

Lone-Actor Terrorists' Emotions and Cognition: An Evaluation Beyond Stereotypes

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Lone-actor terrorists are very often presented as emotionally and/or cognitively impaired—yet is it really the case? The present article provides the first rigorous assessment of the hypotheses according to which a high level of negative emotions, especially anger, and a lack of cognitive flexibility and complexity play a role in lone-actor terrorists' violent actions. Using a sample of lone-actor terrorists' writings, we use the LIWC (a fully automated language use analysis software) to compare terrorists' cognition and emotion with those of other control groups, most notably nonviolent radical activists. Results strongly support the first hypothesis but clearly refute the second one, suggesting that lone-actor terrorists are in fact characterized by a specific combination of high-anger and high-cognitive complexity. These method and results lay the groundwork for a more systematic and nuanced analysis of the psychology of terrorists, which is currently in a deadlock.

KEY WORDS: lone-actor terrorism, psychology, emotions, cognition, political violence, language, LIWC

Lone-actor terrorism—commonly known as “lone wolf” terrorism—is extremely difficult to understand, and the temptation is therefore great to explain this phenomenon as the direct result of individuals' mental health problems. Beyond “hard” cases of schizophrenia like those of Theodore Kaczynski or Anders Breivik—themselves highly controversial—two other “milder” diagnoses are regularly evoked that participate to the categorization of lone-actor terrorists as mentally disturbed: emotional imbalance or impairment and lack of cognitive sophistication or flexibility. The underlying narrative is that these traits—taken either in isolation or together—somehow *cause* their violence, yet empirical evidence is scarce and theoretical foundations precarious. The stakes are high, however, as terrorism is deadlier than ever¹ and intensely discussed, leading to increased pressure to find a psychological profile which could help prevent the phenomenon.

In this context, the present article answers to Rice's call for more research on the emotional aspect of terrorists' activities (Rice, 2009) by critically discussing the literature on lone-actor terrorist's emotions and cognition and by offering a quantitative analysis of the writings of a core sample of lone-actor terrorists with the LIWC (Linguistic Inquiry and Word Count)—a fully automated language use analysis software which identifies psychologically relevant atypical patterns of language use—in order to evaluate their emotions and aspects of cognitive sophistication and flexibility. This

¹ See the Global Terrorism Database at <http://www.start.umd.edu/gtd>.

approach provides an innovative evaluation of these factors, testing for the first time several theories and common-sense assumptions on terrorists in general and lone-actor terrorists in particular.

Results offer a complex view that challenges simplistic causal accounts of lone-actor terrorists' violence. On the one hand, results clearly refute the idea that lone-actor terrorists are characterized by poor cognitive sophistication and flexibility—on the contrary. On the other hand, lone-actor terrorists indeed appear to be characterized by very high levels of negative emotions, chiefly anger. We therefore suggest and theorize that the hallmark of lone-actor terrorists is a particular combination of cognitive sophistication with extremely high anger.

The article proceeds in three steps. First, we critically discuss the already existing psychological explanations of terrorism in general and lone-actor terrorism more particularly in terms of emotion and cognition. Second, and based on this framework, we raise two interconnected hypotheses and expose our method, which is a quantitative, comparative language-use analysis of the prose of 11 lone-actor terrorists and three comparison groups: the LIWC “emotional writing” and “control writing” samples and the comprehensive writings of the three most prominent nonviolent radical political activists. Third, we present and discuss the results in a way that lays the groundwork for a renewed, more sophisticated agenda on the (so far largely miscarried) terrorism profiling project.

“Lone-Actor Terrorists”: Emotionally and Cognitively Impaired?

Recasting the “Psychology of Terrorism” Debate

Terrorism inevitably raises the question of the psychological dynamics underpinning such an extreme behavior. Yet despite innumerable efforts the psychology of terrorism remains “an enigma” (Ross, 1996, p. 129). In their struggle to address the terrorist threat, but also because labeling terrorists as insane is politically convenient (Baele, 2014; Howell, 2007), policymakers and intelligence services have pressed hard to solve this enigma. Encouraging scholars to find “a fixed and unambiguous ‘terrorist profile’” (Crenshaw, 2000, p. 407), they have only witnessed a persistent inability to do so. While it is not our intention here to recall the reasons or history of why academics have largely resisted sanctioning the abnormality thesis,² it is nonetheless important to distinguish between two ideal-typical interpretations of this apparent consensus in order to situate the choice of the present inquiry to focus on lone-actor terrorists' emotions and cognition.

A first interpretation—which we call the “strong claim”—argues that abnormal psychological traits do not play a significant role in terrorism and should therefore not be studied. Proponents of the strong claim stress that evidence is against the psychological/psychiatric thesis and instead insist on the normality of the terrorist population. In 1987 already, McCauley and Segal concluded that “the best documented generalization is negative; terrorists do not show any striking psychopathology” (1987, p. 44). A key contribution in establishing the strong claim has been Sageman's (2004) observation that the terrorist subpopulation is no different than the general population in terms of the distribution of psychological traits. Reflecting on this research agenda and noting that “attempts to profile terrorists have failed resoundingly,” Horgan (2008) later lamented that “in spite of the evidence that, logically, terrorist profiles are unlikely to appear at all . . . the search for the terrorist profile continues” (pp. 80, 83). As Turk (2004) summed up, “traditional notions about violence are misleading insofar as they lead terrorism researchers to focus on psychopathologies” (p. 274). Crenshaw (2000) similarly noted that most experts consider that terrorism “is typically not the result of psychopathology or a

² We redirect the reader to either Loza's concise review (2007, pp. 146, 150) or Victoroff's (2005) seminal extensive critique.

single personality type" (p. 409), a view echoed by the increasingly influential rational-choice approaches to terrorism (e.g., Sandler & Enders, 2004).

A second, "soft claim" more cautiously argues that more theoretical sophistication and empirical evidence is needed to close the debate. For example, arguing that none of the methodological problems encountered by psychological approaches to terrorism "diminishes the importance of continued theorizing about and researching on the psychological causes of terrorism," Ross (1996) warned that "no explanation of any behavioural phenomenon can be complete unless it incorporates structural and psychological factors" (pp. 130, 129). As Dervenik and colleagues (2009) summed up, there is simply "a lack of evidence *for or against* the theory that terrorism is a product of mental disorder or psychopathology" (p. 511, our emphasis). Methodological problems are chiefly blamed for this lack of evidence. Access to nonpurely factual data is notoriously hard, and it is claimed that scholars have dealt with this scarce environment in a nonrigorous way. The "lack of sound empirical knowledge" (Taylor & Horgan, 2006, p. 588) has produced "sweeping generalisations" (Weinberg & Eubank, 2008, p. 186) and "theoretical speculation based on subjective interpretation of anecdotal observations" (Victoroff, 2005, p. 3). Stressing the acuity of methodological problems in terrorism research, proponents of the soft claim do not therefore rule out the possibility of psychological factors playing a key role. Rather, they advocate the development of a renewed, more rigorous research of the kind pursued by Merari and colleagues (2010), who provided direct psychological examinations of terrorists based on rigorous clinical interviews and standardized psychological tests. Crucially, more accurate and rigorous methods would allow research to move beyond the straightforward search for major psychopathologies—which have indeed by and large been shown to be irrelevant—and seek instead to unveil subclinical personality traits, cognitive styles, or emotional troubles.

The present article pragmatically endorses the soft claim, first because the most vigorous efforts today address nonpsychological dynamics, and second because large avenues have recently been opened by theoretical and technical advances in psychology that could be exploited in terrorism research. These advances could help to address the problem of methods and consequently build a more nuanced, dynamic, and multifaceted view on profiling which does not confuse severe psychopathology with subclinical psychological traits, thereby helping to overcome the current "stagnation of terrorism research" (Sageman, 2014). We take one of these advances—that of language-use psychometrics—to build an empirical enquiry that has the ambition to lay the groundwork for a renewed, more systematic research agenda on terrorism that focuses on their emotions and cognition.

Emotions and Lone-Actor Terrorists' Violence

The concept of "lone-actor/wolf terrorism" is a contested category whose boundaries are "inevitably fuzzy and arbitrary" (Spaaij, 2010, p. 857). As scholars like Gill (2015; Gill, Horgan, & Deckert, 2014) rightly warn, the term "lone" only refers to the mode of action, not to the ideological aspect. Lone-actor terrorists engage in violence in the name of ideas shared by other (violent or nonviolent) people, and their endeavors only make sense within specific sets of beliefs attached to particular political communities (Berntzen & Sandberg, 2014; Moskalenko & McCauley, 2011, p. 119). Yet in spite of these cautionary reminders, the label itself encourages a view of an isolated individual committing violence for reasons related to his or her personality and psychology. As a result, they are recurrently depicted—in both the media and academic research (e.g., Spaaij, 2010, p. 862)—as insane or disturbed individuals suffering from mild to severe mental health problems. For example, Barack Obama's 2011 public assessment that lone-wolf terrorism is the United States' biggest threat characterized lone-actor terrorists as "deranged" (MacInnis, 2011). The psychological explanation for lone-actor terrorism is intuitively convincing, especially in contrast to group-based terrorism, for which social dynamics of group affiliation provide a powerful alternative explanation of how "normal" individuals end up taking part in terrorist violence (e.g., Moghaddam, 2005). Even McCauley and

Moskalenko (2008), who stress that lone-actor terrorists are always acting in reference to already-existing worldviews and ideologies, claim that “more than in any other category of radicalization, there is a probability of some degree of psychopathology” (p. 419).

In this context, emotional impairments are recurrently evoked. For example, a recent op-ed in a prominent UK newspaper refers to lone wolf terrorists as “deranged. . .vengeful inadequates” (Ramdani, 2015), and most of the media coverage of Breivik’s trial described him as “cold and unemotional.”³ However, in the shadow of the important literature on emotional effects of terrorism (e.g., Fredrickson, Tugade, Waugh, & Larkin, 2003; Small, Lerner, & Fischhoff, 2006), the emotional state of terrorists in general and lone-actor terrorists in particular has only been investigated in superficial and unconvincing ways, leading to incompatible claims and further stereotyping. As Rice (2009) summarizes, only “limited attention has been paid to the intersection of the social psychological research on emotions and the etiology of terrorism” (p. 248). A noteworthy attempt to integrate emotions has been made by Taylor and Horgan (2006) in their multifaceted model of terrorist involvement which lists “individual’s emotional state” among the relevant personal factors. However, this acknowledgment did not lead to further theoretical advances or empirical evaluation, nor was it tailored to lone-actor terrorists. Merari and colleagues (2010) found some evidence for an “emotionally unstable style” among particular groups of terrorists but did not investigate further. Krueger and Maluková (2003) suggested that terrorist behavior is best understood as an emotional response “to political conditions and long-standing *feelings of indignity and frustration* that have little to do with economics” (p. 119, our emphasis). This “frustration-aggression” claim is frequently used to explain why they take the “last step”—from holding radical ideas to actually engaging in violence. Spaaij (2010), for example, argues that lone-actor terrorists’ ideologies “combine *personal frustrations* and aversion with broader political, social, or religious aims” and subsequently analyses Kaczynski’s case as “inextricably related to personal *resentment*” (pp. 854, 862, our emphases). Similarly, Crenshaw (1981) argues that “if there is a single common *emotion* that drives the individual to become a terrorist, it is *vengeance* on behalf of comrades or even the constituency the terrorist aspires to represent” (p. 394, our emphases). McCauley and Moskalenko (2008) suggest that “individuals are radicalized by personal *grievances* and by identity-group *grievances*” and that “from base to apex, higher levels of the pyramid are associated with decreased numbers but increased radicalization of beliefs, *feelings*, and behaviors” (p. 417, our emphases). In a more recent contribution, they continue to rely on a vocabulary that evokes emotional problems, distinguishing between “disconnected-disordered” lone-actor terrorists who “are individuals *with a grievance* and weapons experience who are social loners and often show signs of psychological disorder” and “caring-compelled” ones, who “are individuals who *strongly feel* the suffering of others and *feel* a personal responsibility to reduce or avenge this suffering” (McCauley & Moskalenko, 2014, p. 69, our emphases). Reviewing studies on psychological factors in terrorism, Victoroff (2005) similarly observed that most adhere to the view that “terrorists, far from being the aggressive psychopaths of public imagination, are often timid, *emotionally damaged* adolescents” (p. 24, our emphasis). However, he rightly denounced the lack of rigorous empirical research supporting such “impressionistic” results, regretting the absence of standardized psychological instruments and empirical testing. In sum, the emotional component of terrorism permeates in academic research, but most of the claims fall into what Silke (1998) famously called the “diagnosis at a distance” trap. Many emotions or emotion-related processes are evoked but with neither serious evidence nor specificity, failing to provide precision on both the nature of emotion and the causal mechanisms linking emotions and violent actions.

Yet as the “soft claim” suggests, dismissing these unproven assertions would be throwing the baby out with the bathwater. Literature indeed strongly suggests that emotions, specifically anger, are

³ See among many others, <http://www.csmonitor.com/World/Europe/2012/0824/Found-sane-Norway-killer-Breivik-gets-21-years-in-prison-video>

linked to violence in general and political violence in particular. Research on emotion is now firmly structured around two core interconnected axioms. First, the experience of particular emotions depends on the individual's appraisal of his or her situation and significant events (e.g., Frijda, 1986, 1987, 1993). The way people make sense of their environment determines which emotions they experience. In other words, "the elicitation as well as the differentiation of emotions is based on a process of appraisal or evaluation," and particular "associations between emotions and specific patterns of appraisals" develop over time (Kuppens, Van Mechelen, Smits & De Boeck, 2003, p. 254). Moreover, as Cheung-Blunden and Blunden (2008b) or Halperin, Sharvit, and Gross (2011) have documented, group membership shapes individuals' appraisal of a situation and therefore their emotional responses. Second, each emotion is "experienced as psychologically distinctive, and involves markedly different patterns of behaviour," or action tendencies (Lazarus, 1999, p. 657). For example, "the action tendency of shame is to hide or disappear; that of guilt, to make atonements and repairs; that of anger, to strike; that of fear, to run; that of joy, to dance" (Elster, 1996, p. 1388). In other words, a "discrete view of emotions" now prevails that avoids lumping all negative or positive emotions together, stressing instead the "emotion-behavior correspondence" (Cheung-Blunden & Blunden 2008a, pp. 126, 124) and identifying the "association of specific action tendencies to specific emotions" (Kuppens, Van Mechelen, Smits, & De Boeck 2003, p. 255). In sum, "emotions can be regarded both as experiences of forms of appraisal and as states of action readiness; . . . appraisal patterns as well as patterns of action readiness show distinct relations to various emotional categories" (Frijda, Kuipers & ter Schure, 1989, p. 212). Connecting these dimensions together, Baele, Sterck, and Meur (2014) have theorized that every individual is characterized by a particular "emotional worldview" largely shaped by the group to which he or she belongs (or imagines to belong), which is "an all-encompassing and coherent logic of understanding the social world that is based on the group's collective memory itself made of socially constructed axioms (statements that are taken for granted, that cannot be contested) and myths (real traumatic past events that are perpetually reinterpreted) that are reproduced in language" (Baele et al., 2014, p. 7). This enduring worldview produces stable patterns of appraisal and therefore recurring emotional experiences, which explains why some individuals are more prone to experience specific emotions and thereby engage in particular behaviors (Baele et al., 2014).

Importantly for the present enquiry, the appraisal and action-tendency of anger have been well theorized and documented. Anger is produced by appraisals shaped by perceptions of goal obstacle,⁴ other accountability, and arrogant entitlement (Kuppens, Van Mechelen, Smits, & De Boeck, 2003) and is therefore strongly associated with antagonistic action tendencies (e.g., Betancourt & Blair, 1992; Cheung-Blunden & Blunden, 2008b; Frijda, 1986, 1987; Kuppens, Van Mechelen, Smits, & De Boeck 2003; Roseman, Wiest, & Swartz, 1994). Papps and O'Carroll (1998) also highlight the role of anger in aggressive behavior, and Agnew (2001) similarly argues that "anger or frustration . . . create pressure for corrective action, and crime is one possible response" (Agnew, 2001, p. 319). Davidson, Putnam, and Larson (2000) have complemented these studies with evidence from functional imaging that some individuals have a predisposition for violent behavior because of a dysfunction of the pre-frontal cortex that makes anger more likely to be triggered. These and other findings have been used to feed the growing literature on the role of negative emotions in political violence more specifically. For example, Ray, Smith, and Wastell (2004) have stressed the role of shame, resentment, and anger in racist violence, claiming that "emotions may be more powerful motors of violence than are beliefs" (Ray et al., 2004, p. 356). Cheung-Blunden and Blunden (2008a) showed that the experience of anger increases support for military action and killing enemy targets in a "robust" and "sizable and unique" way not matched by any other negative emotion. Petersen (2002) provided a powerful account of how the emotions of fear, hatred, and resentment provoke violent action against "enemy" ethnic groups

⁴ This is a refinement of the venerable frustration-aggression thesis (e.g., Dollard, Doob, Miller, Mowrer, & Sears, 1939; Miller, 1941).

and exposed the looping dynamics of negative emotional states reinforcing the radical beliefs that provoked them. This looping effect of emotions on worldviews is also detailed in Baele et al.'s (2014) analysis of the Israeli-Palestinian conflict, which documented the combined importance of resentment and very high levels of anger. Halperin et al. similarly link violence, via intolerance, to a high degree of negative emotions, chiefly fear, hatred, and anger (Halperin, Pliskin, Saguy, Liberman, & Gross, 2014). Many studies therefore suggest that emotions—in particular anger—are at the heart of political and nonpolitical violence and therefore back the hypothesis that they also play a role in terrorism.

Lack of Cognitive Sophistication/Flexibility and Lone-Actor Terrorists' Violence

A second claim asserts that lone-actor terrorists process information and think in a rigid and unsophisticated way; in other words, they lack cognitive sophistication and flexibility. The hypothesis linking cognitive inflexibility and unsophistication with extremism and violence is a venerable one (e.g., Eysenck & Coulter, 1972; Rokeach, 1948). It has recurrently been claimed that thinking with dichotomous and rigid schemata, displaying ideational inflexibility is associated with a greater tendency to turn to aggressive actions. However, this claim has repeatedly been empirically undermined (e.g., Ray, 1988) and even sometimes reversed (e.g., Sidanius, 1985). Van Hiel and Mervielde (2003) have even documented a significant *positive* correlation between cognitive complexity and extremist ideology. These results might be interpreted through the lenses of the literature emphasizing the cognitive dimension of conspiratorial thinking (e.g., Brotherton, French, and Pickering, 2013; Sullivan, Landau, & Rothschild, 2010), which shows that some individuals have a tendency to think through “wonderfully unified accounts of all the data at hand” (Keeley, 1999, p. 119), creating grand theories on complex systems of social controls that favor particular groups (Melley, 2000). Dean (2000) further explains that today's overwhelming quantity of unchecked and connected information provided by the Internet leads individuals to continuously expand the web of information and causal links making up the theory. Such complex, integrated, and blame-attributing causal worldviews are said to push individuals towards radical and sometimes violent action (e.g., Fenster, 1999; Sunstein & Vermeule, 2008).

In spite of these studies on conspiratorial thinking and radicalism, the idea that violent extremists are characterized by a simplistic cognitive style has nonetheless permeated in terrorism research. For example, Schwartz, Dunkel, and Waterman describe terrorists' “authoritarian foreclosure” as the “basis for dichotomized, ‘us versus them’ thinking” leading to violence (2009, p. 544). Loza (2007) similarly characterizes the thinking of terrorists as “rigid, primitive, and unsophisticated,” claiming that “they over-simplify complex issues. . . . The choice is limited to right or wrong. . . . Their analytical thinking is not developed” (p. 147). Kruglanski and Fishman (2006) agree, arguing that “the need for closure which motivates individuals to think in clear-cut dichotomous categories” is a factor increasing the probability to choose the terrorist option (p. 199). They claim that “substantial evidence exists that violent behaviour is influenced by cognitive capacity and/or style, thus it seems plausible that these factors may also foster individuals' support for terrorist organizations” (p. 199). This analysis of terrorists as individuals characterized by simplistic cognitive styles and hence absolutist worldviews is exemplified by Lifton's (2000) analysis of Aum members. Yet as Victoroff (2005, p. 27) again rightly noted, in spite of its intuitive appeal, this argument so far rests on no rigorous evidence.

This claim is sometimes articulated to the one on emotions in an argument where emotion and “normal” rational cognition are sharply opposed, with high emotions pictured as hampering normal cognitive abilities. Ray et al.'s (2004) explanation of racist violence “in terms of emotion *rather than* of rational cognitive processes” (p. 355, our emphasis) is an example of a simplistic view of how the brain functions, relying on a binary opposition between the realm of emotion and that of instrumental thinking. Moskaleiko and McCauley's (2011) sophisticated study of lone-actor terrorism goes in the opposite direction yet falls in the same dualistic trap, arguing that lone wolves' violent behavior

results from “steady, planful, and workmanlike” rather than “continuous or even continual strong emotion, or by the physiological arousal that accompanies strong emotions” (p. 123). This conception of emotion and instrumental reasoning as separate and contradictory dynamics rests on an outdated conception of cognition that Damasio (1994) famously called “Descartes’ error”—the belief that emotions do not intermingle with “normal” cognition. Instead, a wealth of empirical research now encourages us to view emotional dynamics as inextricably linked to basic cognitive functions such as attention, memory, or problem solving in complex ways (e.g., O’Rourke & Ortony, 1994; Salzman & Fusi, 2010) and therefore to resist conceptualizing emotions simply as an external negative nuisance to cognition, embracing instead a more dynamic and nuanced view of the interplay between cognition and emotion. While emotions do not necessarily hamper cognitive tasks, some cognitive styles are on the contrary known to favor particular emotions. On the link between unsophisticated cognition, anger, and violence, two opposing stances coexist. On the one hand, some scholars claim that rigid and simplistic cognitive styles tend to trigger anger. For example, Cohen (2012) argues that cognitive rigidity “has long been recognized as a risk factor for emotional distress, leading to both externalizing behavior (e.g., aggression) and internalizing pathology (e.g., depression)” (p. 347). On the other hand, some scholars argue that unwarrantedly complex and causally integrated conspiratorial cognition feed strong outrage, blame, and anger against outgroups, which can lead to violence (Sunstein & Vermeule, 2008, p. 10).⁵

Method

These arguments lead us to put forward two hypotheses.

H1: Lone-actor terrorists are characterized by very high level of negative emotions, especially anger, which differentiate them from nonviolent individuals.

H2: Lone-actor terrorists are characterized by a lack of cognitive sophistication or flexibility, which shapes their emotional worldview (and thereby appraisals) in a way that tends to trigger high levels of anger, leading to aggressive behavior. However, alternative literature warns us that the exact opposite could be found: Individuals with high cognitive sophistication tend to appraise single events through the prism of an overly complex worldview, which tends to provoke anger.

Various techniques exist to gauge emotions. While questionnaires asking individuals to report on their emotions provide an indirect measurement (e.g., Bizman & Hoffmann, 1993; Halperin, 2008; Halperin et al., 2011), the presence of emotion can also be directly assessed with various techniques detecting emotions’ visible physiological expressions. Medical imaging devices such as ECGs and MRIs detect brain activity known to be associated with emotion; computer software capturing movement or facial expression compare these movements and expressions to those known to accompany emotions like anxiety, fear, or joy. Emotions can also be detected by paying attention to the way individuals speak or write, with specific patterns in language use reflecting emotional states.

From all these techniques, only the last one is realistically implementable in terrorism research for evident reasons, even if the others could arguably serve in a general inquiry into the role of emotions in violence. Moreover, it also responds to Rice’s (2009) argument that work “concentrating on personal narrative should hold a central position” within the new research agenda on the role of emotions in terrorism (p. 253). We use the LIWC, arguably the most robust (e.g., Alpers et al., 2005; Gill, Gergle, French, & Oberlander, 2008; Kahn, Tobin, Massey, & Anderson, 2007; Tausczik &

⁵ Read also Fekete (2011) on Breivik’s conspiratorial worldview.

Pennebaker, 2010, p. 32) computer software in language-use psychometrics. The LIWC is based on the idea that “the words we use in daily life reflect . . . how we are feeling, and how we are organizing and analyzing our worlds” (Tausczik & Pennebaker, 2010, p. 30). The software implements this idea by calculating the frequency, in any given text, of specific words and kinds of words that research in psychology has shown to be indicators of particular emotions or cognitive processes; the higher the frequency of certain words and kinds of words, the more salient the associated emotion or process. Particularly high/low uses of personal pronouns, words that have four syllables or more, or certain adjectives and nouns are the kinds of cues that the LIWC calculates when trying to assess the emotional tone and cognitive dynamics underpinning a text. Although it was initially developed as a tool for counsellors and psychiatrists, this device has recently been imported into the study of politics and conflict, providing important new insights (e.g., Baele et al., 2014; Cohn, Mehl, & Pennebaker, 2004; Pennebaker & Lay, 2002; Pennebaker, Slatcher, & Chung, 2005; Taylor & Thomas, 2008).

The software provides two groups of measurements allowing us to test our hypotheses: one assessing emotions and the other cognitive dynamics. *As regards emotions*, the LIWC measures the general emotional tone of the sample (under the label of “affective processes”) and subdivides this general score in two subparts: one reflecting the saliency of “positive emotions,” the other “negative emotions.” The software also measures the saliency of four specific emotions (anxiety, anger, sadness, and resentment)⁶ and computes the frequency of various pronouns. Pronoun frequency provides useful information on individual psyche (Campbell & Pennebaker 2003), especially as abnormal uses of specific pronouns are frequently evoked as strong predictors of emotional imbalance (e.g., Pennebaker, 2011) and commitment to extremist thought or community.⁷ *As regards cognitive sophistication and rigidity*, the LIWC provides several scores that can be used together to form an assessment, based on the finding that patterns in language use reflect cognitive sophistication and load (e.g., Abe, 2012; Khawaja, Chen, & Marcus, 2014). Although cognitive sophistication is multifaceted (Toplak, West, & Stanovich, 2014), and a full evaluation is beyond the scope of this article, some aspects are amenable to LIWC analysis: “‘depth of thinking’ is evidenced by indicators such as a high presence of prepositions, of words greater than six letters, and of words indicative of cognitive mechanisms such as causal attribution” (e.g., “because,” “therefore,” “knowingly”) (Tausczik & Pennebaker, 2010, p. 35). Moreover, high level of tentative language (e.g., “maybe,” “perhaps”) or on the contrary language reflecting certainty (e.g., “surely,” “obviously”) are measured as they provide an evaluation of cognitive (in)flexibility (Tausczik & Pennebaker, 2010, p. 36), in the “absence of a widely recognized ‘gold standard’ to quantify cognitive rigidity” (Cohen 2012, p. 359).⁸ Some of these components have recently been merged in a single “categorical-dynamic index” (CDI), which expresses a bipolar continuum between two styles of expression: categorical language, which “is a style that combines heightened abstract thinking and cognitive complexity,” and dynamic language, which resembles “time-based stories and reflect a dynamic or narrative language style” (Pennebaker, Chung, Frazee, Lavergne, & Beaver, 2014). Correlated with intelligence and formal logic processing, high CDI (categorical language) appears to be a better predictor of academic success than SAT scores (Pennebaker, Chung, Frazee, Lavergne, & Beaver, 2014).

For each emotion (and pronoun) and cognition indicator, the LIWC computes the percentage of words and kinds of words that are particularly associated with the expression of this specific emotion

⁶ We altered the software to make it capable of evaluating resentment, an ability which does not exist in the original version. Alterations have been made in collaboration with LIWC developer Prof. James Pennebaker.

⁷ “Members of extreme groups use ‘I-words’ at extremely low rates, ‘we-words’ and ‘they-words’ at very high rates. Their members are making distinctions between their ingroups and those who are different, which is the basis of their emotional tone” (Author’s e-mail correspondence with Prof. James Pennebaker, March 28, 2012).

⁸ Cohen explains that “despite its recognized importance . . . virtually no standardized measures of this cognitive style exist,” and that in this context, the LIWC “certainty” scale is “arguably the only text-analysis scale—and certainly the most popular one—to tap the concept of cognitive rigidity” (Cohen, 2012, pp. 347, 356).

or process, out of the total amount of words in the text under scrutiny. CDI is computed on the basis of these scores.⁹ The results are brute scores which get their meaning only from comparison with those of other samples (including already-established control samples provided with the LIWC) in order to establish how statistically similar or different the authors of the texts are, thereby documenting comparatively (ab)normal scores on specific emotions and cognition.

At this stage, it is important to notify that in spite of the reliability of the LIWC, other dictionaries could have been used here. Most prominently, Cohen (e.g., 2011) has argued in favour of context-specific dictionaries. Because emotional language and words denoting cognitive rigidity and sophistication are indeed context-dependent, this is a pertinent argument that calls for our research design to be replicated with alternative dictionaries. However, we believe that using the LIWC dictionaries is pertinent here for three reasons. First, using the LIWC provides a well-known baseline to deliver initial results from which further research on terrorism could expand. Second, the terrorist literature analyzed here is very heterogeneous, varying in style, type, and content; implementing a context-based approach would therefore be difficult. Third, given the clarity of our results, we believe that they would not be significantly different using other dictionaries—had our results been ambiguous, we would have considered other dictionary options (e.g., Cohen's 2011 dictionary for negativity bias; or Cohen's 2012 dictionary for cognitive rigidity). In sum, while we believe that our choice of using the LIWC is adequate and delivers clear results, these results would benefit from being followed up by a more context-specific approach to the data using tailored dictionaries.

We ran the LIWC on 11 text files¹⁰—each corresponding to a clean¹¹ and comprehensive collection of one lone-actor terrorist's writings. The lone-actor terrorist sample has been built implementing a funnel strategy, progressively discarding individuals out of a comprehensive starting list aggregating three lists: Spaaij's (2010) 72-name list of lone-actor terrorists in 15 countries during the 1968 and 2007, Hamm and Spaaij's (2015) 98-name list of lone-actor terrorist attacks in the United States between 1940 and 2013, and the Wikipedia entry on "Lone wolf (terrorism)," which lists 87 lone-actor terrorist attacks between 1988 and today.¹² Two pragmatic constraints successively reduced this list. First, we discarded a significant amount of individuals without any programmatic or ideological text to be analyzed (or, in several cases, when their prose is not accessible). When such a prose was accessible online or in a scholarly effort to compile this type of writing, a compilation was done as exhaustively as possible.¹³ Second, since the LIWC is only able to robustly analyze texts written in English by native English speakers, we were only able to keep lone-actor terrorists who not only wrote in English but also had English as their first language. This constraint, however, did not considerably shorten the list since most listed lone-actor terrorists leaving written statements have so far been English speakers.¹⁴ This strategy sets our empirical analysis on a serious—that is, less imperfect—ground. To be sure, this sampling raises external validity questions, as regards the general population of lone-actor terrorists. However, our funnel strategy reveals that most lists of lone-actor terrorists lump together several different types of criminal offenders, leading to an impossible—and useless—external validity task. Rather, our results should be understood as holding now for our

⁹ CDI is computed as follows: $CDI = 30 + \text{article} + \text{preposition} - \text{personal pronoun} - \text{impersonal pronoun} - \text{auxiliary verb} - \text{conjunction} - \text{adverb} - \text{negation}$ (Pennebaker et al., 2014).

¹⁰ The full text database is available on demand at the author's discretion.

¹¹ Texts have to be "cleaned" according to the *LIWC Operator Manual*.

¹² As a result, some individuals were included who were identified in one or more lists as lone-actor terrorists but rejected by others lists, for example, Timothy McVeigh (e.g., rejected only by Spaaij [2010] who stresses the role of Terry Nichols in the 1995 Oklahoma City bombing).

¹³ These writings were mostly manifestos, but other forms of writings were also included, for example, letters (e.g., McVeigh) or semifictional stories loaded with ideological/political content (e.g., Rudolph).

¹⁴ This constraint notably involved discarding Breivik, in spite of his voluminous manifesto. He would have been discarded anyway since most of this text is not his own prose but rather copy-pasted from other sources.

Table 1. “Terrorists” Sample

Name of Lone-Actor Terrorist	Number of Words in the Compilation of Writings
Paul J. Hill	50,720
Theodore Kaczynski	34,393
Ali Hassan Abu Kamal	566
James Lee	1,166
Timothy McVeigh	5,764
Eric Rudolph	367,665
Mohammed Reza Taheri-Azar	536
John Stack	3,215
James Von Brunn	43,686
Lucas Helder	428
Paul Ross Evans	26,816

Table 2. “Peacemen” Sample

Name of Nonviolent Activist	Number of Words in the Compilation of Writings
Mahatma Gandhi	76,116
Martin Luther King, Jr	78,544
Nelson Mandela	199,739

sample only, and later generalizable only to individuals with the kind of stereotypical lone-actor terrorist identity held by all members of our core 11-member group (acting alone and taking the time to write and circulate an unambiguously political message). In comparison to our study, existing studies of lone-actor terrorism have usually no selection criteria for systematic comparison, rely on even more limited samples, and consequently do not address external validity problems, like Spaaij’s (2010) five specific cases ambiguously “selected on the basis of their diversity” in order “to illustrate, enlighten, and interrogate the main features and patterns of lone wolf terrorism” (p. 858).

We compared these results with those of three samples. The first two comparison samples are the “LIWC control writing” and the “LIWC emotion writing,” which are compilations of thousands of texts expressing, respectively, remarkably low and high emotionality, built by LIWC developers to serve as baselines. The third comparison sample is a comprehensive collection of texts written by three prominent political actors who like lone-actor terrorists radically resisted and fought the political order they were in, but in contrast explicitly rejected violence: Gandhi, Martin Luther King, Jr., and Nelson Mandela. These three important figures (hereafter “peacemen”) are arguably the most prominent and less contestable figures of radical yet nonviolent political action against established hierarchies. The extensive character of these three activists’ writings sets the statistical analysis of language use on a firm ground, and any additional figure in our sample would have opened it to contestation.¹⁵ Table 1 below provides the list of lone-actor terrorists included in the sample and the number of words contained in their writings. Table 2 summarizes the same information for “peacemen.”

¹⁵ Out of comprehensive sets of their writings, we have selected all those which address a political issue at least once (for example, we did not include Gandhi’s theological essays but included King’s sermons which include political statements) and predate the attainment of these figures’ historical objective of putting down an existing order (for example, we did not include Mandela’s texts written after his accession to the presidency of South Africa).

We used a one-tailed Welch's t -test¹⁶ to detect significant differences between the means of the four samples. Welch's t -test was chosen as a generalization of Student's t -test which is intended for use with samples having possibly unequal sizes¹⁷ and variances.

Results

Overall, results strongly support our first hypothesis and provide clear evidence for our second hypothesis. On the one hand, they accredit the thesis of lone-actor terrorists scoring very high on particular emotions; in line with the reviewed literature, extreme anger in particular stands out as an evident specificity of terrorism prose. On the other hand, they discredit the thesis according to which lone-actor terrorists show poor cognitive skills; when their results are distinguishable from other samples, it is on the contrary to reveal greater theorization and conceptualization, in line with Van Hiel and Mervielde (2003) and the literature on conspiratorial cognition.

Emotions

Tables 3 (descriptive statistics) and 4 (Welsh's t -tests) below summarize the results of the LIWC analysis of emotions, which provides evidence that lone-actor terrorists are characterized by a high level of negative emotion in general and anger in particular.¹⁸

The "affective processes" indicator, which provides a global measurement of the emotions as they permeate in texts, situate lone terrorists close to the people whose writings have served as a base-line sample for highly emotional writing. It is striking to see that their score is not statistically different than that of peacemen, who also score high on this indicator.

However, this undistinguishable overall score masks important specific differences. First of all, terrorists score lower on positive emotions and higher on negative emotions than peacemen (who tend to score very high on positive emotions); both differences are significant. Second, in line with the discrete, action-tendency approach of emotions, whilst both terrorists and peacemen are characterized by normal scores (understood as located between the LIWC control writing and LIWC emotional writing samples) as regards anxiety and sadness, contrasting their scores on resentment and anger provides crucial insights since both are claimed to play a central role in violence, especially anger. Figures 1 and 2 below clearly illustrate outstanding similarities and differences on these two patterns.

As regards resentment, the mean scores of terrorists and peacemen are strikingly almost identical. Both groups score clearly higher than the LIWC emotional writing sample, even if this difference is not statistically significant. This stands in line with the common-sense idea that terrorists' actions somehow respond to acrimony felt at the individual level but also that this is only a necessary (and far from sufficient) condition of violence. In this regards, the starting point of Moghaddam's analogy of the "staircase to terrorism" (2005), according to which if humiliation and deprivation contribute to radicalization but that the vast majority of deprived and humiliated people do not escalate these stairs up to its violent end, seems to hold true. The concept of a "bad" staircase unambiguously leading

¹⁶ For two sample of size N_1 and N_2 , means $\bar{X}_1$ and $\bar{X}_2$, and unbiased variance s_1^2 and s_2^2 , the Welch's t -statistic is given

by: $t = \frac{\bar{X}_1 - \bar{X}_2}{\sqrt{\frac{s_1^2}{N_1} + \frac{s_2^2}{N_2}}}$, with $v = \frac{(s_1^2/N_1 + s_2^2/N_2)^2}{\frac{(s_1^2/N_1)^2}{N_1 - 1} + \frac{(s_2^2/N_2)^2}{N_2 - 1}}$ degrees of freedom.

¹⁷ It has to be noted that even if the general rule with automated language-use analysis is that the analysis gets stronger with every increase in text sample size, there is sufficient evidence that the LIWC accurately detects emotions even with small texts (e.g., Gill et al., 2008).

¹⁸ Table 3 provides only sample-level data; the full table providing detailed individual-level statistics is available in the online supporting information. The same applies to Tables 5 and 7.

Table 3. Lone-Actor Terrorists’ Emotions – Descriptive Statistics

	Affective Processes	Positive Emotions	Negative Emotions	Anxiety	Anger	Resentment	Sadness
<i>N</i> Terrorists	11	11	11	11	11	11	11
Standard Error Terrorists	0.95	0.445	0.828	0.5	1.036	0.77	0.24
Mean Terrorists	5.32	2.22	3.03	0.39	1.74	3.31	0.38
<i>N</i> Peacemen	3.00	3.00	3.00	3.00	3.00	3.00	3.00
Standard Error Peacemen	0.27	0.16	0.34	0.04	0.13	0.62	0.11
Mean Peacemen	5.54	3.36	2.11	0.42	0.82	3.30	0.45
Mean LIWC Control Writing	2.66	1.9	0.73	0.21	0.16	1.44	0.14
Mean LIWC Emotional Writing	6.17	3.4	2.7	0.68	0.68	2.93	0.63

Table 4. Lone-Actor Terrorists’ Emotions – Welch’s *t*-tests

Test	Affective Processes	Positive Emotions	Negative Emotions	Anxiety	Anger	Resentment	Sadness
Terrorists vs. Peacemen (<i>p</i> -value) <i>significance</i>	0.5283331	0.0000339**	0.0178725*	0.8890422	0.0157088*	0.9856744	0.4707297
Terrorists vs. Control Writing (<i>p</i> -value) <i>significance</i>	0.0000034**	0.0440872*	0.0000033**	0.2554413	0.0005016**	0.0000116**	0.0080655**
Terrorists vs. Emotional Writing (<i>p</i> -value) <i>significance</i>	0.0147586*	0.0000032**	0.2059376	0.0911673 [†]	0.0071271**	0.1367512	0.0048966**

[†]*p* < .10, **p* < .05, ***p* < .01

from this starting point to violence is, however, misleading, since this first step is also the one to non-violent radical activism.

As regards anger, by contrast, terrorists score significantly higher than peacemen and indeed all other samples, strongly confirming the aforementioned literature arguing that anger stands out in its antagonistic action-tendency. Peacemen do not actually score low on that scale, but they are nowhere near the terrorists. While some individuals drive the mean score very high (e.g., Kamal), and although a couple of individuals obtain scores closer to the level of peacemen (e.g., Kaczynski), it is nonetheless striking to observe that every single terrorist at the exception of Helder—whose text is very small and therefore provides less meaningful scores—obtain higher results than LIWC’s emotional writing. In this sense, terrorists’ mean LIWC score on anger—1.74—is therefore highly abnormal.¹⁹ This result hence empirically supports the literature discussed above stressing the specific role of anger in violence. The similarity of peacemen and terrorists on resentment and their difference on anger, once taken together, undermine simplistic theories on resentment or humiliation as a direct cause of violence—as Kruglanski and Fishman (2006) rightly recall, “the simple frustration-aggression hypothesis

¹⁹ A quick comparison with the same indicator computed in a study of radical pro-Israeli and pro-Palestinian blogs, who only obtained 0.91 and 0.78, respectively (Baele et al., 2014, p. 16), clearly illustrates the impressive level of terrorists’ anger.

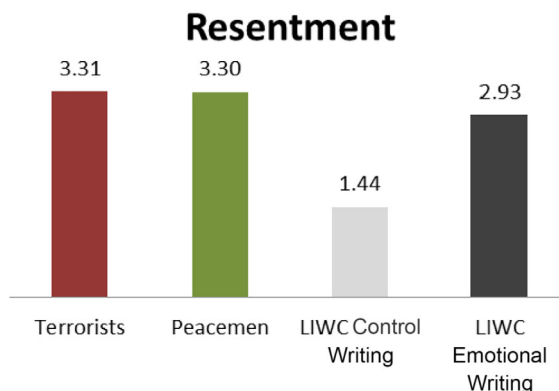


Figure 1. Resentment. [Color figure can be viewed at wileyonlinelibrary.com]

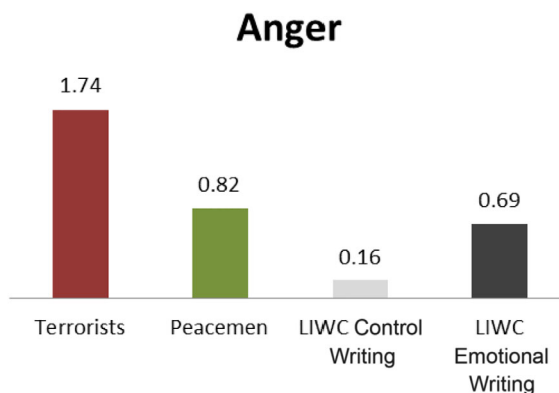


Figure 2. Anger. [Color figure can be viewed at wileyonlinelibrary.com]

has long been questioned. Just because one is frustrated does not necessarily mean that one would aggress against others” (p. 196). The observation that nonviolent radical activists share a similarly high level of resentment, but not anger, is consistent with the conclusions of McCauley and Moskalenko (2014), who highlight the importance of “the gap between radical opinion and radical action, . . . distinguishing radicalization of opinion from radicalization of action” (p. 69).

The analysis of lone-actor terrorists’ use of pronouns, summarized in Tables 5 (descriptive statistics) and 6 (Welsh’s *t*-tests) below, allow us to reinforce the analysis of lone-actor terrorists’ emotions, yet not in a straightforward way given the heterogeneousness of the sample. This diversity is exemplified by lone-actor terrorists’ use of “I” pronouns.²⁰ On the one hand, some terrorists like Taheri-Azar, Kamal, or Stack clearly engage on heavily self-centred prose, with high levels of “I” pronouns accrediting the idea that self-centredness and narcissism, among other traits, increase the likelihood of embarking in terrorist activities (e.g., Akhtar, 1999; Johnson & Feldmann, 1992; Ross, 1996). On the other hand, lone-actor terrorists like Kaczynski, Von Brunn, or Lee almost never use “I” pronouns, probably as they seek to offer more “objective” ideological justifications of their actions. This difference clearly highlights the fact that lone-actor terrorism should not be considered to be a homogenous practice as regards its practitioners’ ideological commitments. Lone-actor terrorists’ overuse of “they”

²⁰ The “I” pronouns dictionary encompasses all first-person pronouns (e.g., “I,” “my”). The same is true for other pronouns (e.g., “We” pronouns encompass “we,” “our,” “ourselves,” etc.).

Table 5. Lone-Actor Terrorists’ Pronouns – Descriptive Statistics

	"I"	"We"	"You"	"They"
<i>N</i> Terrorists	11	11	11	11
Standard Error Terrorists	2.06	0.51	1.73	0.528
Mean Terrorists	2.58	0.69	0.93	1.38
<i>N</i> Peacemen	3.00	3.00	3.00	3.00
Standard Error Peacemen	1.23	0.98	0.38	0.23
Mean Peacemen	1.96	2.01	0.90	0.95
Mean LIWC Control Writing	8.52	0.94	0.2	0.41
Mean LIWC Emotional Writing	10.38	0.73	0.38	0.71

Table 6. Lone-Actor Terrorists’ Pronouns – Welsh’s *t*-tests

Test	"I"	"We"	You"	"They"
Terrorists vs. Peacemen (<i>p</i> -value) <i>significance</i>	0.5306617	0.1529547	0.9598432	0.0683279 [†]
Terrorists vs. Control Writing (<i>p</i> -value) <i>significance</i>	0.0000026**	0.1406993	0.1922602	0.0001237**
Terrorists vs. Emotional Writing (<i>p</i> -value) <i>significance</i>	0.0000002**	0.7905238	0.3220917	0.0019095**

[†]*p* < .10, **p* < .05, ***p* < .01

pronouns (which are found in a statistically higher frequency than in the peacemen sample) echoes their high score on both resentment and anger. In contrast with peacemen, whose resentment does not transform into negative emotions and anger, terrorists appear to speak and write much more about a putative external group allegedly responsible for the problem or situation they fight, instead of overcoming this emotion by building constructive, less divisive narratives. While this could be taken as evidence for simplistic, dichotomous cognitive style, the discussion below encourages us to interpret this result as evidence for complex conspiratorial thinking. Terrorists also tend to underuse “we” pronouns. Even if differences do not appear to be significant again because of high standard errors, they are still quite striking: Peacemen rely on “we” narratives much more extensively than terrorists (at the exception of Evans), who tend to score really low on this indicator.

In sum, lone-actor terrorists are indeed characterized by high levels of negative emotions, more specifically a particular combination of resentment and extreme anger. Given the limited size of our sample and the variance in the length of texts, we tested the robustness of these results by checking for sensitivity to outlying observations, verifying whether the suppression of each individual in the lone-actor terrorist sample would alter the significance of the results. Internal validity was fully confirmed, with only very minor changes in the degrees of significance occurring.²¹

Besides, our analysis of pronouns tends to accredit the claim, made several times and already discussed in our Methods section, that there is no such thing as a homogenous group of lone-actor terrorists, as some heavily engage in self-centred prose while other ones produce less subjective narratives. However, what clearly differentiates nonviolent to violent radicals is their use of “they” pronouns, which suggests the incapacity of the latter—and not of the former—to transform resentment into positive, inclusive, constructive narratives instead of polarizing, other-accountability accounts leading to antagonistic action tendencies (in line with Kuppens, Van Mechelen, Smits, & De Boeck, 2003). The design of the present study does not allow for further theorization on this link between resentment and

²¹ For example, taking Helder out of the sample further strengthens the difference between terrorists and peacemen on anger, from a 95% to a 99% confidence. Taking Taheri-Azar out actually makes the difference of resentment between the terrorist and the LIWC emotional writing samples significant at a 10% threshold. Full results of this robustness test are available on demand.

Table 7. Lone-Actor Terrorists' Cognition – Descriptive Statistics

	Words> Six Letters	Cognitive Processes	Prepositions	Causality	Tentative	Certainty	CDI
<i>N</i> Terrorists	11	11	11	11	11	11	11
Standard Error Terrorists	2.68	2.35	1.65	0.79	0.79	0.72	5.99
Mean Terrorists	23.23	16.77	14.51	2.46	2.16	1.84	23.58
<i>N</i> Peacemen	3.00	3.00	3.00	3.00	3.00	3.00	3.00
Standard Error Peacemen	3.55	0.98	0.72	0.19	0.69	0.19	5.43
Mean Peacemen	21.87	16.90	15.43	1.80	1.91	2.17	22.25
Mean LIWC Control Writing	14.19	14.54	16.15	1.29	2.35	0.8	18.11
Mean LIWC Emotional Writing	13.5	19.79	12.99	1.85	3	1.74	1.14

Table 8. Lone-Actor Terrorists' Cognition – Welsh's *t*-tests

Test	Words> Six Letters	Cognitive Processes	Prepositions	Causality	Tentative	Certainty
Terrorists vs. Peacemen (<i>p</i> -value) <i>significance</i>	0.5807720	0.8917991	0.1942998	0.0259393*	0.6187528	0.2071636
Terrorists vs. Control Writing (<i>p</i> -value) <i>significance</i>	0.0000006**	0.0108101*	0.0082171**	0.0006477**	0.4568365	0.0007853**
Terrorists vs. Emotional Writing (<i>p</i> -value) <i>significance</i>	0.0000003**	0.0016875**	0.0121740*	0.0293198*	0.0061471**	0.6514136

† $p < .10$, * $p < .05$, ** $p < .01$

anger, but this clearly seems to be an important aspect of lone-actor terrorists' violence that should be further investigated.

Cognitive Sophistication

The LIWC analysis of lone-actor terrorists' cognitive sophistication, summarized in tables 7 (descriptive statistics) and 8 (Welsh's *t*-tests) below, clearly refutes the idea that they are characterized by a lack of cognitive sophistication. Instead, the findings encourage us to conceptualize lone-actor terrorism as an extreme emanation of conspiratorial thinking.

On the "cognitive processes" indicator, which provides an overarching measurement of the intensity and complexity of thought, terrorists and peacemen cannot be statistically differentiated, both scoring significantly *higher* than normal writing which means that both groups of actors are engaged in equally thorough efforts to theorize and offer causal narratives of their views and actions.

Similarly, terrorists obtain very high CDI levels, slightly higher than peacemen who are themselves very high. This means that in spite of very high levels of negative emotions and anger, they are capable of thorough categorical thinking. It might not be "good" logic in the sense of "moral," but the authors are clearly attempting to be rational.

These two trends are confirmed by more specific measures. For example, both groups make an extensive use of words of more than six letters, at a significantly higher level than both LIWC samples. But more remarkably, terrorist's writings are characterized by an abnormally high—in comparison not only with LIWC samples, but also with peacemen—use of words expressing causality, which

undoubtedly reflects a consistent and unusual will to theorize and offer explanation. Imperfect as they might be, these scores nonetheless undoubtedly lead us away from the idea that terrorists are characterized by a lack of cognitive abilities. Lone-actor terrorists' theories and causal narratives might be unacceptable or refutable, yet they are neither loosely constructed nor characterized by poor sophistication. Terrorists do not show the particular profile of individuals incapable of nuance, looking in either black or white: As the LIWC "certainty" and "tentative" indicators show, their claims are usually made in a less certain and more hesitant way than peacemen, even if this difference is not statistically significant. It is striking to see that even highly theoretical writings like those of Kaczynski are characterized by a high level of uncertainty.

We claim that these results offer a new understanding of lone-actor terrorists' violence, one which is more in line with the literature on conspiratorial thinking than with the one on violence as a product of low cognitive abilities. Lone-actor terrorists are characterized by complex and theoretically integrated worldviews with a strong component of other-blaming, which produce stable patterns of appraisal that recurrently trigger extremely high levels of anger.

Conclusions

Crenshaw's seminal "Agenda for the 21st Century on the Psychology of Terrorism" (2000) stressed both the many and varied psychological causes of terrorism on the one hand, and the complex, indirect ways through which these causes operate, and hence the problem with a unidimensional profiling project. As highlighted by our sampling strategy, differences within the lone-actor terrorist group encourage us to critically evaluate the very pertinence of the lone-actor terrorist category as commonly used. Our LIWC inquiry further shows the discrepancy on several variables even within our core sample, between profiles like those of Kaczynski and Kamal. As a consequence, "profiling" "lone wolf terrorists" can indeed only be a vain enterprise if it considers a heterogeneous population and speculates beyond clearly identifiable and measurable factors. In this context, our effort to document both at once the heterogeneous character of lone-actor terrorists as a broad population and some of the common traits found in a core group of offenders, echoes Kruglanski and Fishman's (2006) nuanced claim that "though no one personality variable or situational condition appears to constitute a 'root cause' of terrorism in the strong logical sense of necessity and sufficiency, a wide variety of personality traits and situational conditions continually referred to in terrorism research may well qualify as contributing factors to terrorism" (p. 199).

With this caveat of not aiming to disclose a simplistic, unidimensional profile, our study nonetheless reveals two clear and important results. First, we have documented the predominance of negative emotions in general, and high levels of resentment and anger in particular, among lone-actor terrorists. Second, we have provided evidence that lone-actor terrorists engage in sophisticated categorical thinking. Lone-actor terrorists are characterized by high levels of cognitive sophistication and surprisingly low levels of cognitive inflexibility. Together, these results encourage us to accept the fascinating hypothesis that lone-actor terrorist violence is triggered by extreme anger recurrently triggered by appraisals shaped by unwarrantedly wide and causally integrated worldviews.

Our results therefore indicate that more research is needed on the mechanisms that allow some individuals with cognitive sophistication and a high level of resentment to prevent this resentment to turn into anger against particular groups. The lack of such ability indeed seems to be at the heart of the explanation of lone-actor terrorists' violence. In this sense, the present article hopes to pave the way for further studies of the interplay between emotions and cognition in terrorism, which would both at once focus on individual factors and social dynamics, dissolving the dilemma highlighted by Horgan (2008): "[W]hen we assume static qualities of the terrorist (a feature of profiles), we become blind to the qualities of the dynamics that shape and support the development of the terrorist" (p. 84).

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Supporting Information

Additional supporting information may be found in the online version of this article at the publisher's website:

Table 1: Lone-actor terrorists' emotions – Descriptive statistics

Table 2: Lone-actor terrorists' pronouns – Descriptive statistics

Table 3: Lone-actor terrorists' cognition – Descriptive statistics