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## Mapping the Minds of Suicide Bombers using Linguistic Methods: The Corpus of Palestinian Suicide Bombers' Farewell Letters (CoPSBFL)

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### ABSTRACT

This study proposes a novel methodology for the study of the mindset, motives, and cognitive style of individual suicide bombers in Israel/Palestine, based on a comprehensive corpus of personal farewell letters (which also serve as last wills) that were written by suicide bombers to their family during the Second Intifada (2000–2006). To avoid privileging certain a priori sentiments, motivations, or concepts over others, I used a programmatic “bottom-up” sequence of quantitative psycholinguistic procedures, in which prominent themes or concepts from one level of analysis are further qualified and contextualized in the next. This afforded a minimally biased view of the cognitive content of Palestinian suicide bombers, including the sentiments, motivations, and concepts that they were more preoccupied with, and the context in which these ideas were expressed. The results are largely consistent with theories of political violence that place pro-social sentiments at the forefront of the motivations for suicide terrorism, and paramount to antisocial sentiments such as hatred and revenge. Since the linguistic patterns that were uncovered in this analysis cannot be controlled consciously, and the farewell letters of suicide bombers have rarely been rigorously analyzed linguistically, this study may provide an unprecedented glimpse into the cognitive style and content of individual suicide bombers—a glimpse that is minimally biased by political, partisan, or sectarian preconceptions.

### Suicide Terrorism at the Individual Level: Methodological Barriers and their Consequences

Despite being one of the oldest warfare tactics in history, suicide terrorism is still a poorly understood phenomenon—especially on the individual level. While many theories of suicide terrorism attempt to explain the phenomenon on both the organizational and individual levels, only a few distinguish between the two.<sup>1</sup> Studies of the recent wave of suicide terrorism in the Middle East, which almost invariably focus on the widespread religio-political ideology of “Jihadi” Terrorism<sup>2</sup> and its signature tactic of suicide missions, are no exception.

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Most of these studies examine the organization-level explications of suicide terrorism more rigorously than the individual-level determinants of this phenomenon. The apparent bias in terrorism studies in favor of organizational understanding of the phenomenon is likely due to the sizeable methodological and conceptual obstacles associated with the study of suicide terrorism on the individual level. Apart from the obvious fact that the perpetrator of a successful suicide mission cannot be interviewed, some of the most often cited obstacles to research in suicide terrorism have been its imperviousness to interception: the simplicity of the mission, its small cadre and cheap costs make these secret missions almost impenetrable to intelligence gathering and/or prevention.<sup>3</sup>

This article has three goals. First, I review the current theories concerning the mindset of individual suicide bombers in general and within the Palestinian context in particular. Oftentimes, studies of the mental content (e.g., thoughts, emotions, preoccupations) of suicide bombers' minds are conducted within the framework of empirical studies of the core motives for suicide terrorism and the role of radicalization for violent jihadi ideology in inducing the readiness for self-sacrifice. Second, I will review the methodological limitations and biases of current paradigms for studying individual suicide bombers (e.g., interviews with incarcerated would-be bombers, post-mortem interviews with relatives and friends of suicide bombers, and mining local media information about the bomber). Third, I will exemplify the likely advantages of studying the minds of Palestinian suicide bombers using their own words, by applying a systematic text-analytical set of queries to the personal farewell letters that they have written to their family before their suicide mission.

### ***Current Psychological Models of Suicide Bombers: The Quest for Core Motives and the Role of Religio-Political Ideology***

The mindset of individual suicide terrorists is arguably one of the most emblematic debates in the literature concerning suicide terrorism. However, as those debates are circumscribed by methodological obstacles to the conceptualization of the phenomenon, most efforts to understand this mindset have been speculative to one degree or another regarding the nature of the individual motivation to commit such acts and the role that hegemonic ideology might play in the internal readiness to perpetrate them. Furthermore, these conceptualizations are often intertwined with the search for core individual motives for suicide terrorism, commonly recast as the search for the private, idiosyncratic meaning that the individual bomber might make out of the hegemonic ideology, as spelled out by the ideologues and leaders who radicalized them. Over the years, a variety of core individual motivations for suicide terrorism have been proposed, and most of them are still endorsed and cited by various scientific (and potentially political) "cliques," with no apparent convergence toward a consensus—and the quest for the core motivation of Palestinian suicide bombers is no exception.<sup>4</sup> The difficulties in reaching a scientific consensus around core motivations are not unique to the study of suicide terrorism. Indeed, the fundamental unfalsifiability and functional equivalence of most motives mired the study of human motivation from its inception<sup>5</sup>—most likely due to the hermeneutic nature of motivation as a *plausible* interpretation of a certain behavior rather than a uniquely provable *cause* for that behavior.

Some of the most frequently cited core individual motivations for politico-religious self-sacrifice have been extrapolated from the more general frameworks for understanding suicide terrorism on the societal and organizational levels.<sup>6</sup> These include rational choice and

instrumental reasoning,<sup>7</sup> heightened awareness and sensitivity to social and/or political grievance and relative deprivation;<sup>8</sup> and as a response to social dynamics such as perceived social and cultural norms, tacit peer-pressure, conformity, and over-identification with the collective.<sup>9</sup> On the most individualistic end of the gamut of core motivations are theories that posit mental health issues as an essential root cause for suicide terrorism. These can range from neuroticism and emotional dysregulation (e.g., helplessness, depression and/or suicidal tendencies<sup>10</sup>) to aberrant thinking and perception, delusion, and cognitive rigidity.<sup>11</sup>

The epistemological and paradigmatic obstacles to understanding the motivations for religio-political self-sacrifice in the individual terrorist have inevitably been carried over to our understanding of the role of ideology in the individual readiness for suicide terrorism. Consequently, even among experts of terrorism ideologies there is still little consensus as to which values or concepts are primary, central, and essential, and which ones are derivative, negotiable, or superfluous.<sup>12</sup> Similarly to the research on core motives for terrorism, the research on terrorist ideology has also preferentially focused on the more readily available hegemonic, or “top-down,” versions of this ideology, rather than its more individualized or idiosyncratic versions.<sup>13</sup> This representational bias of hegemonic ideology in the research literature is nonetheless at odds with the decisive role that the understanding of this ideology by the individual bomber—however idiosyncratic—presumably has on their readiness to commit terrorism acts in general and join suicide missions in particular.<sup>14</sup>

### ***Existing Paradigms for Probing the Mindset of Suicide Terrorists***

Most attempts to probe the multitude of motives and factors associated with the individual readiness for religio-political self-sacrifice utilize either database-driven or process-driven methodological designs. Database-driven studies attempt to find associations between the individual readiness to engage in suicide terrorism and observable behaviors, circumstances and/or personal attributes. These data are then contrasted with a control group of non-suicide terrorists or equivalent community members that have not turned to political violence.<sup>15</sup> Process-driven studies, in contrast, aim to gauge a presumed internal psychological process—rather than an external attribute—that might be associated with suicide terrorism acts. Notable examples of such internal factors include the personal quest for significance,<sup>16</sup> the response to existential threats and anxiety of death,<sup>17</sup> the defense of sacred values and/or its concomitant sense of identity,<sup>18</sup> among others.<sup>19</sup> Both methodological approaches have provided valuable insights into the complex matrix of factors associated with suicide terrorism on the individual level, and both have important implications for empirically informed counterterrorism policies. However, both approaches have also been criticized for their limited reliability and/or ecological validity when applied to suicide terrorism—especially when they are compared to studies of individuals who committed non-suicidal forms of political violence.<sup>20</sup> Thus, while database-driven studies of suicide terrorism are often more comprehensive in their samples, they are limited to observable data that are often collected after the bombers are already deceased. As such, they are useful in generating hypotheses regarding the circumstances under which an individual is more likely to engage in suicide terrorism, but can shed little light on the cognitive and emotional processes through which these circumstances are being interpreted and personalized to induce in the individual the readiness for religio-political self-sacrifice. In contrast, process-driven studies are able to gauge psychological processes with greater reliability and depth, but as most of these studies require

controlled conditions (e.g., interviews or surveys with “high risk” community members), their ability to approximate the mindset of the suicide bomber within their operative context is compromised. The usefulness of such a tradeoff between ecological validity and increased reliability has been questioned, especially among policymakers, military and law enforcement agencies, and its integration into counterterrorism strategies has been lengthy and arduous.<sup>21</sup>

Research on the individual mindset of Palestinian suicide bombers has capitalized on two integrative paradigms that combine database-bound and process-bound elements. These include interviews with failed Palestinian suicide bombers who are incarcerated in Israeli prisons<sup>22</sup> and psychological “post-mortem” analysis of Palestinian suicide bombers through interviews with their families and friends.<sup>23</sup> In both paradigms, demographic data were contrasted with in-depth psychological interviews to map the interplay, in the mind of the individual suicide-bomber, between external (e.g., age, marital status) and internal determinants (e.g., personality characteristics, mental functioning, individual motivations). The methodological shortcomings of these paradigms are particularly noteworthy, since they are the source for almost all the data on individual suicide terrorists in the Middle East and therefore have far reaching impact on counterterrorism models and policies in the region. One of the most crippling shortcomings is the classified status of prison interviews with terrorists, which preclude sharing them with the larger scientific community for re-analysis, corroboration, or alternative hypothesis testing.<sup>24</sup> In the case of Palestinian terrorism, the access of researchers who do not have security clearance with the State of Israel to incarcerated would-be suicide bombers seems to be particularly difficult.<sup>25</sup>

Another shortcoming of interviews with failed suicide bombers is their resistance (whether explicitly acknowledged or not) to share personal and intimate information. This resistance may be particularly strong in the case of Palestinian would-be suicide bombers who are incarcerated in Israeli prisons. In addition to the cognitive dissonance and mindset shifts that naturally follow any failed terrorism attempt,<sup>26</sup> would-be Palestinian suicide bombers are both incarcerated and interviewed by members of their perceived enemy. The fact that this enemy was so vilified in their eyes as to justify indiscriminate killing of its members can hardly be claimed not to affect their stance vis-à-vis any attempt to be interviewed by such members post-incarceration. Under conditions of failure and incarceration, it is also likely that personal motivations for the terrorism act would be defensively downplayed, while political motivations may be overplayed to conceal them. This defensive overplay of political (and/or non-intimate) motivations for suicide terrorism may also interfere with interview attempts to tap personal religious motivations for suicide terrorism, as the failure to achieve paradise is often perceived by the would-be-martyr as a rejection by God.<sup>27</sup> Overstating political motives while downplaying personal ones has also been suggested as a conscious tactic to manipulate the interviewers into serving as unwitting mouthpiece for the incarcerated terrorists’ propaganda.<sup>28</sup>

Finally, mindset shifts in incarcerated would-be terrorists may also satisfy a dire need to provide the enemy with the information it seeks—which presumably emerge under conditions of torture and existential threat.<sup>29</sup> Although there is virtually no data on such phenomenon in the context of the Israeli–Palestinian conflict, numerous reports have documented a high level of coercion—and most likely torture—in Israeli prisons.<sup>30</sup> The Israeli government, however, openly avows a policy of Obscurity (*amimut* in Hebrew) as regards its incarceration and interrogation practices, and has repeatedly refused requests for independent reviews

of these practices by various UN committees that monitor compliance with the international treaties, conventions, and covenants on torture—on which it is a signatory.

In the case of psychological “post-mortem” interviews with friends and families of suicide bombers, the resistance of the informants to share intimate information about the attacker may involve fears of jeopardizing his or her posthumous stature in the community and/or jeopardizing their wellbeing in the afterlife.<sup>31</sup> These gains in social status may also curry monetary gains in the forms of social benefits or services, and at times are even accompanied by direct monetary recompense for the martyrs’ family.<sup>32</sup> These considerations are particularly hard to circumvent within the tight social control in the Palestinian community—which may explain why friends and family members of Palestinian suicide bombers are rarely interviewed individually,<sup>33</sup> and their independent views of the martyr may therefore not adequately tapped.

Recent legal reviews in Israel have suggested an additional contributor to the reluctance of family members of Palestinian suicide bombers to share information about the martyr’s radicalization process. This is particularly applicable to cases whereby the martyr’s household members admit to knowledge of the bomber’s terrorism readiness, intentions, and plans. Under current Israeli legal praxis, if any household member of a suicide bomber had any knowledge of the mission, their home could be legally eligible for demolition, and they may even face expulsion.<sup>34</sup>

### ***Methodological Advantages of Studying the Mindset of Palestinian Suicide Bombers through Their Personal Farewell Letters***

This article argues that despite the methodological challenges that were described above, Palestinian suicide terrorism may nonetheless be uniquely amenable to a straightforward, empirical, non-coercive, shareable, and methodical examination of the readiness for martyrdom on the individual level. This paradigm is based on the widespread custom among Palestinian suicide bombers to write personal farewell letters—or last wills (in Arabic: *Wasiyah pl. Wasaya*) that are addressed primarily to their immediate family, but also contain messages for their fellow comrades and the Palestinian people at large. In this study, Computerized Text- and Content-Analysis is used to systematically mine these farewell letters for prominent themes, in an attempt to overcome some of the obstacles that were mentioned above.

Although the tradition of writing last wills and farewell letters is practiced in Islamic martyrdom campaigns throughout the world,<sup>35</sup> its popularity in Palestinian suicide terrorism is unprecedented. The ubiquity of this practice in Palestine affords the systematic examination of the cognitive and emotional processes of individual suicide bombers through their language use. A collection (or corpus) of these letters may provide a fairly representative sample of the suicide bomber population at the most relevant (and virulent) stage of their militancy. Additionally, as is the custom with last words of martyrs in the Abrahamic religions, the last wills are canonized after the martyr’s death, and strong cultural and religious prohibitions prevent them from being modified or edited—which further contributes to their viability as substrates for linguistic analysis.

In the context of Palestinian suicide terrorism, the widespread custom to write personal farewell letters seems to be the culmination of a “perfect storm” of sociological factors. First, it is rooted in a well-documented and pan-human interest in last words, especially those uttered by individuals who sacrificed themselves for socially sanctioned goals.<sup>36</sup> The

reverence of last words throughout history is manifest through their canonization and reproduction, which is often concomitant with the beatification of the speaker. In the Abrahamic religions, a person who sacrificed themselves for the religio-political cause is often considered a martyr.<sup>37</sup> In the Palestinian case, the strong interest in last words is evident by strong popular demand for the bombers' last wills in jihadi-tolerant chat rooms and social media sites following news of the bomber's death. This demand seems to be driven mostly by the veneration of the martyr and less from the extent of his success—as requests for a martyr's will are still made on Palestinian jihadi forums even after a failed attack in which the harm to the enemy was negligible, contested by the Israeli authorities, or nil. The community's interest in the martyrs' last words is complemented by the interest of the dispatching organization (e.g., Hamas) to publish the bomber's last will and thus to valorize the martyr as a potential role model for others. In doing so, the dispatching organization also attempts to make political gains by providing their own version of the martyr's motivations, and thus downplay more personal motivations that the martyr may have divulged in their last will. This is usually accomplished by embedding the will, along with the "official" biography of the martyr (*syrah*) and other propaganda material in the form of a military bulletin (*Bayan Askari*) or a poster featuring the martyr. Third, the bombers themselves have a vested interest in the dissemination of their farewell letters, and they often address them to both their families and their people. The need to explicate their actions to their family may be particularly strong, as the martyrs are eager to share details about the long period in which they have kept their intentions and training secret from their family.<sup>38</sup> As mentioned above, keeping this information secret from family members may also serve to protect them against the collective punishment that Israeli authorities practice against households of suicide bombers, such as house demolitions and expulsions.

The bombers' drive to explicate themselves to their parents is further reinforced by a set of religious admonishments—explicitly stated in the Quran and the Hadith both in general and in the context of jihad—that caring for, obeying, and/or minimizing the pain of the parents (and in particular the *mujahid's* mother) outweighs jihad as a holy duty. Thus, disobedience and displeasing of the parents are one of the six major sins (*Kaba'er*) in Islam, while pleasing them is of supreme importance.<sup>39</sup> Moreover, numerous exemplary stories concerning the prophet Mohammad (*Ahadith*), in both Sunni and Shi'a traditions, put the dutifulness toward the parents squarely above the holy war or jihad.<sup>40</sup> These religious considerations loom large in the minds of Palestinian Muslims of the jihad persuasion, as evidenced by the frequent and passionate mention of them in jihad-sympathetic chat rooms and social media sites.

This study argues that the unique confluence of tradition, circumstances, and motives in Palestinian suicide terrorism, along with the omnipresent and decentralized nature of the World Wide Web, afford the corpus-minded psycholinguist with a rare opportunity to systematically examine the mindset associated with religio-political self-sacrifice. Corpus-based psycho- and sociolinguistic analysis is likely to bring us closer to the intimate working of the suicide terrorists mind and mitigate the methodological barriers to studying this important phenomenon.

The methodological paradigm in this study rests on the assumption that Palestinian suicide bombers are the writers of their own last wills, rather than being forced or dictated these wills by the dispatching organization. Testing this assumption using a variety of stylometric and authorship attribution techniques has shown that the wills are not likely to be a product

of “top-down” dictation, but this analysis is beyond the scope of this article and is the subject of a manuscript currently in preparation by the author. Briefly, here are some of the evidence to date for discrediting the idea that the last wills are not written by the suicide bombers themselves: First, when read by Arab speakers, the letters invariably give the impression of being written by different authors with different writing styles, regional dialects, and habitual typos; Second, the letters contain personal instructions for family members that require intimate knowledge of the family. Furthermore, family members would readily notice if the language of the last will differed from that of their loved one and would have turned to social media to express their suspicions—especially in cases when the martyrs operated on behalf of Hamas but came from a family with different political leanings. Third, a thematic analysis of 170 military bulletins (81 percent of the sample in this study), in which the martyr’s last will was posted alongside Hamas’s explication of his actions, showed that the motives that Hamas attributed to the martyr and the motives that the martyr mentioned in his last will are vastly different. Lastly, a formal authorship analysis ascertained that the similarity in the word frequency distribution between the first and second half of each last will is far greater than the similarity to any other half of any of the remaining corpus—formally cementing the impression that the last wills have indeed been written by distinct writers.<sup>41</sup>

### **Content- and Text-Analysis in Terrorism Studies**

Computerized text-analysis, largely popularized in the behavioral sciences by Dr. James Pennebaker, enjoys a broad empirical support for its use of word choice to gauge psychological processes that may take place outside the individual’s awareness. The technique and its derivatives have successfully predicted a range of psychological and physiological characteristics, including immune system functionality,<sup>42</sup> suicidality,<sup>43</sup> and emotional–cognitive style<sup>44</sup>—among others.<sup>45</sup>

In studies of political extremist and terrorism, formal content- and text-analyses have been used only sporadically, and rarely on the individual level of inquiry. To date, studies of extremist propaganda have mainly canvassed secondary sources concerning terrorism (e.g., expert reviews and academic literature) for prominent themes.<sup>46</sup> In contrast, only a handful of studies have used content analysis to *formally* (as opposed to impressionistically) identify themes in terrorist propaganda.<sup>47</sup> Invariably, these studies have been conducted on English translations and/or summaries of primary sources, and all but one<sup>48</sup> have been conducted on the organizational, rather than the individual, level. Studies that attempted to apply content analysis to understand Palestinian suicide bombers on the individual level include Kimhi and Even,<sup>49</sup> who based their analysis on both news reports and their experience with incarcerated “would-be” terrorists whose mission was botched or intercepted, and Pedahzur and colleagues,<sup>50</sup> who used Israeli news reports as their information source on Palestinian bombers.

Computerized text-analysis has only recently been introduced to the study of political extremism, and it largely follows the general trend in suicide terrorism research—exemplified above—of using summaries, reviews and/or English translation of terrorist organizations’ propaganda. Studies using this method have identified intriguing keywords and themes in the extremist literature that were uniquely associated with the propensity of the organization to engage in violent—but not necessarily suicidal—missions.<sup>51</sup>

Interestingly, despite the potential of systematic corpus-based research to mitigate the political, ethnic, and emotional biases that inevitably permeate the study of political violence,

no study thus far has systematically utilized this technique to examine the last wills of Palestinian suicide bombers, despite their availability online.<sup>52</sup> This “blind spot” is all the more puzzling when contrasted to the widespread media coverage (and subsequent popular awareness and political impact) of video clips depicting Palestinian suicide bombers’ last message to Israel and/or the West as their designated enemy.<sup>53</sup> It should be noted in this context that these video clips are far less representative of Palestinian suicide bombers than the widespread tradition of writing personal farewell letters. Moreover, most sociolinguistic theories predict that personal farewell letters to loved ones should be more informative and less defensive than public communiqués whose aim is to threaten the enemy.

Of the text- and content-analytical studies of political violence to date, this is the first one to use programmatic, “bottom-up” text-analysis on “preserved” language samples in the original Arabic to understand suicide terrorism on the individual level. The rest of the article will first describe the construction of the CoPSBFL, and then the select linguistic analyses that were used to shed light on the mindset and motives of Palestinian suicide bombers. The programmatic and sequential nature of the psycholinguistic procedure will also be discussed as a “proof-of-concept” as regards the potential of corpus linguistics to deepen our understanding of the meaning-making process that underpin the individual justification of, and readiness for religio-political self-sacrifice.

## Method

### *Open-Source Search Strategy and its Rationale*

Previous studies, involving both open sources and the so-called Dark Web showed that several unique challenges have to be addressed in collecting a Web-based corpus of potentially transgressive and contested communications.<sup>54</sup> For terrorist communications, the Internet search strategy must address the decentralized and often poorly indexed nature of the data across many communities of users, each with their own combination of social media or preferred online fora—depending on their location, organizational affiliation, and religious/ideological leanings. The search must also take into account the notorious instability of jihadi Islam’s electronic footprint—a result of an ever-changing user dynamics compounded by vehement counterterrorism efforts to shut down “Jihadi-friendly” servers and disrupt access to websites that are deemed seditious.<sup>55</sup>

To maximize the completeness of the data collection in this study while mitigating the obstacles described above, a two-pronged search strategy was used. This strategy consisted of both targeted and non-targeted components. The targeted search component consisted of manual perusal of over 60,000 pages of known Palestinian jihadi websites in search of the suicide bomber’s last will, since many such wills are embedded seamlessly within the local news coverage of the mission or the military bulletins (*Bayan*) and biographical accounts (*Syrah*) posted by the dispatching organization to extoll the bomber as a hero and a role model.

In the non-targeted search, as the name suggests, the search for last wills went beyond known Palestinian websites that host jihadi content to include the entire Web. The non-targeted approach showed that farewell letters of Palestinian suicide bombers are not restricted to Palestinian-centered websites, but rather can be found in about 326 websites that hosted Palestinian content and users. This translated to searching within 4.2 million Web pages. The websites that were used for this study are listed in Appendix A.

In the non-targeted search approach, the name of the martyr, along with linguistic indicators for farewell letters were fed into several search engines. As search engines, this study used Google, Yahoo and DuckDuckGo (each of which was set to minimum constraints and filtering), and the search ran on several independent web browsers (Mozilla Firefox, Microsoft Explorer, and Opera). The redundancy in the search strategy was deemed necessary to counter the various idiosyncrasies in the internal algorithms of these search engines (e.g., PageRank), which could suppress relevant results.

The linguistic markers for last wills were chosen based on recursive word (or bigram) frequency of the extant corpus. Specifically, these keywords represented word combinations in the growing corpus that were identified as statistically more prevalent than their marginal-based chance level. To identify such keywords, I used Dunning's Log Likelihood test<sup>56</sup> on the log-likelihood online calculator hosted at Lancaster University Centre for Computer Corpus Research on Language.<sup>57</sup>

Apart from the name of the martyr and the linguistic markers for farewell letters, the non-targeted search also made use of any distinctive details associated with the event (e.g., names of places and people), as identified in Israeli news media and online terrorism event databases.<sup>58</sup> Since all searches were conducted in Arabic while the details of the operations were culled from reports in Hebrew, Arabic, or English, I included in the search alternative spellings of ambiguous proper names. Due to the fluidity of the jihadi electronic footprint (see above), the non-targeted research was not always conducted directly online. Whenever possible, I performed these searches offline, on a mirror backup of the websites, which I created using "spider-based" website backup software (primarily Offline Explorer Enterprise and Teleport). The mirror backup of the website was treated as a corpus of Hypertext Markup Language (HTML) files, and I carried out the searches using the RegEx search language.

### **Text Selection**

Together, the targeted and non-targeted searches yielded 249 farewell letters. The targeted search, which involved websites of Palestinian organizations that customarily claimed responsibility for suicide attacks, resulted in 205 wills. The non-targeted search of the World Wide Web resulted in 45 additional farewell letters. However, only wills that were associated with the wave of suicide bombers known as the "Second Intifada" (2000–2006) were retained for this study, as they are fairly homogenous in their ideological variants and political circumstances. Further, to control for basic psycholinguistic determinants like age, geographical location (e.g., regional dialect or regiolect), and education level, only bombers for whom this information could be obtained were included in the final corpus. Of the 205 wills from the targeted search, this information could be obtained for 179 bombers, and of the 45 wills that the non-targeted search added, only 32 were written during the Second Intifada and their authors' basic demographics could be obtained. Thus, the final corpus for this study contained  $179 + 32 = 211$  farewell letters.

### **Text- and Content Analysis of the CoPSBFL: Procedure Overview**

As mentioned before, this study aims to strike a balance between the "bottom-up," inductive, or hypothesis-free canvassing of the thematic content of the last wills, and the "top-down," deductive, or hypothesis-driven search (however potentially biased by existing speculations

concerning terrorism motives) for specific ideological or motivational themes that the bombers are presumably preoccupied with as evidenced by their language use.

To minimize confirmation bias—or the tendency to ignore themes that may not be expected based on current models of suicide terrorism—I used a programmatic sequence of linguistic analyses that started with the most comprehensive “bottom-up” array of themes in the farewell letters and gradually qualified them using an increasingly “top down,” of hypothesis-driven queries. For the “bottom up,” hypothesis-free approach I used (1) Computerized Thematic Analysis with an established set of thematic dictionaries and (2) Word Frequency Analysis. Subsequently, for the “top down” approach I used (3) Computerized Text Analysis based on specialized dictionaries that I created for select themes of those identified in the “bottom-up” phase that are frequently mentioned in the literature on the ideological or motivational characteristics of *Salafi-jihadist* suicide bombers (e.g., paradise, historical grievance) and (4) Concordance Analysis, which can uncover mental constructs based on the context in which their associated words were mentioned. Specifically, I used this technique to examine wishes of, and requests made by, the bombers, since those are likely to capture the issues that the bomber is most invested in controlling “from beyond the grave” and therefore may surround issues that the bombers feel most insecure about. In the following sections, I delineate the technical details of each approach.

### **Computerized Thematic Analysis**

First, I carried out a broad thematic survey of the last wills using the CoPSBFL in translation to English and the Linguistic Inquiry and Word Count software package.<sup>59</sup> I chose to work with the English translation of the corpus, at least for this preliminary stage of the data analysis, due to the lack of established computerized thematic dictionaries in Arabic.<sup>60</sup> Additionally, conducting text-analysis (at least in this preliminary stage) is justified on linguistic grounds, since content-related words (e.g., nouns) are more faithfully preserved in translation than pronouns or verbs.<sup>61</sup> Finally, despite the drawbacks of linguistic analysis of translated text, previous studies<sup>62</sup> have used the LIWC software package meaningfully for analyzing jihadi terrorist ideology in translation. This would allow the results from this stage to be compared to and integrated with insights from related studies. Furthermore, the subsequent stages, whereby the corpus is analyzed in the original Arabic, could potentially identify any translation-related artifacts in the results.

### **Word Frequency Analysis**

Word Frequency Analysis of the CoPSBFL was performed on a Unicode text rendition of the entire corpus in the original Arabic, using WordSmith 5.0.<sup>63</sup> This analysis, in which the prevalence of every word of the corpus is tallied is a *de rigeur* “gold standard” in linguistic corpus studies, which provides the most comprehensive and detailed linguistic overview of the corpus. As such, Word Frequency Analysis allows the researcher to concurrently estimate the prominence of a certain theme in the text and the contribution of each individual word to the theme. Furthermore, Word Frequency Analysis may identify prominent words that were not included in the standardized dictionary of the Computerized Thematic Analysis. The high resolution of Word frequency Analysis, however, also poses a disadvantage due to the large amount of data it produces. Thus, a certain theme may be scattered across many unique word forms, representing every conjugation, derivation, misspellings, and (in the case of Arabic) variations in diacritical punctuation. This data proliferation is exacerbated

by the fact that words that appear only once in the text (“hapax legomena”) constitute the majority of any word frequency table. For example, in the CoPSBFL, the 98,501 word forms (known as “tokens” in linguistics) in the entire corpus represent 20,434 unique word, of which 12,619 (close to 62 percent) appear only once.

### **Computerized Text Analysis**

To estimate the prevalence of hypothesis-driven themes that were previously identified in the literature of suicide terrorism, Computerized Text Analysis on the CoPSBFL was performed using a set of computer codes written by the author, on a rendition of the corpus that retained the original spelling or syntax (including mistakes and typos). The computer codes were specifically designed to accommodate the lack of standardized digital coding of Arabic texts language,<sup>64</sup> including the idiosyncratic use of diacritics that is common in Arabic personal correspondence.<sup>65</sup>

Additionally, since the last wills are purported to be missives that explicate the bombers’ actions both to their families and to their fellow Palestinians, the Arabic therein is a mixture of several variants: Colloquial Arabic (“3amiyah”), Modern Standard Arabic (Fusha; The language of politics and media), and Quranic Arabic (or Classical Fusha).<sup>66</sup> As was mentioned above, the internal dictionaries in this stage were designed to accommodate the entire gamut of words in the corpus. Furthermore, to adequately identify words as belonging to a certain theme, the software for this stage also distinguished between “frozen” expression and “true” use of word forms. This was done to accommodate the fact that the texts in the corpus—being both personal and religious in nature—included a large number of bound phrases. This feature proved particularly important for differentiating between the use of the word “Allah” as denoting religious versus cultural themes—as the word may be used as a manner of speech that has lost much of its original religious meaning. As a language that developed largely in Islamic context, many Arabic phrases of Quranic origin that mention Allah are habitually used for expressing a variety of non-religious sentiments (e.g., Insha’llah “God willing,” Ilhamdulillah “thank God”). However, in the context of jihadi writings, phrases that mention “Allah” may also be used in their “proper” religious register. The differentiation between the religious and the cultural uses of the word Allah is therefore crucial in mitigating the over-estimation of religious sentiments in the writings of suicide bombers by confusing bona fide religious expressions with colloquial bound phrases—as would be the case in computerized text-analysis.<sup>67</sup> Based on their use in modern Palestinian Arabic, the full list of phrases that include the word “Allah” and their attribution in this study to either the religious or the cultural register is provided in Appendix B.

### **Word-in-Context (Concordance) Analysis**

Concordance Analysis is a venerable linguistic technique for the disambiguation and characterization of a word meaning through a systematic examination of the context in which this word appears. For this study, however, I used this analysis for further qualifying the results of Word Frequency Analysis and Computerized Text-Analysis. Despite the extensive use of this technique in traditional philological and semantic paradigms, its computerized form is a relatively novel practice, but one that has already resulted in a significant increase in the validity of results that were obtained from “off the shelf” text-analytical software that do not take the word context into account.<sup>68</sup> This practice is even more pertinent to this study, due to the highly morphogenetic nature of Arabic, in which the same word form can have vastly different meanings depending on its context. For example, in the CoPSBFL the word *وعدا*,

depending on its context could mean (1) a promise; (2) they (both) promised; (3) they (both) considered; (4) and calculating; (5) and except for; (6) and he attacks.

As a general rule, I used Concordance Analysis to qualify every ambiguous, polysemous, or homographic word that was identified by Word Frequency Analysis and Computerized Text software. In the Concordance Analysis that I wrote for this study, the key word was presented flanked by the 20 words immediately to its right and left, for each of its appearance in the entire corpus.

## Results

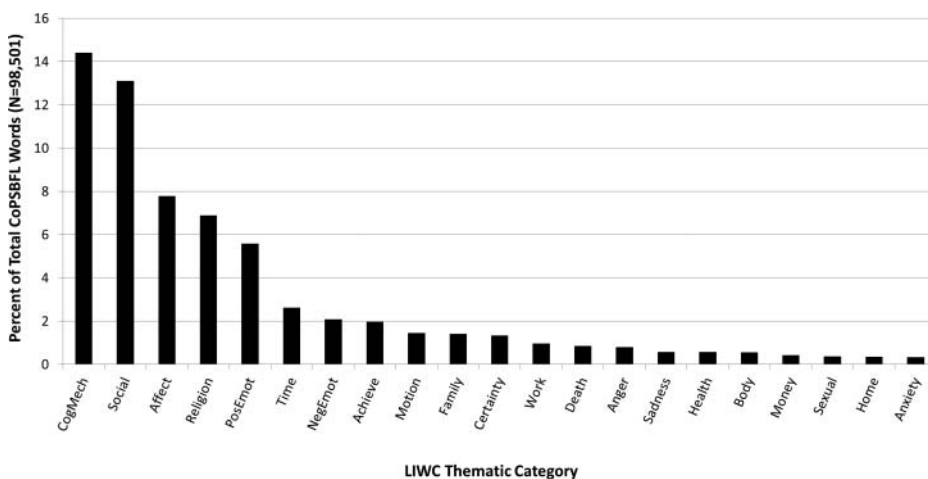
### Computerized Thematic Analysis

As mentioned in the method section above, the initial exploration of the broad themes in the CoPSBFL was carried out on its English version using the LIWC software package. After omitting the non-thematic dictionaries from the LIWC analysis (e.g., pronouns, punctuation marks, auxiliary verbs), the thematic landscape of the last wills in general, as captured by the various LIWC thematic dictionaries, is presented in Figure 1. The results in Figure 1 indicate that, broadly speaking, the last wills are replete with words that are used for explication and persuasion (corresponding to the “Cognitive Mechanisms” dictionary in the LIWC), social concerns, emotion (both in general, and positive emotions in particular), and religious concerns. As Figure 1 indicates, the rest of the LIWC themes appear in considerably lower prevalence.

### Word Frequency Analysis

A more detailed characterization of the concerns and preoccupations that the average suicide bomber might have was accomplished using a Word Frequency Analysis of the entire CoPSBFL ( $N = 211$  wills; 98,501 words).

After constructing the word frequency table for the entire corpus, the 500 most frequent words, accounting for 54.64 percent of the entire text, were selected for further analysis.



**Figure 1.** General thematic survey of the Corpus of Palestinian Suicide Bombers Farewell Letters (CoPSBFL), in its English translation, using Pennebaker’s Linguistic Inquiry and Word Count (LIWC) internal thematic dictionaries.

**Table 1.** Refinement of the categories from the LIWC general thematic survey (Figure 1) based on the first 500 most frequent content-words in the CoPSBFL.

LIWC general theme	Word-frequency-based sub-theme	Examples
Cognitive mechanisms	Persuasion and explication	I ask/implore/admonish you, I'd like to say/argue, I know, opinion, my will, by Allah (vow), etc.
Social	Social embeddedness	My mother, my father, my brothers, beloved, the mujahideen, members, Hamas, Islamic Bloc, your brother, etc.
Religion	Islamic formulae and bound phrases	"God willing," "thank God," "May God's and the prophet's blessings and compassion be with you," etc.
	Spiritual entities	Allah, God, almighty, Muhammad, the messenger (Muhammad's unique title), the prophet, "peace be upon him," etc.
	Abstract religious concepts	The path (of seeking god), paradise, heavens, martyrdom, Godly covenant, belief, etc.
Emotion	Concrete religious concepts	Jihad, mosque, prayer, (prayer of) dawn, supplication, Imam, worship, etc.
		Love, suffering, benevolence, heart (keyword for emotion expressions), forgiveness, etc.

Note: Noun phrases such as "my mother" or "your brother" and even entire clauses such as "and I admonish you" or "forgive me, you two" appear as one word-form in Arabic. For the ways in which this study's results addressed this phenomenon please refer to the text.

Following standard procedures in Arabic corpus linguistics, function words that carry no thematic meaning in the Arabic language (e.g., the Arabic equivalents to "in," "to," "that," "on," "this") were omitted—leaving 204 thematic words. Categorizing these 204 words based on their root (which in Arabic serves as a general indicator for the theme of the word), along with consideration of their use and context revealed a similar thematic composition as the one that the LIWC has found. However, the word-by-word resolution of the word frequency table allowed for the identification of distinct sub-themes within the broad LIWC ones. Table 1 presents both the LIWC themes and the specific sub-themes that were identified using the most frequent content words in the corpus.

Examination of the individual word forms in the Word Frequency table also allowed for estimating the prominence of words whose meaning convey extreme, absolute or overgeneralized quality, such as extremizers and superlatives. The function of these Arabic words is similar to the English extremization markers "all," "any," "specifically," "never," "even if," "uniquely," "excluding," and so on.

Figure 2 shows a word cloud of the entire corpus in its original form, and gives an overall visual sense of the most frequent words and themes therein. The word cloud, in which a word-form prevalence is proportional to its size, was rendered using the Wordle algorithm<sup>69</sup> on the most frequent 146 words of the CoPSBFL corpus, excluding general syntactic particles (see above), but including grammatical particles that are used for reasoning, persuasion and extremization—in recognition of their unique role in ideological texts. In doing so, the word cloud technique goes beyond merely providing information on the most prevalent themes and words in the text, as it also gauges the relative prominence of the various themes in the corpus. This use of content analysis is particularly important in the psychology of motivation and meaning making, as the relative prevalence of the various themes in personal communications has been consistently shown to correspond to their relative importance in the mind of the communicator—whether or not the communicator is aware of it.<sup>70</sup>



relationship terms would ensure the sensitivity of the dictionary to this construct, while ascertaining the unambiguity of these words based on their context would ensure its relevance.

Following this paradigm for optimizing sensitivity and specificity, Computerized Text Analysis dictionaries were constructed for the following frequent themes: “mother,” “father,” “parents,” “paradise,” “virgins,” “intercession” (on behalf of family members, to be forgiven and admitted to paradise) and “revenge.” For specificity’s sake, I selected only the words that are uniquely associated with each of these themes (usually due to their Quranic origin), and ascertained, using Concordance Analysis that they were not used for any other purpose. The exact words, word-stems, and word forms in the original Arabic (including their diacritic variations) that comprise these dictionaries are available from the author on request.

Figure 3 shows the results of the computerized text-analysis for the select themes, and suggests that preoccupations regarding paradise, the bomber’s parents and the ability to intercede on behalf of their family far surpass the average martyr’s preoccupation with revenge. This pattern is further buttressed considering that the sensitivity of the “revenge” dictionary was equal or higher than that of the other dictionaries, as it contained more words and synonyms for the concept. The relative sensitivity of the dictionary suggests that the low frequency in which the concept was mentioned in the wills is not due to an experimenter bias but is rather a reliable reflection on the relative importance of pro-social and interpersonal themes have in the mind of the Palestinian suicide bomber over antisocial ones like revenge.

### Concordance Analysis

As noted in the methods section, Concordance Analysis is mostly used to qualify and disambiguate keywords that were identified as prominent in the corpus using Word Frequency Analysis or Computerized Text Analysis. One of the intriguing results in Figure 2 is the

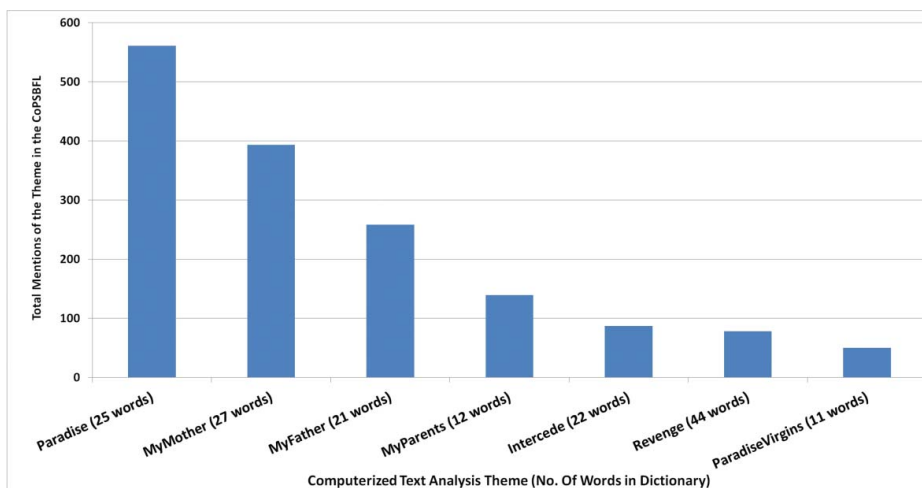


Figure 3. Computerized text-analysis of the prominent themes in the CoPSBFL, as identified through Word Frequency Analysis.

prominence of requests and imperatives (sometimes known as “supplications” in the context of a last will), bearing the general meaning of “and don’t” or “and do not” (both are represented as one word in Arabic, due to its morphogenic nature—as discussed above). Since the farewell letters are (at least in the mind of their writers) the last communication of the suicide bomber with their family and loved one (see introduction for details), this feature of their language may be of considerable importance. From a sociolinguistic perspective, requests and imperatives, especially when they are phrased in negation, serve three pragmatic functions: The first is to communicate a concern or fear that the suicide bomber may have; The second is to express a wish to address and mitigate this fear, and the third is to relate to their readership (either as a suggestion or a command—depending on the urgency of the concern) their opinion how to best address or mitigate this concern or fear. Naturally, the finality of the situation is likely to augment and intensify all three functions—which is why last requests are given special heed in most societies. Of the 722 occurrences of the word “don’t” in all its variations, 121 occurrences were omitted due to being part of Quranic bound phrases and not representing original ideas. [Figure 4](#) lists the top 10 verbs that came after “don’t” (accounting for 41.21 percent of all occurrences of the word in the CoPSBFL), along with examples from the corpus.

## Discussion

This article introduces a novel approach to the study of the mindset and motivations of Palestinian suicide bombers based on the language of the personal farewell letters they sent to their families shortly before embarking on their mission. The paradigm that was used in this study integrates “bottom-up” and inductive linguistic procedures with “top-down,” or hypothesis-driven ones to reach a comprehensive characterization of the mindset associated with religio-political self-sacrifice. Such multi-pronged approach is purported to mitigate and/or complement existing paradigms for the study of suicide terrorism on the individual level, such as “post-mortem” interviews with friends or relatives and interviews of “would-be” suicide bombers whose mission was intercepted or failed. Unlike existing paradigms, the proposed method is non-coercive, shareable in its raw data form, and amenable to a variety of linguistic pattern analyses (in the original Arabic), of which the bombers are presumed to have little conscious awareness or control. The ecological validity of the method is further buttressed by the “canonization” and preservation of the martyrs’ last words and the strong ties that the writers had with their families and loved ones—ties that are likely to confer honesty and intimacy to their farewell letters.

### *Representativeness of the Sample in this Study*

Before elaborating on the findings of this study, it would be useful to gauge the extent to which the 211 last wills that make up the corpus in this study are representative of the population of Palestinian suicide bombers in general. However, as with the methodological barriers that pervade the field, this endeavor, too, is subject to definitional, methodological, and political uncertainties. One of the most fundamental ways in which political considerations intersect with methodological ones in this study is the choice of a group of reference against which the sample should be compared. Thus, to assess the representativeness of a sample, the sub-population of Palestinian suicide bombers in

### Top 10 most frequent verbs after the word "don't"

تحزنوا	be sad (said to a group)
تسوني	forget me (said to a group)
تحزني	be sad (to a woman)
تبكي	cry (said to a woman)
تبكوا	cry (said to a group)
تحزن	be sad (said to a man)
تنسوا	forget (said to a group)
تتركوا	abandon (said to a group)
تسنيني	forget me (said to a woman)
تسونا	forget us (said to a group)

### Example of Concordance items associated with the top 10 most frequent verbs:

تحزنوا لأني ذاهب للحد	إلى إخوتي وأخواتي لا
to my brothers and sisters - do not	be sad for my departure forever
تسوني من الدعاء	أهلي .. أحيتي .. أرجو منكم لا
my family and loved ones, I beg you don't	forget me in your prayers
تحزني وإن شاء الله موعدنا	فلا تزعلي ولا
do not be upset and	do not be sad, and God's willing we will meet
تبكي يا حبيبيتي..	مالي أرى دموعك يا أمه لا
why would you be tearing up, my mother, do not	cry my beloved
تبكوا علي	إخوتي وأخواتي لا
my brothers and sisters do not	cry over me
تحزن إن الله مع الصابرين ،	أبي الغالي لا
my dear father don't	be sad, for God is with the patient ones
تنسوا العهد الذي تفارقنا عليه	جزاكم الله عني خير الجزا لا
My Allah reward you do not	forget the pledge we took
تتركوا الشباب	ووصيتي إليكم بأن لا
and my wish to you is that you do not	abandon our youth
تسنيني من الدعاء في الصلاة	وأوصيك يا والدتي الحبيبة أن لا
and I ask you my beloved mother that you don't	forget to pray for me
تسونا ، نستحلفكم بالله	والإكثار من النوافل ولا
expand your non-obligatory prayers and don't	forget us by the name of God

**Figure 4.** Concordance Analysis of the overrepresented imperative “Don’t”: The upper portion lists the top 10 most frequent uses of the imperative (accounting for 41.2 percent of all occurrences in the CoPSBFL), while the bottom portion exemplifies the technique by listing sentences that correspond to the upper portion. The translations were made by the author.

this study could potentially be contrasted with (1) the number of completed suicide terror attacks as reported by the Israeli government (i.e., mainly those that infiltrated into Israeli borders and inflicted damage that the Israeli authorities admitted); (2) the sum of completed and foiled attacks (with the latter being largely unknown due to Israeli national security concerns); (3) the number of suicide attacks that targeted Israelis at large (i.e., both civilians and soldiers within Israeli borders and Israeli Defense Forces [IDF] soldiers in Palestinian-inhabited areas or in checkpoints)—to name but a few viable reference groups for this task. Arguably, these methodological barriers may partially explain why most studies of individual Palestinian suicide bombers do not mention the representativeness of their sample. In a rare exception, Ariel Merari and colleagues<sup>72</sup> attempted to calculate how representative their sample of would-be suicide bombers is, by comparing them to those bombers whose mission was intercepted before they could

push the trigger. However, the small sample size (four would-be suicide bombers and eleven foiled bombers) did not permit a formal hypothesis testing. Other studies involving would-be Palestinian suicide bombers either explicitly state that they are not representative,<sup>73</sup> or are mum on the issue altogether.<sup>74</sup> The representativeness of these samples is likely low considering that estimates of the total number of incarcerated would-be suicide bombers in Israeli prisons range from about a hundred,<sup>75</sup> to 200,<sup>76</sup> to 250.<sup>77</sup> Due to a variety of reasons in addition to the ubiquitous security concerns, there is no consensual or official statistics on this population from either Israeli or Palestinian sources.

This study adopted a more psychological approach to the definition of suicide bombers and included any Palestinian who died and left a personal farewell letter. This inclusion criterion seems the most ecological and appropriate for studying religio-political self-sacrifice, regardless of whether the suicide bomber died within Palestinian territories while inflicting minimal damage to Israeli soldiers (in which case the incident is not likely to be reported in either the Israeli or the international media). This inclusion criterion is consistent with both the social and religious perspectives, since both the Palestinian community and Islamic doctrine (as interpreted by most Palestinian Imams) would consider them as martyrs for all intents and purposes. This inclusion criterion is also consistent with Claude Berrebi's findings<sup>78</sup> that although 93 percent of Palestinian martyrs write last wills, only 89 percent of the attacks were planned and only 40 percent of those were suicide attacks in the strict sense of the word (i.e., the bomber initiated the attack and controlled the timing of his self-detonation). Using Berrebi's 2007 data, which seems the most complete and inclusive, the sample in this study constitutes  $211/373 = 57$  percent of the suicide bombers in the years 2000–2006. This is consistent with Palestinian data claiming 367 suicide bombers,<sup>79</sup> putting the representativeness of this study at  $211/367 = 57.5$  percent of the Palestinian suicide bombers population. It should be noted that Israel Security Forces official data, which only tallies completed suicide missions in the strict sense of the word within Israeli borders (see above), estimates the number of suicide bombers between 2000–2005 (which mostly overlap the period covered in this study) as  $N = 161$ .<sup>80</sup> This is also roughly consistent with our data, considering the estimated number of Palestinians in Israeli prisons at the same time period for different degrees of involvement in suicide bombing, which, using Israeli sources ranges between 200 to 250.<sup>81</sup> Thus, by most viable estimates, the sample in this study represents roughly 56 percent of the overall population of Palestinian suicide bombers for the Second Intifada (2000–2006).

### ***The Predominance of Pro-Social over Antisocial Motives in Palestinian Suicide Bombers***

Taken as a whole, one of the most consistent patterns across all levels of analysis in this study is the predominance of pro-social sentiments over antisocial ones in the language of the farewell letter—and presumably in the minds of Palestinian suicide bombers. Apart from the frequent use of words denoting straightforward social relations (e.g., mother, father, brothers), most of the cognitive verbs that were used in the letters were also interpersonal in nature, consisting mainly of linguistic markers of social reasoning and persuasion. Even the religious words were preferentially used in their social context, and were mainly used by the bomber

to justify his decision to engage in suicide terrorism. Furthermore, the most frequent religious words in the corpus (see Figures 2 and 3) suggest that even the duty of jihad, which is considered by jihadi terrorist ideology worldwide as an individual duty (“Fard Al Ayn”)<sup>82</sup> is nonetheless construed by most Palestinian suicide bombers largely as a relational wish to attain paradise and be close to God and the prophets and thus able to intercede on behalf of family members so they, too, can attain paradise. In fact, the intertwined nature of these two related wishes (i.e., to attain paradise and to intercede from there on behalf of family members) can be reliably demonstrated using Computerized Text Analysis, since the language that is used to describe them is Quranic in origin and is not used for any other discourse. Computerized Text Analysis further suggests that the pro-social or interpersonal preoccupations with attaining paradise in order to intercede on behalf of family members, along with the general concern for the parents are stronger than any mention of antisocial sentiments such as revenge (for which an exhaustive Arabic text-analytical dictionary could also be reliably constructed).

The prominence of pro-social themes in the personal farewell letters of Palestinian suicide bombers lends a minimally biased empirical support to theories of suicide terrorism that have long suggested that a pro-social set of motives fundamentally undergirds the otherwise antisocial acts that characterize it. In particular, this pattern of results is consistent with theories that highlight the strong social and relational ties of terrorists as a major motivator behind their commitment to the cause.<sup>83</sup> This is particularly true of Palestinian suicide bombers, above and beyond other campaigns of jihadi suicide terrorism, which generally seem to rely on disenfranchised and/or second generation Muslims, who may or may not be committed to local or national causes.<sup>84</sup> Palestinian suicide bombers, in contrast, are often reported to have stronger sense of altruism, presumably borne by their relative ethnic homogeneity and strong sense of social embeddedness and commitment: To their families, their organizations and cells, and to their people and culture in general.<sup>85</sup>

The results of this study also concur with theories concerning the fundamentally interpersonal nature of religion as a motive for suicide terrorism. This was accomplished by carefully differentiating between religious words that the bombers (1) Used to communicate their understanding of Islam as a religious *doctrine*; (2) Used as part of common Arabic phrases whose religious origin was largely inconsequential; and (3) Used to communicate their understanding of Islam as an interpersonal relationship to Allah, including the wish to be closer to him, the Prophets and the Righteous that surround him, and leveraging this proximity to intercede on behalf of other family members. The results of this study, which demonstrate the prominence of the interpersonal—rather than the instrumental or procedural<sup>86</sup>—construal of religious commitment in the mind of the Palestinian suicide bombers, are consistent with evolutionary and psychoanalytic theories of suicide terrorism. These theories suggest that the unwavering fanaticism over religious or sacred values is fundamentally an interpersonal process.<sup>87</sup> This insight may have important counterradicalization implications, as it advocates a shift from the popular rational focus on either scholastic disputation of jihadi doctrine or tilting the cost–benefit ratio (utility function) using individual incentives and punishments. Rather, the insights from this study are consistent with counterradicalization interventions that (re)integrate jihadists into a social context that purports to fulfill their pro-social motives and values using nonviolent tactics.<sup>88</sup>

Lastly, the results of this study shed light on the role of revenge in suicide terrorism. Overall, the “revenge” theme was downplayed in the personal farewell letters of Palestinian

suicide bombers, as is expected based on Islamic and cultural norms (see introduction). This finding seems at odds with several studies concerning the motives for Palestinian suicide terrorism.<sup>89</sup> A closer look at Ariel Merari's unprecedentedly detailed 2010 sample indeed shows that 7 of 12 incarcerated would-be suicide bombers listed personal revenge as "high" or "very high" in their list of motives. Yet, based on psychological reasons that were discussed in the introduction, one should expect a shift towards political and rational explication style under conditions of failure, incarceration and possible coercion. Nevertheless, the heightened sensitivity to pro-social sentiments compared to antisocial ones that was found in this study may help contextualize this revenge motive and perhaps even resolve Merari's somewhat incongruous contention that "examination of the would-be suicides' background hardly revealed any reason for personal revenge. ... Still, several would be suicides indicated personal revenge was important in their willingness to carry out the mission" (p. 125). Thus, consistent with the results of this study, of the four cases that Merari features as examples of high personal revenge motive, only two avenged a primarily personal grievance, while the other two avenged a second-degree relative.<sup>90</sup> Similarly, the two would-be suicide bombers that were featured in Anat Berko's 2007 sample (Jalal and Rifat) cited a non-personal revenge motive. Rather, their actions purported to avenge the Palestinian people at large.

### ***Wishes and Fears of Palestinian Suicide Bombers as expressed in their Personal Farewell Letters: Implications for Counterterrorism***

Above and beyond their generalized pro-social sensitivities, this study shows that Palestinian suicide bombers are particularly preoccupied with minimizing the pain to their parents—and especially their mothers. This finding, whose quantification is unique to this study,<sup>91</sup> is consistent with the position of Islamic scriptures, laws, and traditions concerning the importance of tending to the parents' needs over and above any obligations for militant jihad (see introduction for more details). This concern for the parents, and in particular the mother (who is mentioned in the average farewell letter 1.5 times more than the father, as [Figure 3](#) shows) is disproportional to the representation of other social concerns in the letters, and as such may serve as a direct evidence for a link between religio-political ideology and the internal preoccupations of suicide bombers. In contrast to this religion-bound preoccupation with the welfare of the parents, none of the bombers in this study explicitly acknowledged any of Islam's numerous exhortations to put the parents' farewell before any violent jihadi endeavor. As such, the finding of this study point to an internal conflict in Palestinian suicide bombers vis-à-vis the stark incompatibility of the violent jihadi doctrine with the larger Islamic religion and laws.

Another set of concerns that loom large over the individual decision to engage in suicide terrorism was uncovered in this study using a paradigm that combined Word Frequency Analysis and Concordance Analysis. Following up on the unexpectedly high prevalence of words that denote the imperative "don't" (see [Figure 2](#)), Concordance Analysis showed that individual Palestinian suicide bombers are acutely concerned about (1) the emotional reactions of their family members to their act and (2) to the possibility that their loved ones will forget them. This specific set of concerns can also be viewed as directly related to the fears of the bombers that the hegemonic Hamas ideology might be wrong in its interpretation of Islam and they may not achieve paradise by becoming suicide bombers. Although these fears are not mentioned explicitly in the wills, they nevertheless provide the most straightforward

explanation to the frequency and intensity of these particular exhortation. They are also consistent with in the stipulations of achieving paradise that mainstream Islam posits while the *Salafi-jihadist* ideology downplays or ignores. As was discussed before, attaining paradise in the context of jihad in mainstream Islam is stipulated on it not upsetting the parents (and in particular the mother). However, if the *mujahid*, as is often the case in Palestinian suicide terrorism, concealed their joining the jihad, several traditions claim that the Prophet will not admit the martyrs' souls to heaven unless their survivors express content with the martyrdom and pray for their souls. These considerations may explain why jihadi ideology oftentimes invests considerable propaganda efforts in promising paradise to its fighters and in justifying its attainment. Taken together, the findings of this study demonstrate that known ideological fault lines between mainstream Islam and its *Salafi-jihadist* offshoot—although not explicitly admitted—are nonetheless detectable through the verbal behavior of suicide bombers.

## Conclusion

This study introduces a methodology that could greatly advance our understanding of the intimate workings of suicide bombers minds. As such, it may complement the common practice of extrapolating the motives and rationales of individual terrorists from the ideological communications of *Salafi-jihadist* leaders and ideologues. Similarly, counterterrorism efforts that purport to address the ideology of terrorist organizations as communicated by their leaders may, using the proposed paradigm, tailor their counter-messaging to the concerns of the actual perpetrators of the terrorism act, rather than assume that the hegemonic terrorism ideology is espoused by each and every suicide bomber—a notion that is inconsistent with the results of this study (among a few others).

Further studies may augment the reliability of the approach proposed in this study by combining it with procedures that involve human raters and judgment. The combination of the accuracy and sensitivity of human judgment with the expediency of computerized linguistics can potentially detect even more nuanced (and implicit) attitudes, motivations, and internal conflicts or dissonance in the minds of suicide bombers.

## Notes

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  64. Ahmed ElKholy and Nizar Habash, "Techniques for Arabic Morphological Detokenization and Orthographic Denormalization," in *Proceedings of the Seventh International Conference on Language Resources and Evaluation (LREC)*. Valletta, Malta, 2010; Nizar Y. Habash, "Introduction to Arabic Natural Language Processing," *Synthesis Lectures on Human Language Technologies* 3(1) (2010), pp. 1–187.
  65. Mohamed Maamouri, Ann Bies, and Seth Kulick, "Diacritization: A Challenge to Arabic Treebank Annotation and Parsing," in *Proceedings of the British Computer Society Arabic NLP/MT Conference*. 2006. See also Appendix B.
  66. For further discussion see: Shuki J. Cohen, "The Socio-Linguistics of Arabic Variants in a Corpus of Palestinian Suicide Bombers Last Wills: Implication for Empirical Terrorism Research," *Association Internationale pour l'Étude du Moyen Arabe et des Variétés Mixtes de l'Arabe (AIMA) IV Conference*, Emory University, Atlanta, GA, October 2013.
  67. For a general discussion on the effects of bound phrases and manners of speech on text-analysis results see: Cohen, "Measurement of Negativity Bias in Personal Narratives Using Corpus-Based Emotion Dictionaries."
  68. See more examples in *ibid.* and Cohen, "Construction and Preliminary Validation of a Dictionary for Cognitive Rigidity."
  69. Jonathan Feinberg, "Wordle," in Julie Steele and Noah Iliinsky, eds., *Beautiful Visualization: Looking at Data through the Eyes of Experts* (O'Reilly Media, 2010), pp. 37–58.
  70. Extensive reviews of the various validity indicators (many of which are outside the writer's conscious control) that are associated with prevalence of thematic words can be found in Pennebaker, "Using Computer Analyses to Identify Language Style and Aggressive Intent"; Pennebaker et al., "Psychological Aspects of Natural Language Use"; Tausczik & Pennebaker, "The Psychological Meaning of Words."
  71. While the sensitivity of the text-analytical dictionary is proportional to the prevalence of the words it tallies, its specificity largely depends on whether those words were used exclusively in the sense that the dictionary purports to capture.
  72. Merari et al., "Personality Characteristics of 'Self Martyrs'/'Suicide Bombers' and Organizers of Suicide Attacks."
  73. Kimhi and Even, "Who are the Palestinian Suicide Bombers?" with  $N = 9$ .
  74.  $N = 7$  in Anat Berko and Edna Erez, "'Ordinary People' and 'Death work': Palestinian Suicide Bombers as Victimizers and Victims," *Violence and Victims* 20(6) (2005), pp. 603–623.
  75. Roberts, *Inside the Mind of a Suicide Bomber*.
  76. Kulick, "Israel's Confrontation with Suicide Terrorism."
  77. Berko and Erez, "'Ordinary People' and 'Death work'"; note the consistently higher estimates from Israeli sources with security clearance.

78. Claude Berrebi, "Evidence About the Link between Education, Poverty and Terrorism among Palestinians," *Peace Economics, Peace Science and Public Policy* 13(1) (2007), pp. 1–36.
79.  $N = 367$  according to Hamas official data. Available at <http://www.palestine-info.info/arabic/hamas/shuhda/>
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81. Kulick, "Israel's Confrontation with Suicide Terrorism"; Berko and Erez, "'Ordinary People' and 'Death work.'"
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85. Ehud Sprinzak, "Rational Fanatics," *Foreign Policy* 133 (2000), pp. 66–73; Leonard Weinberg and William Lee Eubank, "Cultural Differences in the Behavior of Terrorists," *Terrorism and Political Violence* 6(1) (1994), pp. 1–18. See also Abufarha, *The Making of a Human Bomb*; Araj, "The Motivations of Palestinian Suicide Bombers in the Second Intifada (2000 to 2005)"; Hafez, *Manufacturing Human Bombs*; Pedahzur et al., "Altruism and Fatalism"; Jeremy Ginges, Ian Hansen, and Ara Norenzayan. "Religion and Support for Suicide Attacks." *Psychological Science* 20, no. 2 (2009): 224–230.
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90. Merari, *Driven to Death*, pp. 125–127.
91. Although it is mentioned *en passant* in Hafez, *Manufacturing Human Bombs* and Berko, *The Path to Paradise*.
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## Appendix A. The websites that were used in the search for Palestinian suicide bombers farewell letters.

<a href="http://www.7raair.com">http://www.7raair.com</a>	<a href="http://www.10neen.com">http://www.10neen.com</a>	<a href="http://www.alqassam.ps">http://www.alqassam.ps</a>	<a href="http://www.al-yemen.org">http://www.al-yemen.org</a>	<a href="http://www.iraqnight.net">http://www.iraqnight.net</a>	<a href="http://www.alborqorum.info">http://www.alborqorum.info</a>
<a href="http://www.gr8.cc">http://www.gr8.cc</a>	<a href="http://www.4as7ab.com">http://www.4as7ab.com</a>	<a href="http://www.alsaher.net">http://www.alsaher.net</a>	<a href="http://www.aqsatube.com">http://www.aqsatube.com</a>	<a href="http://www.isaiarui.com">http://www.isaiarui.com</a>	<a href="http://www.aljazeera.alk.net">http://www.aljazeera.alk.net</a>
<a href="http://djelfa.info">http://djelfa.info</a>	<a href="http://www.alhewar.org">http://www.alhewar.org</a>	<a href="http://www.alsayra.com">http://www.alsayra.com</a>	<a href="http://www.arabprof.com">http://www.arabprof.com</a>	<a href="http://www.kobanisat.com">http://www.kobanisat.com</a>	<a href="http://www.ansurimvoice.com">http://www.ansurimvoice.com</a>
<a href="http://www.7my.com">http://www.7my.com</a>	<a href="http://www.aldair.net">http://www.aldair.net</a>	<a href="http://www.altakwa.net">http://www.altakwa.net</a>	<a href="http://www.azharjet.com">http://www.azharjet.com</a>	<a href="http://www.majalisna.com">http://www.majalisna.com</a>	<a href="http://www.ansar-journal.com">http://www.ansar-journal.com</a>
<a href="http://www.nme.com">http://www.nme.com</a>	<a href="http://www.aldorr.com">http://www.aldorr.com</a>	<a href="http://www.annabaa.org">http://www.annabaa.org</a>	<a href="http://www.brainjnet.com">http://www.brainjnet.com</a>	<a href="http://www.noorsoria.com">http://www.noorsoria.com</a>	<a href="http://www.ar.clip-arabe.com">http://www.ar.clip-arabe.com</a>
<a href="http://www.pfip.ps">http://www.pfip.ps</a>	<a href="http://www.almedad.co">http://www.almedad.co</a>	<a href="http://www.archive.org">http://www.archive.org</a>	<a href="http://www.d-sunnah.net">http://www.d-sunnah.net</a>	<a href="http://www.pal-media.net">http://www.pal-media.net</a>	<a href="http://www.asharqalawsat.com">http://www.asharqalawsat.com</a>
<a href="http://www.roaa.ps">http://www.roaa.ps</a>	<a href="http://www.al7ma.net">http://www.al7ma.net</a>	<a href="http://www.ardknaan.co">http://www.ardknaan.co</a>	<a href="http://www.elkarama.net">http://www.elkarama.net</a>	<a href="http://www.qadsonline.ws">http://www.qadsonline.ws</a>	<a href="http://www.wazzambobooks.4t.com">http://www.wazzambobooks.4t.com</a>
<a href="http://www.ULDY.or">http://www.ULDY.or</a>	<a href="http://www.ansar1.com">http://www.ansar1.com</a>	<a href="http://www.dci-pal.org">http://www.dci-pal.org</a>	<a href="http://www.felestene.net">http://www.felestene.net</a>	<a href="http://www.sandroses.com">http://www.sandroses.com</a>	<a href="http://www.bahrainonline.org">http://www.bahrainonline.org</a>
<a href="http://filexoom.com">http://filexoom.com</a>	<a href="http://www.arabna.com">http://www.arabna.com</a>	<a href="http://www.ebnmasr.net">http://www.ebnmasr.net</a>	<a href="http://www.hizbollah.tv">http://www.hizbollah.tv</a>	<a href="http://www.shahedhb.net">http://www.shahedhb.net</a>	<a href="http://www.fateh-65.own0.com">http://www.fateh-65.own0.com</a>
<a href="http://islamway.com">http://islamway.com</a>	<a href="http://www.azhour.com">http://www.azhour.com</a>	<a href="http://www.elshora.com">http://www.elshora.com</a>	<a href="http://www.islamweb.net">http://www.islamweb.net</a>	<a href="http://www.summereon.net">http://www.summereon.net</a>	<a href="http://www.forums.graaam.com">http://www.forums.graaam.com</a>
<a href="http://up5.m5zn.com">http://up5.m5zn.com</a>	<a href="http://www.bafree.net">http://www.bafree.net</a>	<a href="http://www.etwhed.com">http://www.etwhed.com</a>	<a href="http://www.jidhafi.net">http://www.jidhafi.net</a>	<a href="http://www.alborqorum.inf">https://alborqorum.inf</a>	<a href="http://www.fateh-65.own0.com">http://www.fateh-65.own0.com</a>
<a href="http://vb.x333x.com">http://vb.x333x.com</a>	<a href="http://www.base5.com">http://www.base5.com</a>	<a href="http://www.esawiah.com">http://www.esawiah.com</a>	<a href="http://www.kbwindow.com">http://www.kbwindow.com</a>	<a href="http://www.abutalha.jeeran.co">http://www.abutalha.jeeran.co</a>	<a href="http://www.forums.sosforum.net">http://www.forums.sosforum.net</a>
<a href="http://www.as22.net">http://www.as22.net</a>	<a href="http://www.bdr130.net">http://www.bdr130.net</a>	<a href="http://www.falaja1.com">http://www.falaja1.com</a>	<a href="http://www.kord-can.com">http://www.kord-can.com</a>	<a href="http://www.airsforum.com">http://www.airsforum.com</a>	<a href="http://www.ktab.sosforum.net">http://www.ktab.sosforum.net</a>
<a href="http://www.aw4h.net">http://www.aw4h.net</a>	<a href="http://www.beach2.net">http://www.beach2.net</a>	<a href="http://www.falaja1.net">http://www.falaja1.net</a>	<a href="http://www.lebsouth.com">http://www.lebsouth.com</a>	<a href="http://www.alqasagat.net">http://www.alqasagat.net</a>	<a href="http://www.palestineonly.net">http://www.palestineonly.net</a>
<a href="http://www.c5c6.com">http://www.c5c6.com</a>	<a href="http://www.elagha.net">http://www.elagha.net</a>	<a href="http://www.flashfp.net">http://www.flashfp.net</a>	<a href="http://www.maghrabi.net">http://www.maghrabi.net</a>	<a href="http://www.alarabnews.com">http://www.alarabnews.com</a>	<a href="http://haboubfamily.mam9.com">http://haboubfamily.mam9.com</a>
<a href="http://www.dlyl.com">http://www.dlyl.com</a>	<a href="http://www.elm7abh.co">http://www.elm7abh.co</a>	<a href="http://www.gulfson.com">http://www.gulfson.com</a>	<a href="http://www.mosalman.net">http://www.mosalman.net</a>	<a href="http://www.al-falaja.info">http://www.al-falaja.info</a>	<a href="http://alkarnee.wordpress.com">http://alkarnee.wordpress.com</a>
<a href="http://www.jamaa.cc">http://www.jamaa.cc</a>	<a href="http://www.esnips.com">http://www.esnips.com</a>	<a href="http://www.hanein.info">http://www.hanein.info</a>	<a href="http://www.pala7rar.com">http://www.pala7rar.com</a>	<a href="http://www.ar.kurdroj.org">http://www.ar.kurdroj.org</a>	<a href="http://asd913.maktooblog.com">http://asd913.maktooblog.com</a>
<a href="http://www.m5zn.com">http://www.m5zn.com</a>	<a href="http://www.ikhwan.net">http://www.ikhwan.net</a>	<a href="http://www.i3tesam.com">http://www.i3tesam.com</a>	<a href="http://www.palissue.com">http://www.palissue.com</a>	<a href="http://www.forum.te3p.com">http://www.forum.te3p.com</a>	<a href="http://hamasgaza.wordpress.com">http://hamasgaza.wordpress.com</a>
<a href="http://www.moq3.com">http://www.moq3.com</a>	<a href="http://www.kefayh.net">http://www.kefayh.net</a>	<a href="http://www.imanway.com">http://www.imanway.com</a>	<a href="http://www.paltoday.com">http://www.paltoday.com</a>	<a href="http://www.skyinet-dvb.com">http://www.skyinet-dvb.com</a>	<a href="http://www.almojahden.host.sk">http://www.almojahden.host.sk</a>
<a href="http://www.nohra.ca">http://www.nohra.ca</a>	<a href="http://www.khayma.com">http://www.khayma.com</a>	<a href="http://www.jawwalk.com">http://www.jawwalk.com</a>	<a href="http://www.palvoice.com">http://www.palvoice.com</a>	<a href="http://www.thegulfbiz.com">http://www.thegulfbiz.com</a>	<a href="http://www.audio.islamweb.net">http://www.audio.islamweb.net</a>
<a href="http://www.o2o1.com">http://www.o2o1.com</a>	<a href="http://www.km-pal.net">http://www.km-pal.net</a>	<a href="http://www.jnoubvc.com">http://www.jnoubvc.com</a>	<a href="http://www.palutube.com">http://www.palutube.com</a>	<a href="http://www.startimes2.com">http://www.startimes2.com</a>	<a href="http://www.majdah.maktoob.com">http://www.majdah.maktoob.com</a>
<a href="http://www.o9o9.com">http://www.o9o9.com</a>	<a href="http://www.lahdah.com">http://www.lahdah.com</a>	<a href="http://www.mahjoob.com">http://www.mahjoob.com</a>	<a href="http://www.pdfbooks.net">http://www.pdfbooks.net</a>	<a href="http://www.yabeyouth.com">http://www.yabeyouth.com</a>	<a href="http://www.palestine-info.com">http://www.palestine-info.com</a>
<a href="http://www.QodsTV.I">http://www.QodsTV.I</a>	<a href="http://www.ma3alli.net">http://www.ma3alli.net</a>	<a href="http://www.marah-fm.ps">http://www.marah-fm.ps</a>	<a href="http://www.qalqilia.biz">http://www.qalqilia.biz</a>	<a href="http://www.almosaferon.com">http://www.almosaferon.com</a>	<a href="http://www.sudaneseonline.com">http://www.sudaneseonline.com</a>
<a href="http://94.75.200.163">http://94.75.200.163</a>	<a href="http://www.moheet.com">http://www.moheet.com</a>	<a href="http://www.montada.com">http://www.montada.com</a>	<a href="http://www.sabiroon.org">http://www.sabiroon.org</a>	<a href="http://www.almustaqbal.com">http://www.almustaqbal.com</a>	<a href="http://www.alfazzazi.110mb.com">http://www.alfazzazi.110mb.com</a>
<a href="http://www.3asfh.net">http://www.3asfh.net</a>	<a href="http://www.paldf.info">http://www.paldf.info</a>	<a href="http://www.qassim.com">http://www.qassim.com</a>	<a href="http://www.saidsea.com">http://www.saidsea.com</a>	<a href="http://www.amtwireless.com">http://www.amtwireless.com</a>	<a href="http://www.ezdeeden.com/arabic">http://www.ezdeeden.com/arabic</a>
<a href="http://www.alasra.ps">http://www.alasra.ps</a>	<a href="http://www.qassam.org">http://www.qassam.org</a>	<a href="http://www.moqamrh.com">http://www.moqamrh.com</a>	<a href="http://www.shamiyat.org">http://www.shamiyat.org</a>	<a href="http://www.arabicream.com">http://www.arabicream.com</a>	<a href="http://www.palestine-gallery.co">http://www.palestine-gallery.co</a>
<a href="http://www.aqsa.com">http://www.aqsa.com</a>	<a href="http://www.qassimiy.com">http://www.qassimiy.com</a>	<a href="http://www.qadsnet.com">http://www.qadsnet.com</a>	<a href="http://www.uni-sy.co.cc">http://www.uni-sy.co.cc</a>	<a href="http://www.diwanalarab.com">http://www.diwanalarab.com</a>	<a href="http://www.palestine-info.info">http://www.palestine-info.info</a>
<a href="http://www.aqsa.com">http://www.aqsa.com</a>	<a href="http://www.qaweim.com">http://www.qaweim.com</a>	<a href="http://www.qudsway.com">http://www.qudsway.com</a>	<a href="http://www.vb.x333x.com">http://www.vb.x333x.com</a>	<a href="http://www.diwanalarab.com">http://www.diwanalarab.com</a>	<a href="http://sahsahegypt.blogspot.com">http://sahsahegypt.blogspot.com</a>
<a href="http://www.benaa.com">http://www.benaa.com</a>	<a href="http://www.qudsst.com">http://www.qudsst.com</a>	<a href="http://www.qudsway.net">http://www.qudsway.net</a>	<a href="http://www.zahrapal.com">http://www.zahrapal.com</a>	<a href="http://www.diwanlebanan.org">http://www.diwanlebanan.org</a>	<a href="http://www.asharqalarabi.org.uk">http://www.asharqalarabi.org.uk</a>
<a href="http://www.bo7.or.net">http://www.bo7.or.net</a>	<a href="http://www.qudsway.ir">http://www.qudsway.ir</a>	<a href="http://www.sanabes.com">http://www.sanabes.com</a>	<a href="http://www.abualrish.com">http://www.abualrish.com</a>	<a href="http://www.fatehforums.com">http://www.fatehforums.com</a>	<a href="http://www.forum.alagsaveice.ps">http://www.forum.alagsaveice.ps</a>
<a href="http://www.bsmih.net">http://www.bsmih.net</a>	<a href="http://www.raneem.net">http://www.raneem.net</a>	<a href="http://www.serag77.com">http://www.serag77.com</a>	<a href="http://www.afwajamal.com">http://www.afwajamal.com</a>	<a href="http://www.fateh-voice.com">http://www.fateh-voice.com</a>	<a href="http://www.furat.alwehda.gov.sy">http://www.furat.alwehda.gov.sy</a>
<a href="http://www.difaf.net">http://www.difaf.net</a>	<a href="http://www.rapeta.net">http://www.rapeta.net</a>	<a href="http://www.tibneen.com">http://www.tibneen.com</a>	<a href="http://www.aqsavoice.p">http://www.aqsavoice.p</a>	<a href="http://www.amerobead.maktoobblog.com">http://www.amerobead.maktoobblog.com</a>	<a href="http://www.asharqalarabi.org.uk">http://www.asharqalarabi.org.uk</a>
<a href="http://www.elagha.net">http://www.elagha.net</a>	<a href="http://www.shathaa.net">http://www.shathaa.net</a>	<a href="http://www.traidnt.net">http://www.traidnt.net</a>	<a href="http://www.alarabiya.net">http://www.alarabiya.net</a>	<a href="http://www.fathi2003.maktoobblog.com">http://www.fathi2003.maktoobblog.com</a>	<a href="http://www.forum.alagsaveice.ps">http://www.forum.alagsaveice.ps</a>
<a href="http://www.elaph.com">http://www.elaph.com</a>	<a href="http://www.shff.co.cc">http://www.shff.co.cc</a>	<a href="http://www.weislam.com">http://www.weislam.com</a>		<a href="http://www.islamonline.net">http://www.islamonline.net</a>	<a href="http://www.tamkeen.iragserve.com">http://www.tamkeen.iragserve.com</a>
<a href="http://www.hanein.net">http://www.hanein.net</a>				<a href="http://www.maktoobblog.com">http://www.maktoobblog.com</a>	<a href="http://www.asd813.maktoobblog.com">http://www.asd813.maktoobblog.com</a>

<a href="http://www.hwazn.com">http://www.hwazn.com</a>	<a href="http://www.staaaj.com">http://www.staaaj.com</a>	<a href="http://www.zupload.com">http://www.zupload.com</a>	<a href="http://www.al-ayyam.info">http://www.al-ayyam.info</a>	<a href="http://www.neqashalhob.com">http://www.neqashalhob.com</a>	<a href="http://www.muntada.islamtoday.net">http://www.muntada.islamtoday.net</a>
<a href="http://www.muslim.net">http://www.muslim.net</a>	<a href="http://www.sumood.com">http://www.sumood.com</a>	<a href="http://amshly.jeeran.co">http://amshly.jeeran.co</a>	<a href="http://www.aljazeera.net">http://www.aljazeera.net</a>	<a href="http://www.raofofonline.com">http://www.raofofonline.com</a>	<a href="http://forums.graaaam.com/99093.htm">http://forums.graaaam.com/99093.htm</a>
<a href="http://www.paldif.net">http://www.paldif.net</a>	<a href="http://www.swalif.com">http://www.swalif.com</a>	<a href="http://j-hd.blogspot.co">http://j-hd.blogspot.co</a>	<a href="http://www.alltalaba.com">http://www.alltalaba.com</a>	<a href="http://www.suhbaonline.net">http://www.suhbaonline.net</a>	<a href="http://www.ahmad-ps.freehostia.com">http://www.ahmad-ps.freehostia.com</a>
<a href="http://www.qodstv.ir">http://www.qodstv.ir</a>	<a href="http://www.swalif.net">http://www.swalif.net</a>	<a href="http://news2.jeeran.com">http://news2.jeeran.com</a>	<a href="http://www.almaqdesi.com">http://www.almaqdesi.com</a>	<a href="http://www.thisissyria.net">http://www.thisissyria.net</a>	<a href="http://www.hackjaponaise.cosm.co.j">http://www.hackjaponaise.cosm.co.j</a>
<a href="http://www.rawsh.com">http://www.rawsh.com</a>	<a href="http://www.truveo.com">http://www.truveo.com</a>	<a href="http://www.a7laqalb.com">http://www.a7laqalb.com</a>	<a href="http://www.almotmaiz.net">http://www.almotmaiz.net</a>	<a href="http://www.twoba.201mb.com">http://www.twoba.201mb.com</a>	<a href="http://www.hasanad.maktoobblog.com">http://www.hasanad.maktoobblog.com</a>
<a href="http://www.saowt.com">http://www.saowt.com</a>	<a href="http://www.v.3bir.com">http://www.v.3bir.com</a>	<a href="http://www.al-amanh.net">http://www.al-amanh.net</a>	<a href="http://www.almuhandis.org">http://www.almuhandis.org</a>	<a href="http://www.vard.blogfa.com">http://www.vard.blogfa.com</a>	<a href="http://www.palestineremembered.com">http://www.palestineremembered.com</a>
<a href="http://www.sapsy.com">http://www.sapsy.com</a>	<a href="http://www.wataan.com">http://www.wataan.com</a>	<a href="http://www.al-ayyam.com">http://www.al-ayyam.com</a>	<a href="http://www.al-qatayya.or">http://www.al-qatayya.or</a>	<a href="http://www.modawanati.com">http://www.modawanati.com</a>	<a href="http://www.saleem55.maktoobblog.com">http://www.saleem55.maktoobblog.com</a>
<a href="http://www.saraya-ps">http://www.saraya-ps</a>	<a href="http://www.zahrah.com">http://www.zahrah.com</a>	<a href="http://www.albasrah.net">http://www.albasrah.net</a>	<a href="http://www.al-shaaba.net">http://www.al-shaaba.net</a>	<a href="http://www.garib.modawanati.com">http://www.garib.modawanati.com</a>	<a href="http://www.forum.sh3bwah.maktoob.com">http://www.forum.sh3bwah.maktoob.com</a>
<a href="http://www.ummah.com">http://www.ummah.com</a>	<a href="http://www.zorpi.com">http://www.zorpi.com</a>	<a href="http://www.alboraq.info">http://www.alboraq.info</a>	<a href="http://www.al-shera3.com">http://www.al-shera3.com</a>	<a href="http://www.alsaeef.8k.com">http://www.alsaeef.8k.com</a>	<a href="http://www.ogrisharab.modawanati.com">http://www.ogrisharab.modawanati.com</a>
<a href="http://www.upload.ps">http://www.upload.ps</a>	<a href="http://www.zshare.net">http://www.zshare.net</a>	<a href="http://www.aldeerah.net">http://www.aldeerah.net</a>	<a href="http://www.amalislam.com">http://www.amalislam.com</a>	<a href="http://www.alwatanvoice.com">http://www.alwatanvoice.com</a>	<a href="http://www.shamela.net/get/index.htm">http://www.shamela.net/get/index.htm</a>
<a href="http://www.v232v.com">http://www.v232v.com</a>	<a href="http://www.aboshms.com">http://www.aboshms.com</a>	<a href="http://www.alhawali.com">http://www.alhawali.com</a>	<a href="http://www.aqsaVOICE.com">http://www.aqsaVOICE.com</a>	<a href="http://www.atharshohada.org">http://www.atharshohada.org</a>	<a href="http://www.terrorism-information.com">http://www.terrorism-information.com</a>
<a href="http://www.wa3ad.org">http://www.wa3ad.org</a>	<a href="http://www.al7orya.com">http://www.al7orya.com</a>	<a href="http://www.alibabaa.com">http://www.alibabaa.com</a>	<a href="http://www.as7apcool.com">http://www.as7apcool.com</a>	<a href="http://www.azzambooks.4t.co">http://www.azzambooks.4t.co</a>	<a href="http://www.ranad-1994.maktoobblog.com">http://www.ranad-1994.maktoobblog.com</a>
<a href="http://www.webpsy.com">http://www.webpsy.com</a>	<a href="http://www.al7waz.org">http://www.al7waz.org</a>	<a href="http://www.almatsaa.net">http://www.almatsaa.net</a>	<a href="http://www.assabeel.info">http://www.assabeel.info</a>	<a href="http://www.hewar.khayma.com">http://www.hewar.khayma.com</a>	<a href="http://groups.google.fr/group/modjahed">http://groups.google.fr/group/modjahed</a>
<a href="http://www.zffat.com">http://www.zffat.com</a>	<a href="http://www.al-faloja.w">http://www.al-faloja.w</a>	<a href="http://www.almoltaqa.ps">http://www.almoltaqa.ps</a>	<a href="http://www.binjbeli.org">http://www.binjbeli.org</a>	<a href="http://www.navideshahed.com">http://www.navideshahed.com</a>	<a href="http://www.shbaalahwaz.maktoobblog.com">http://www.shbaalahwaz.maktoobblog.com</a>
<a href="http://www.w7.0zz0.com">http://www.w7.0zz0.com</a>	<a href="http://www.alflela.com">http://www.alflela.com</a>	<a href="http://www.alqimmah.net">http://www.alqimmah.net</a>	<a href="http://www.buscatube.com">http://www.buscatube.com</a>	<a href="http://www.navideshahed.com">http://www.navideshahed.com</a>	<a href="http://www.mansour-al-ahwazi.maktoobblog.com">http://www.mansour-al-ahwazi.maktoobblog.com</a>
<a href="https://alboraq.info">https://alboraq.info</a>	<a href="http://www.almedad.com">http://www.almedad.com</a>	<a href="http://www.alsakher.net">http://www.alsakher.net</a>	<a href="http://www.damasgate.com">http://www.damasgate.com</a>	<a href="http://www.sawtakonline.com">http://www.sawtakonline.com</a>	<a href="http://www.aljazeeraalk.net/forum/archive/index.php">http://www.aljazeeraalk.net/forum/archive/index.php</a>
<a href="http://alfatehmag.net">http://alfatehmag.net</a>	<a href="http://www.almedad.inf">http://www.almedad.inf</a>	<a href="http://www.alshahid.org">http://www.alshahid.org</a>	<a href="http://www.fatehnews.net">http://www.fatehnews.net</a>	<a href="http://www.vb.arabseyes.com">http://www.vb.arabseyes.com</a>	
<a href="http://alsear.qjb.net">http://alsear.qjb.net</a>	<a href="http://www.almmbr.info">http://www.almmbr.info</a>	<a href="http://www.al-shera3.co">http://www.al-shera3.co</a>	<a href="http://www.fileflyer.com">http://www.fileflyer.com</a>	<a href="http://www.vb.arabsgate.com">http://www.vb.arabsgate.com</a>	
	<a href="http://www.alhejom.com">http://www.alhejom.com</a>	<a href="http://www.alsrdaab.com">http://www.alsrdaab.com</a>	<a href="http://www.getalyric.com">http://www.getalyric.com</a>	<a href="http://www.alqsa-online.com">http://www.alqsa-online.com</a>	

Note: Due to the instability of the "dark net," many of these websites are no longer accessible online. Please refer to the text for more information.

## Appendix B. Identification and Categorization of Bound Phrases Containing the Word “Allah”

To increase the specificity and accuracy in estimating the prevalence of religious themes in the texts, and to differentiate them from references to God that may be more mundane or “manner of speech,” a sequence of linguistic procedures was carried out: First, bound phrases were identified using the n-gram detection algorithm in.<sup>63</sup> Then, the computer software written by the author (see method section) identified any three-word combination in the CoPSBFL that could potentially be a part of those n-grams that contained the word “Allah.” This two-prongs approach “bootstrapped” the detection of complex sentences that might not be otherwise detected by the computer due to morphological variations, including typos and/or inconsistent diacritics (e.g., *tashkeel*, *shadda*, *tanween*, *qashida*, etc.). These accommodation of morphological variability were necessary due to the diverse level of literacy among the bombers, compounded by the highly morphogenic nature of the Arabic language—whereby the same word can be written in many different forms.

The categorization to “primarily religious” or “primarily cultural” phrases was based on previous empirical linguistics work of the author in mixed-register Palestinian Arabic,<sup>92</sup> and is presented in the following table:

Primarily Religious	Primarily Cultural
السَّهْيِدِ الْحَيِّ بِإِذْنِ اللَّهِ	الحمد لله
السَّلَامُ عَلَيْكُمْ وَرَحْمَةُ اللَّهِ وَبَرَكَاتُهُ	السَّهْيِدِ بِإِذْنِ اللَّهِ
الْفَقِيرِ إِلَى اللَّهِ	السَّلَامُ عَلَيْكُمْ
اللَّهُ عَزَّ وَجَلَّ	اللَّهُ أَكْبَرُ
اللَّهُ فَيَقْتُلُونَ وَيَقْتُلُونَ وَعَدَا عَلَيْهِ حَقًّا فِي التَّوْرَةِ وَالْإِنْجِيلِ وَالْقُرْآنِ	اللَّهُ تَعَالَى
اللَّهُمَّ خُذْ مِنْ دَمِي حَتَّى تَرْضَى	اللَّهُ يَرْحَمُهُ (هَا)
إِنَّ اللَّهَ اشْتَرَى مِنَ الْمُؤْمِنِينَ أَنْفُسَهُمْ وَأَمْوَالَهُمْ بِأَنْ لَهُمُ الْجَنَّةُ	إِلَى اللَّهِ شَهِيدًا
إِنَّهَا لَشَهَادَةٌ لَا تَنْتَهِي لَا تَنْتَهِي لَا تَنْتَهِي إِلَى الْحَبِيبِ إِلَى الْحَبِيبِ إِلَّا شَرِيدًا أَوْ شَهِيدًا	إِنْ شَاءَ اللَّهُ
أَعْدَاءَ اللَّهِ	بَارَكَ اللَّهُ فِيكَ (م)
أَوْصِيكُمْ بِتَقْوَى اللَّهِ	بِإِذْنِ اللَّهِ
بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ وَالْحَمْدُ لِلَّهِ رَبِّ الْعَالَمِينَ	بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ
بِيُوتِ اللَّهُ	جَزَاءُكَ (م) اللَّهُ عَنِّي
حَسْبُنَا اللَّهُ وَنِعْمَ الْوَكِيلُ	رَحْمَةُ اللَّهِ
فِي سَبِيلِ اللَّهِ	رَسُولُ اللَّهِ
قَاتَلُوهُمْ يُعَذِّبُهُمُ اللَّهُ بِأَيْدِيكُمْ وَيُخْزِهِمْ وَيَبْصُرْكُمْ عَلَيْهِمْ وَيَشْفِ صُدُورَ قَوْمٍ مُؤْمِنِينَ	صَدَقَ اللَّهُ الْعَظِيمُ
كِتَابِ اللَّهِ (وَسُنَّةَ رَسُولِهِ)	صَلَّى اللَّهُ عَلَيْهِ وَسَلَّمَ
وَلَا تَحْسِبَنَّ الَّذِينَ قَاتَلُوا فِي سَبِيلِ اللَّهِ أَمْوَاتًا بَلْ أَحْيَاءٌ عِنْدَ رَبِّهِمْ يُرْزَقُونَ	لَا إِلَهَ إِلَّا اللَّهُ
وَمَنْ أَوْفَى بِعَهْدِهِ مِنَ اللَّهِ فَاسْتَبْشِرُوا بِبَيْعِكُمُ الَّذِي بَايَعْتُمْ بِهِ	وَاللَّهُ الْعَظِيمُ (also the colloq form) اللَّهُ وَالْعَظِيمُ