The Golden Age? What the 100 most cited articles in Terrorism Studies tell us

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In a context where widespread failings in the nature of terrorism research are well recognised - yet where the quantity of work is still enormous - is it possible to fairly assess whether the field is progressing or if it has become mired in mediocre research? Citation analysis is widely used to reveal the evolution and extent of progress in fields of study and to provide valuable insight into major trends and achievements. This study identifies and analyses the current 100 most cited journal articles in terrorism studies. A search was performed using Google Scholar for peer-reviewed journal articles on subjects related to terrorism and counter-terrorism. The most cited papers were published across 62 journals which reflected the interdisciplinary nature of terrorism studies. Compared to other articles, the most cited papers were more likely to be the result of collaborative research and were also more likely to provide new data. 63 of the top 100 articles have been published since 2001. The findings are discussed in relation to the evolution of terrorism research and current debates on progress in the field.

Keywords bibliometrics, citation analysis, citation classics, highly cited articles, terrorism studies

Over the past forty years periodic reviews have attempted to assess the health of terrorism research, highlighting in the process key trends, significant gaps, areas of progress and areas of failure. A recurring theme has been strong disquiet about a range of lingering weaknesses identified within the research literature. Prior to 9/11 dominating concerns were the small size of the active research community and the general lack of research funding, and the range of vices which followed such characteristics, especially limited data-collection and analysis.

Post 9/11, terrorism attracted a massive influx of both new researchers and funding. While this appears to be ebbing to an extent, the area nevertheless continues to attract far more resources than in the pre-9/11 period (and seems unlikely to ever fully return to the severe austerity of that time). The years of bounty, however, have not overcome worries about the quality of research. That the quantity had massively increased everyone agreed. However reviews continue to find problems, particularly that despite the flood of research papers, articles and books, there has been only a minor shift towards more rigorous data collection

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and analysis.\textsuperscript{5} These weaknesses were sometimes partly attributed to long-running disagreement on what terrorism is,\textsuperscript{6} but also to a continuing restricted range of data collection methodologies.\textsuperscript{7} Somewhat linked to such failings, this period also witnessed the emergence of the sub-field of Critical Terrorism Studies, whose driving concerns at least initially revolved around a perception that “terrorism studies appears to be academically moribund and politically biased.”\textsuperscript{8} Overall, the situation tended to throw up an unusual dichotomy. On the one hand, a great deal of new research, but on the other a widespread perception among many experts that the area was struggling to progress, often expressed in what Stampnitzky has referred to as the “rhetoric of failure”.\textsuperscript{9}

A recent example of such rhetoric was provided by Marc Sageman with his claim that research on terrorism has stagnated.\textsuperscript{10} In a stark overall analysis, Sageman concluded that:

it is hard to escape the judgment that academic terrorism research has stagnated for the past dozen years because of a lack of both primary sources and vigorous efforts to police the quality of research, thus preventing the establishment of standards of academic excellence and flooding the field with charlatans, spouting some of the vilest prejudices under the cloak of national security.\textsuperscript{11}

Such a bleak view was not shared by all. While acknowledging there were considerable problems in places, Alex Schmid, for example, argued that there was still significant cause for optimism about the current state of terrorism studies:

Looking back over four decades of terrorism research, one cannot fail to see that, next to much pretentious nonsense, a fairly solid body of consolidated knowledge has emerged. In fact, Terrorism Studies has never been in better shape than now.\textsuperscript{12}

In the immediate aftermath of Sageman’s publication – and probably due to the starkness of his conclusions - several prominent figures within the field provided a counter to his harsh assessment, most highlighting along the way examples of what they felt were good recent pieces of research.\textsuperscript{13} Yet, Sageman’s assessment clearly touched a collective nerve and in such a climate it is perhaps inevitable that the debate around progress (or lack of) should periodically re-ignite. Is a resolution to the debate possible? In a context where widespread failings in the nature of terrorism research are well recognised - yet where the quantity of work is still enormous - is it possible to fairly assess whether the field is progressing or if it has become mired in mediocre research? Citation analysis may help provide some answers to such questions.

**Insights from Citation Analysis**

The past twenty-five years have witnessed an enormous increase in the attention paid to citation analysis, with a growing recognition that this can provide valuable insight into major trends and achievements in different research fields.\textsuperscript{14} Medical research, in particular, has stood out as an area where this approach is used frequently to identify gaps in current knowledge and to build more effectively on past research.\textsuperscript{15}
The number of times an article is cited provides an important measure of its impact in the scientific community.\textsuperscript{10} Works that make a key impact in a field tend to attract a large number of citations.\textsuperscript{17} As Hamrick, Fricker and Brown note “Citations are used to acknowledge prior relevant research, to document sources of information, and to substantiate claims. As such, citations play a key role in the evolution of knowledge.”\textsuperscript{18} The fate of most research papers, however, is to disappear without a trace. Sadly most achieve this with formidable speed: they are published, read by a handful of people and then swiftly forgotten. Between 1900 and 2005, approximately 38 million scientific papers were published. Only 0.5\% were cited more than 200 times. Half received no citations whatsoever.\textsuperscript{19} As a result, most research papers are either never cited or else cited only a handful of times.\textsuperscript{20} Considering that many authors will try to cite their own work at least once in subsequent papers,\textsuperscript{21} the low average underlines the fact that the majority of articles have an extremely limited and short-lived impact. Such is the unhappy fate of most research papers, across most disciplines, and terrorism studies as an interdisciplinary crossroads has certainly not shown itself immune.

In such a climate, it can be worthwhile to consider those papers which buck these trends and especially those which achieve exceptional levels of citation, often referred to as “citation classics”.\textsuperscript{22} Research which is seen as being important and significant will tend to be mentioned more by other researchers when they write their own articles. Really good research will be used by other researchers when they are designing later studies, and comparisons will be made with the earlier results. Overall, \textit{good} research tends to be cited much more frequently in other journal articles.\textsuperscript{23} While there have been some mixed findings, in general papers which are independently assessed as high quality research are much more likely to subsequently achieve higher levels of citation.\textsuperscript{24} Common measures of higher quality research tend to correlate with higher citation levels. For example, reviews find that studies with large sample sizes receive more citations than studies with smaller samples.\textsuperscript{25} Similarly studies which incorporate more measures to improve the validity and reliability of the findings - such as the use of control groups - receive more citations than studies with weaker design measures.\textsuperscript{26}

Citation analysis is often criticised on a variety of grounds. To begin with, even the leading databases used to conduct the analysis (such as Web of Science, Scopus, and Google Scholar) are incomplete. Not everything is included and some academic disciplines are much more thoroughly covered than others. Other weaknesses include the impact of self-citations, and there are also difficulties distinguishing between positive and negative citations. Research may be cited in another article as evidence of a sloppy methodology or foolish conclusions, rather than as an acknowledgment of interesting findings or worthwhile theories and methods. As Kelly et al warn:

\begin{quote}
Numerous biases also exist, including self citation, in-house bias, journal bias, powerful person bias, parochialism by country, state or institution, language bias towards English, and omission bias in not citing competitors.\textsuperscript{27}
\end{quote}

In general, however, detailed reviews suggest that self-citations do not skew lists of the top articles. Indeed, the opposite seems to apply. The most cited articles are \textit{less likely} to include self-citations than average articles, and not surprisingly when reviews of "citation
classics” exclude self-citations from consideration, the list of the most heavily cited articles remains unchanged. 28 Thus we need not be especially concerned with self-citations skewing our list here. Similarly, examination shows that the vast majority of other citations are either positive or neutral, with relatively few being negative. 29 Put bluntly, poor research is generally relatively ignored, and overall, surveys find that good research is much more likely to be cited than bad research.

While citation analysis is not without its limitations and its critics, overall advocates argue that citation counts still remain useful as “a substantial body of literature has shown that the number of citations to scientists’ publications are correlated with other assessments of scientists’ impact or influence.” 30 Similarly, Cohn, Farrington and Iratozqui recently concluded that “it is clear that citation analysis is very important, and it has the advantage of being a scientific, objective, quantitative technique.” 31

As a result, citation analysis can be a useful framework for assessing the quality of articles, as direct citation remains a key indicator of the significance of a research output. Even bearing in mind problems with issues around self-citation, negative citation, etc., the “more times a paper has been cited does reflect the importance and impact that the article has had on the scientific community as a whole.” 32 Examining particularly highly cited articles can reveal “important information about the relatively small number of papers that make a significant impact upon a given field.” 33 Such analysis can reveal the extent of progress in any given field of study.

Bearing this in mind, and considering the wider context of a long-running debate regarding the state of health of terrorism research, it seemed a particularly appropriate time to conduct a review of the most cited articles in terrorism studies. In particular, such a review may provide some meaningful insight on the level of progress in the field and assess the question of whether the area has stagnated or not.

The current review was based on analysis of the most cited articles on terrorism and counter-terrorism as listed in Google Scholar. In recent years, Google Scholar has become an increasingly popular online bibliographic searchable database. It was first introduced in 2004 and contains scholarly works across many disciplines and sources, including theses, books, reports, abstracts, peer-reviewed and non-reviewed articles, and web pages that are deemed scholarly. In its early years the database was criticised on grounds of variable coverage between academic disciplines, unclear definitions of its database content and a lack of precision in its search returns compared to some other databases. 34 Recent years however have seen increasing recognition that Google Scholar is now matching the precision of other databases, is exceeding them in terms of the amount of content included, is outperforming them in terms of returning relevant items and is also notably superior in providing access to free full-text articles. 35 In a recent study on Google Scholar, de Winter, Zadpoor and Dodou concluded that while still not without its limitations, “GS is an invaluable tool for conducting literature research. ... The fact that GS has expanded notably over the last few years and now covers most of the available literature data means that it could be used for meaningful research evaluation.” 36
Even prior to this, Auffhammer had noted that Google Scholar was quickly becoming the primary citation database in many fields.\textsuperscript{37} Not surprisingly, Google Scholar has now been used in a large number of citation based analyses; including efforts to identify the most widely cited articles in various areas ranging from economics, finance,\textsuperscript{38} engineering,\textsuperscript{39} health sciences,\textsuperscript{40} social work\textsuperscript{41} and so on. Further, prior reviews have highlighted that other databases often used for citation analysis, such as the ISI Citation Indexes, while excellent in areas such as physics and chemistry, are rated as only “moderate” in areas like political science and the humanities, which are of strong relevance for any effort focused on terrorism.\textsuperscript{42} There is also a growing acceptance that Google Scholar’s coverage of the social sciences and humanities is at the very least comparable and more usually superior to that provided by other databases.\textsuperscript{43} Bearing all this in mind, and given the strongly interdisciplinary nature of terrorism studies and its leanings towards the political and social sciences in particular, Google Scholar seems to offer effective access to the relevant knowledge base.

Identifying the Most Cited Articles in Terrorism Studies

Peer-reviewed journals are considered particularly important in citation analysis as the peer review process acts as an important quality check to ensure that the published work meets minimum standards in terms of scientific quality and reliability. As Ronald Kostoff concluded ‘Peer review undoubtedly is and has to remain the principal procedure of quality judgement.’\textsuperscript{44} Peer review has its flaws, but so far no other system has been developed which can exceed or even match it in terms of maintaining the quality of scientific literature.\textsuperscript{45} As a result both national research assessment frameworks and academic employment and tenure panels often place a strong emphasis on research publications in peer-reviewed journals, and in some disciplines weighting them heavier or equal to other research outputs.

This focus on peer-reviewed output is also reflected in citation analyses, where the overwhelming majority of such work focuses exclusively on assessing the impact of peer-reviewed journal articles. This current study follows that approach and only considers articles which have been published in peer-reviewed journal articles.

Nevertheless, it is worth adding the caveat that some significant pieces of research will inevitably not be considered here. For example, most readers will appreciate very strongly that some of the most influential published work in the area has taken the form of books. In some cases, books and articles can be linked. Robert Pape’s 2005 book Dying to Win, for example, focused on the same research as his 2003 article in the American Political Science Review.\textsuperscript{46} Both have been highly cited (the book somewhat more than the journal article). But in other cases, there has been no article partnering a high impact book. Good representative examples of this category include Schmid and Jongman’s classic Political Terrorism which has been very influential since its publication in 1988 or Marc Sageman’s heavily cited Understanding Terror Networks to name but two.\textsuperscript{47} Thus it is worth remembering that the published core of the terrorism studies literature will be bigger than
just the peer-reviewed journals considered in this review, while still recognising that these journals do represent a very substantial and important section of that literature.

Google Scholar was used to identify the 100 most highly cited articles published in academic peer-reviewed journals. To identify relevant articles, searches were conducted of the Google Scholar database in June 2013. The following search terms were used: terrorism, terrorist, terror, political violence, radicalisation, radicalization, insurgency, counter-insurgency. These terms are comparable to those used in other bibliometric analysis of the terrorism literature. Articles where at least one of these words appeared on a search setting of “anywhere in the article” were returned. It is recognised though that even using this range of search terms it is possible that potentially relevant articles may still have been missed. An article which focused on a particular group or conflict but which did not use any of the above terms in its text, or which was not published in a journal with at least one of those words in the journal title, would be missed. This might, for example, prejudice some relevant older articles particularly those published before the late 1960s.

All query results were visually inspected for incomplete or inaccurate results. Results for books, book chapters, PhD and other dissertations, conference papers and non-peer-reviewed papers were removed.

Also removed were articles where the search terms had been applied in an unconventional manner within the article which was judged beyond the scope of this review (e.g. articles which referred to domestic violence as “patriarchal terrorism”). That said, in general the review attempted to incorporate a wide-ranging definition of terrorism rather than adopt a narrow framework. For example, violence committed by states was considered along with that of sub-state actors, and the contexts of the violence ran the gamut of criminal, lone actors, small groups, insurgencies, civil war, state actions and so forth, reflecting in many respects the long-running distributed and contested definitions of terrorism.

Similarly, the review was consciously inter-disciplinary in focus and did not restrict the focus to specific academic disciplines. It has been long been recognised within the field that terrorism studies is a strongly inter-disciplinary subject area, and while it has often traditionally been dominated by the political sciences, there have been very significant contributions from other areas, including psychology, criminology, sociology, anthropology, economics, history, religious studies, etc. In adopting such an inter-disciplinary focus the review again follows the approach taken by other recent bibliometric analyses of the area.

Results

The list of the 100 most cited papers is provided in appendix 1. The top paper was cited 3490 times, the 100th paper 177 times. The papers were published between 1952 and 2007. One of the most remarkable and significant findings from the review was just how many of the top cited papers have been published in the last 14 years. Often most cited reviews favour older papers as these have had more of an opportunity to be cited in the literature and to establish themselves as recognised classics. As figure 1 highlights,
however, that trend is conspicuously absent from the terrorism studies literature, with 63 of the top 100 most cited articles published since 2001, and 12 of these published after 2006.

Overall, figure 1 clearly shows that the most significant period for terrorism studies has been during the last 13 years. In terms of a debate as to whether terrorism studies has stagnated or not, figure 1 argues against such a view, suggesting instead that the recent past has been an exceptional era, producing an unprecedented number of high impact articles.

As previously discussed, high levels of citation are usually a reasonable indicator of the quality of the research. Nevertheless, high impact does not automatically imply high quality. In order to assess the qualities of the most cited articles, it seemed sensible to examine the most-cited articles in closer detail. As a comparison this review drew on the findings of previous reviews by Silke on articles published in two core terrorism studies journals between 1990 – 2007. These two core journals were *Terrorism and Political Violence* and *Studies in Conflict and Terrorism*. Contrasting the findings from those reviews with the characteristics of the most-cited articles identified here seemed a useful way to explore whether the most-cited articles were typical of the field or whether they were otherwise distinctive.
An initial factor to consider was how many papers were the result of collaborations? The previous reviews had highlighted that before 9/11, less than 10 percent of articles in the two journals were the work of two or more researchers. The vast majority of studies at that time were carried out by isolated researchers working alone. Individual researchers are clearly more limited in terms of the amount of time and effort that can be invested in a research study. Following 9/11 there was a remarkable increase in collaborative research which rose to 22 percent of papers. This doubtless reflected both the greater availability of funding for work in the area but also an increased interest among researchers (both new and established) for examining issues related to terrorism and counter-terrorism.

Figure 2 shows that the highly cited articles are considerably more likely to be collaborative papers. More than half of the most cited papers are team efforts. As a result, they have benefited from the advantages of multiple authors including being able to invest greater resources and effort in data collection and analysis. In this regard, the most cited articles are comparable to those in other fields where multi-authored papers also dominate the top cited lists.55

The expectation that collaborative research is more likely to be associated with data collection is borne out by figure 3. This shows the percentage of papers which provided new research-based data. A long running criticism of terrorism studies has been the very heavy reliance on literature review methods. Schmid and Jongman, for example, were very critical of the paucity of fresh data which researchers were producing in the 1980s.56 The data from Silke shows that this problem continued in the 1990s with only 32 percent of the research papers adding data which was previously unavailable to the field.57 In the two core journals
the situation had not improved greatly up to the end of 2006, where despite the influx of additional researchers since 9/11, only 35 percent of articles provided new data.

The most cited articles stand in marked contrast to these trends. As figure 3 shows, 47 percent provided fresh data which was previously unavailable. There was still a relatively high proportion of review articles, though overall it is normal in most fields for at least a moderate proportion of the most cited articles to be review papers.58

**Discussion**

In assessing the merits of the most cited articles on terrorism, this review suggests that the prominence of many of these articles is at least partly due to their more rigorous methodologies (compared to the average paper) and to the fact that they have produced important new data. The high level of collaborative papers among the most cited again is a reflection that greater resources were available to allow more ambitious data collection and analysis – ambition which paid off in the subsequent prominence of the paper. A key trend in this review is the extent to which the list is dominated by recent papers. 62 percent have been published since 9/11, and there is a strong perception that this dominance of post 9/11 research papers will only deepen.

While the most cited list supports Schmid’s argument that research on terrorism essentially began in the 1970s, 9/11 and its aftermath has radically transformed the extent of this research. Overall, the last fourteen years have effectively witnessed a powerful renaissance.
period for the scientific study of terrorism. Back in 1963, Derek de Solla Price observed that, “Eighty to 90 percent of all the scientists that have ever lived are alive now.”69 Today we can say with equal confidence that at least 95 percent of all scientists that have ever studied terrorism are alive now. Powerful consequences follow from this in terms of the field’s vibrancy and evolution. While a great deal of the recent work on terrorism is of mediocre or questionable quality, there is still more high impact work being published now than at any previous time.

In considering how to appropriately rate and regard the most-cited papers identified here, it is probably useful to consider the ideas of Cole in relation to what he called core knowledge and frontier knowledge.60 Frontier knowledge consists of all the output currently being produced by active researchers. In terrorism studies we are currently swimming in a blizzard of such work. As Cole warned the vast majority of these new contributions are destined to disappear without a trace and will “be of little or no lasting significance ... Most of the work produced at the frontier has little or no impact on the development of community-based knowledge.”61 In contrast to the fleeting frontier studies, core knowledge represents theories, methods and findings which are accepted by the scientific community as important.

Thus the most cited articles identified here can be seen to represent at least part of the core knowledge of terrorism studies. The high level of citations reflects a consensus view by the scientific community that these papers are particularly important in the field. That a large proportion of these core articles are very recent suggests that terrorism studies is experiencing an especially dynamic period. Indeed, far from being stagnant or moribund, terrorism studies is arguably enjoying a golden age. High impact articles are appearing at a rate never before seen, and the core knowledge of the area is shifting and coalescing around new research and theories. The golden age does not, however, imply that the attributes of the most cited articles are common among the mass of new papers. They are not. The typical failings highlighted by Sageman and others are legitimate and widespread. Cole would argue, however, that a huge quantity of mediocre research doomed to disappear is common across all disciplines. For terrorism studies, that we should have so much dross to wade through should not in itself be overly discouraging, particularly in light of the gems which are emerging.

Acknowledgments

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Notes


6. For example, see Young and Findley (note 4).


12. Schmid, (see note 1), 470.


28. Lawani (see note 24); and, Aksnes (see note 21).
29. Ellen Cohn and David P. Farrington, "Who are the most influential criminologists in the English-speaking world?" British Journal of Criminology 34, no. 2 (1994): 204-225.
31. Cohn, Farrington and Iratzoqui (note 13), vii.


41. Hodge, Lacasse and Benson (note 33).


47. Schmid and Jongman (note 1); Marc Sageman, Understanding Terror Networks (Pennsylvania: University of Pennsylvania Press, 2004).


51. For example, Schmid and Jongman (note 1) and Schmid (note 1).

52. For example, Magnone (note 48).


56. Schmid and Jongman (note 1).

57. Silke (note 2).

58. Aksnes (note 55).

59. Derek Price de Solla, Little Science, Big Science ... and Beyond (New York: Columbia University Press, 1963), 1.


61. Ibid., 16.
Appendix 1: Top 100 cited articles ranked in order of citations received

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