraging to find that the automated corpus-linguistic approach identified many of the semantic and intent based trends evident in the manual coding. For example, both found a prevalence of stressing the negative morality of the ‘out-group’, a decrease in the use of Social Proof related arguments and themes, and an increase in strategies and concepts pertaining to an Activation of Commitments. Might it be possible to use one in lieu of the other? There are obvious advantages to using an automated, rather than manually applied coding system. Automated coding provides more or less immediate access to the salient topics of the discourse, while manual coding is time consuming. Perhaps more importantly, automated coding affords better reliability on the grounds that it is applied mechanistically, rather than by the researcher. (The error rate of USAS is estimated at 9% on written text, and it is possible to manually re-assign items to their correct category for more accurate results). However, when it comes to validity, it is difficult to ignore the theoretical richness and bespoke adaptability of a manual coding scheme. Arguably, the semantic systems built into USAS still have a way to go to capture the interpretative power of a knowledgeable coder. Therefore, as evidenced by the findings of the current paper, a perhaps more fruitful method is to combine manual and automated approaches to give alternative perspectives on the issue under investigation.

Our findings suggest this analysis of authors language use has the potential to make an important contribution to our understanding of extremist media use. Examining the information content and composition of extremist media through these methodologies allows a number of interesting (tentative) observations. For example, the evident variety with which authors used persuasive devices demonstrates empirically what practitioners have long observed, namely, that it is a mistake to treat online media as a homogeneous entity. The composure of online media was found to differ depending on who constructed it, and the content itself differed depending on whether it was produced before or after Israel’s initial military action. Similarly, the dominance of Moral Proof arguments within the texts should prompt

further research into both the content of this message type (as achieved initially through our corpus-linguistic analysis) and the most effective response. Such research might proceed theoretically, or it might proceed by examining ‘counter-messages’ as they emerge in the same media space. Either way, a focus on Content and Composition Analyses that seeks to empirically examine authors’ intent and perceptions of a conflict from their language use, may be a valuable way forward for terrorism informatics.

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