MAPPING A DARK NETWORK WITH SOCIAL NETWORK ANALYSIS (SNA): THE RIGHT WING VAAL DAM BOMB PLOT

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Abstract

The use of Social Network Analysis (SNA) to map dark, i.e. illegal, networks gained momentum after the 9/11 attacks on the World Trade Centre in New York, and numerous studies have been conducted that map Islamic extremist organisations. This article follows international studies and contemporary practices in military intelligence in using SNA to map the ties of the members of the Southern right wing group plot to blow up the Vaal Dam, who were arrested in 2002 and subsequently convicted of sabotage. It is shown how the leader of the plot consistently scores highest on betweenness, degree, and closeness centrality, and that he played an important role as broker between the Southern and the Northern groups (better known as the Boeremag). Ties between the two right wing groups are also discussed, along with the important structural roles that their meeting places played.

Keywords: Social Network Analysis; intelligence; terrorism; Vaal Dam plot; Boeremag; right wing.

Sleutelwoorde: Sosiale Netwerkanalise; intelligensie; terrorisme; Vaaldam-komplot; Boeremag; regtervleuel.

1. INTRODUCTION

Despite widespread media coverage, relatively little has been written about right wing terrorist groups in South Africa. Schönteich and Boshoff's (2003) study provides a thorough historical contextualization of the phenomenon, but as with other studies on the subject (e.g. Schönteich 2004; Blaser 2004; Hübschle 2004; and Botha 2009), they include very few details on the right wing itself, and none of these studies address the Southern connection of the Boeremag. On 28 March 2002, police arrested the members of a group that allegedly planned to bomb the Vaal Dam, and Leon Thomas Peacock, Hercules Michael Viljoen and Allen Rautenbach were subsequently convicted of sabotage. Although claims were made that they were not part of the highly-publicised Boermag's supposed plot to overthrow the ANC-led government and should be considered separately from the Boeremag, it will be shown in this article that connections between the two groups did exist. The ties between the two groups were minimal, and it is indicative of the two groups' independence that members of the Southern group are not listed

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as "political prisoners" on 1 (Anonymous 2010), while this website contains the most comprehensive list of currently incarcerated right wing extremists available. The members of the Southern group have distanced themselves from the Northern group (Versluis 2003:2), and together with the list on www.volkstaat.net, there is sufficient basis for discussing the two groups separately.

In recent years, network theory has emerged as an important interdisciplinary paradigm in complex systems research, arguing that the network structure of complex systems (including social systems) facilitates a system's functioning. Network theory is applicable to complex systems as diverse as metabolic processes, ecosystems, power grids, film actors and international trade, and numerous theorists have noted the near-universal attributes of networks (Barabási 2009:412; Watts 2004[2003]:65). Authors studying security issues, such as Krebs, Kochade and Everton, have also embraced this approach, and Kennedy & Weimann (2011:201) write: "Attempts to apply social network theories to analyses of terrorist communication are becoming increasingly popular." Borgatti *et al.* (2009:893) note that of all the disciplines that now incorporate network theory, security is probably the field that incorporate it the most:

> "Of all the applied fields, national security is probably the area that has most embraced social network analysis. Crime-fighters, particularly those fighting organized crime, have used a network perspective for many years, covering walls with huge maps showing links between 'persons of interest'. This network approach is often credited with contributing to the capture of Saddam Hussein. In addition, terrorist groups are widely seen as networks rather than organizations, fueling research on how to disrupt functioning networks. At the same time, it is often asserted that it takes a network to fight a network, sparking military experiments with decentralized units."

This article follows the example of Krebs (2002), Kochade (2006), Rodriguez (2005), Everton (2009), Roberts & Everton (2011), Kennedy & Weimann (2011) and others who have used SNA to map Islamic extremist networks by investigating the small Southern connection of the so-called Boeremag: the Vaal Dam plot-group. Openly available data was used in this study, including newspaper articles, websites, witness affidavits, and court reports. However, because the reliability of sources is a major problem in this case, preference was given to the court verdict on the appeal of Peacock, Viljoen and Rautenbach (High Court of South Africa 2004), which in any case offers the most detailed historical overview of the events leading up to the arrests of the plot members. All other sources were therefore used in a supplementary capacity to inform the context of their social ties beyond the network itself. As much information as possible was entered into a database, including connections between people, where meetings took place, organizations they belonged to, etc. All their interactions and connections were mapped using Social Network Analysis (SNA) software, Sentinel Visualizer, which was specifically developed for the US Intelligence Community (IC). The resulting network is what Henke (2009:17) calls a meta-network, which has two defining characteristics: "It

is multi-mode with several different entity classes such as agents, actions, locations, and so on, as well as multi-plex with several different types of connections such as financial and directive." Any tie between a person and a place or another person was therefore recorded as e.g. X met with Y, Y resides at Z. Although this network is much smaller than the Islamic networks analysed in the abovementioned studies, it is shown how the same principles apply, and it is also illustrated that this approach can offer useful insights into South African issues as well.

2. THEORETICAL BACKGROUND

Network theory's development in the twentieth century occurred in parallel with developments in intelligence analysis. The roots of SNA (the social branch of network theory) are usually traced to Jacob Moreno, whose publication of *Who shall survive?* (1934) was "a signal event in the history of social network analysis" (Freeman 2004:7). During the time when Kurt Lewin – whose works had a definitive impact on the development of SNA (Prell 2012:24) – published his seminal works on the social field (1939 and 1951), the IC developed "traffic analysis" (also known as *communication link analysis*), as Ressler (2006:6) states:

> "This technique consists of the study of the external characteristics of communication in order to get information about the organization of the communication system. It is not concerned with the content of phone calls, but is interested in who calls whom and the network members, messengers, and gatekeepers. Traffic analysis was used by the British MI5 internal security service to combat the IRA in the 1980s and 1990s and continues to be used across the world by law-enforcement agencies including the U.S. Defense Intelligence Agency (DIA) [and the] Office of National Drug Control Policy" (see also Roberts & Everton 2011:2).

Another similar method, the Village Survey Method, was introduced by Ralph McGehee in Thailand in the 1960s, and was used to analyse family and community ties to identify the covert structure of local and regional Communist Party membership and arms training (Roberts & Everton 2011:2).

SNA continued to develop in parallel with traffic analysis and the Village Survey Method through the 1960s and 1970s, particularly through Harrison White, Barry Wellman, Mark Granovetter and Stanley Milgram, and the field gradually developed its own institutions, journals and software, as well as formulas for calculating the roles individuals fulfil in large networks (see Bavelas 1948:16-30 and Freeman 1979:215-239). The Information Revolution in the 1990s enabled a growth spurt in both the IC and in the academic community, where increasing computing power and the availability of large datasets allowed for the analysis of much larger networks (Albert & Barabási 2002:483), which also had implications for network theory itself. In the academic sphere, this spurt was expedited by two publications in particular: Watts & Strogatz (1998) and Barabási & Albert (1999), who both broadened the field of network theory to include various other complex

systems, apart from the social, and focused on identifying universal characteristics of complex networks, such as small-worldedness, scale-free link distributions, clustering, assortativity, robustness and degree correlations. These theoretical insights further influenced the intelligence analysis-branch of SNA, as will be shown later.

At the same time, network theory gained prominence within the IC. Already in 1991, Sparrow (1991:251-274) advocated for the application of network analysis to criminal intelligence, and Henke (2009:5) calls Arquilla, Ronfeldt & Zanini (1999) "the first dedicated analysis of information age terrorism". The attacks on the World Trade Centre on 11 September 2001 provided impetus for an amplified interest in SNA from the IC, together with enlarged defence expenditure, which facilitated the development of increasingly sophisticated software, and a fuller integration of intelligence analysis methods with network theory. Numerous software platforms, including Sentinel Visualizer, Starlight VIS, and i2 Analyst's Notebook were developed around this time, some with funding specifically allocated from the US Defence budget.

Soon after the invasion of Afghanistan, studies using SNA to map terrorist networks emerged. Valdis Krebs (2002) was the first to apply SNA to terrorist networks (Koschade 2007:131), where he used open-source information to map the ties between the 9/11 hijackers, indicating that Mohammed Atta was the ring leader of this plot (Krebs 2002:47) by using SNA's formulas for betweenness, closeness and degree centralities. Rodriguez (2005) mapped the network responsible for the March 2004 Madrid bombings, Carley *et al.* (2003) analysed the Al-Qaeda cell that was responsible for the 2002 bombing in Tunisia, while Koschade (2006) mapped Jemaah Islamiyah, and Roberts & Everton (2011) mapped the connections of Noordin Top. By 2006, the new *The US Army and Marine Corps Counterinsurgency Field Manual* (Petraeus 2006:B10-B17) dedicated an entire section to SNA for military intelligence purposes, where Petraeus calls SNA "a tool for understanding the organizational dynamics of an insurgency and how best to attack or exploit it" (2006:B10). Ressler (2006:7) remarks:

> "Many government agencies, such as the Defense Advanced Research Projects Agency (DARPA), U.S. Army Research Labs, the U.S. Office of Naval Research (ONR), the National Security Agency (NSA), the National Science Foundation (NSF) and the Department of Homeland Security (DHS), have funded research related to social network analysis."

Petraeus (2006:1-17) defines a network simply as, "a series of direct and indirect ties from one actor to a collection of others". Simply stated, a network consists of entities (also called *nodes*, *actors* or *vertices*), and the ties (*links*, *connections*, *relationships*, or *edges*) between them. The key to understanding the network, as Lawson, Ferris, Cropley & Cook (2006:9) write, is that the connections result in complex emergent properties:

> "A network is formed when a number (between two and infinity) of distinct entities that may be similar or dissimilar (nodes, elements, components, people, military formations, software instructions) are connected and interact such that new properties or behaviors emerge that are beyond the capabilities of any of the entities acting alone. These emergent properties cannot be predicted using reductionist consideration of the distinct entities. They are of interest because of the functions they perform and the purposes they serve, while the distinct and dissimilar entities included within a particular network boundary are those that are understood to be most significant in determining the emergent properties."

The IC learned from research done in sociology, anthropology, and more recently, physics. SNA's formulas for degree, betweenness, and closeness centrality are now embedded in SNA software developed for the IC, and the underlying theory is discussed in the *The US Army and Marine Corps Counterinsurgency Field Manual*. Granovetter's "strength of weak ties" hypothesis (1973) was appropriated into studies of terrorist networks (Rodriguez 2005), and studies of network robustness, which refers to the "ability of a network to avoid malfunctioning when a fraction of its constituents is damaged" (Boccaletti *et al.* 2006:213), obviously also has important ramifications for the analysis of "dark", i.e. illegal, networks. Complex networks of all types (including social, technological, information and biological networks) were found to be robust against random failure when they lost some of their nodes, *but* a targeted attack on the best-connected nodes, as usually identified through closeness and betweenness centrality (see below) can result in cascading failures (Watts 2004[2003]:191-192 and Kitano 2002:208), which means that if these best-connected nodes are lost, the network disintegrates rapidly. In terms of terrorist networks, if these best-connected nodes (usually the leaders of the organisation) can be identified and targeted, the network can be disrupted in the most cost-effective way. Petraeus (2006:B12) writes that it is precisely the ability of SNA to identify key figures in large masses of data that makes it so valuable for intelligence purposes, and although he does not use the term *robustness*, he writes that SNA helps identify "points of failure".

The analysis of dark networks, as opposed to light networks (e.g. the film actor network or an interlocking network of company directors) is compounded by three issues in particular: incompleteness of data, fuzzy boundaries and dynamic and evolving networks (Everton 2009:7 and Sparrow 1991). Firstly, Everton (2009:7) writes, "analysts are constantly faced with the possibility that our data are incomplete. This speaks to the importance of considering the adoption of strategies that improve our intelligence gathering capabilities." An intelligence analyst will have access to sources not available to the academic researcher, such as Imagery Intelligence (IMINT) and Signals Intelligence (SIGINT), while the academic researcher's sources are usually limited to Open-Source Intelligence (OSINT). However, the academic researcher is often further removed in time from the event than the intelligence analyst, allowing for the use of a greater number of sources. For example, much of the information on the Vaal Dam group only emerged during

the trial, and court reports, as well as media reports of the on-going trial, were vital in this analysis. While the intelligence analyst therefore confronts incomplete data because of his proximity to the event, the academic researcher is also confronted with incomplete data, albeit for different reasons. The best solution is to incorporate as many sources as possible. In the IC community, the integration of all-source intelligence is the best way to ensure the comprehensiveness of data (Sims 2001:42). In academic research, one way to ensure the comprehensiveness of data is to integrate various mediums. For this purpose and for this study, all court reports that were available, a large number of sources available on the World Wide Web, over a thousand newspaper clippings relating to the Boeremag and the Vaal Dam plot, and every academic study that could be found, was consulted. Nevertheless, the data is necessarily incomplete, because the researcher does not have access to IMINT, SIGINT, etc.

Secondly, fuzzy boundaries denote the phenomenon that it is difficult to distinguish where one network ends and another begins. This is a pertinent issue when investigating the ties between the Northern group (commonly known as the Boeremag) and the Southern group (the Vaal Dam plot), where actors play a role in both groups – not only the leadership, but the police informants as well. To simplify this issue, the members of the Southern group are therefore identified as those convicted in the Bloemfontein High Court on charges of sabotage, as named in Appeal A12/2004 of the High Court of South Africa (2004). Nevertheless, information on the Northern group did shed light on some connections with the Southern group, which suggests that an analysis of the Southern group should at least keep the Northern group in mind.

Thirdly, the aspect of dynamically evolving networks refers to the fact that ties are continually formed and severed in real networks (a process that may be difficult to observe because of incomplete data). This problem is eliminated by viewing the Vaal Dam historically. Pre-trial meetings are of course no longer taking place, and thus the data issue is annulled by the current approach, which only considers the finished trial report.

To these issues should be added the familiar problem in intelligence collection of the reliability of the source. Sentinel Visualizer has a built-in feature to rank source reliability for this specific purpose: especially OSINT is prone to inaccuracies (Krupa 2012:27). The same issue confronted the researcher in this study. Botha (2009:149), for instance, calls Johann Niemöller the "reputed leader of *Die Volk*" (a right wing organization) while Deon Loots describes Niemöller as a member of Military Intelligence (Loots 2013:3). While most newspaper reports name Mike du Toit as the author of the infamous Document 12, which outlined the Boeremag plan to overthrow the government, Loots (2013:6) states that the document was manufactured by the Crime Intelligence Unit.

In terms of the Southern group, numerous claims were made that they were not affiliated with the Northern group (Versluis 2003:2; JB 2003:12), and yet the Boeremag plan supposedly *included* blowing up the Vaal Dam (Prince 2012:12; De Lange 2012:6; Jacobson 2002:17). Another relevant issue is the connection between Lourens du Plessis and the Boeremag, which is discussed later. Given the controversy surrounding the case, as well as conflicting testimonies, the decision was therefore made to take the most-verified source relating to the Vaal Dam plot, the High Court Appeal A12/2004 (High Court of South Africa 2004), as the authoritative source. The only details that were not contained herein were newspaper reports and witness affidavits used as supplementary sources.

It is important to note that while the network approach considers the ties between people and the roles they play in an organization, and assigns roles to entities based on this network structure, this does not mean that the network does not have some sort of hierarchy, as Henke (2009:10) writes:

> "Just because a given organization is 'networked' does not mean that there is no hierarchy to the organization or that no given individual is in charge. All organizations are hierarchical to some degree regardless of the type of structure that organization conforms; the structure dictates how control is effectively or ineffectively exerted, which may vary by situation. As a result, viewing terrorist networks as 'leaderless' does not accurately depict the reality at hand."

Often lacking in-depth knowledge about who the leaders of dark networks are, the leadership can usually be identified using the centrality score of an individual in the network. According to Everton (2009:15), "most social networks contain people or organizations that are more central than others and because of their position, they often enjoy better access to information and better opportunities to spread information". These centralities can be measured with Freeman's (1979) formulas for degree centrality, closeness centrality, and betweenness centrality, all of which weigh an entity's importance in a network relative to other entities, as is discussed in the following paragraphs.

Degree centrality is simply "the count of the number of an actor's ties" (Everton, 2009:15), in other words, an entity's direct connections. While degree centrality is not a measure of influence, because an entity can have a high number of ties to less important entities, it is an indication of activity (Petraeus 2006:B14; Kochade 2007:159), with the entities with the highest degree centralities being the most active entities in a network. Closeness centrality indicates to what extent an entity is close to most other entities in a network (Everton 2009:15), and identifies "the ability of actors within a network to access others" (Koschade 2007:160). Betweenness centrality measures to what extent "each actor lies on the shortest path between all other actors in a network" (Everton 2009:15). Betweenness centrality is usually interpreted as a way of finding the most important entities in a network, for without these entities, the network loses coherence and becomes fragmented.

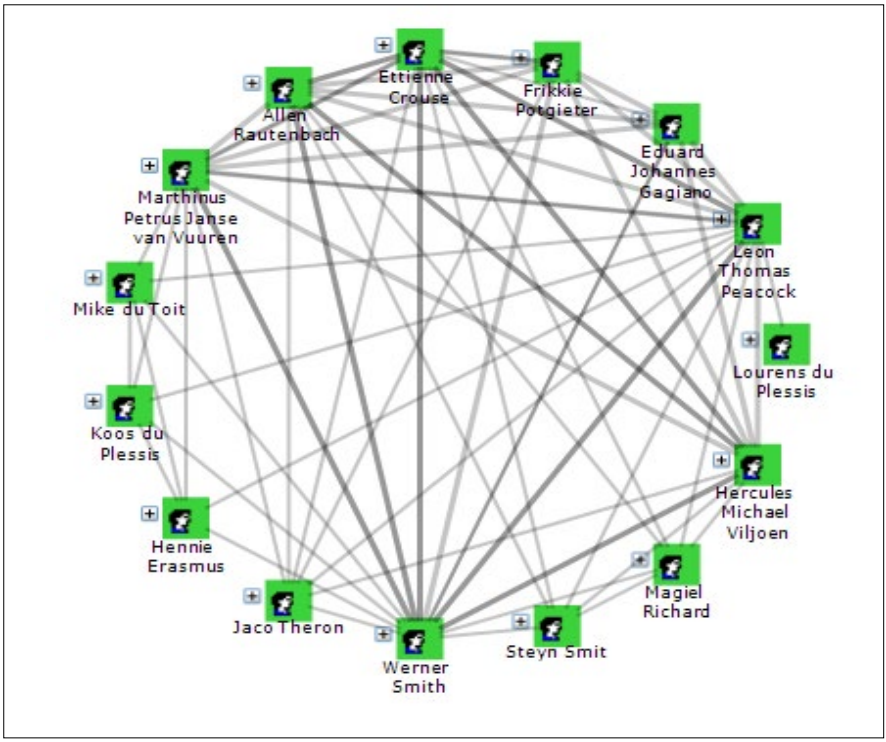
In terrorist networks, the same principle applies, and Koschade (2007:298) writes: "The node with the highest level of betweenness will almost certainly be the critical node within the network." In Krebs's (2002:47) calculation of members involved in the 9/11 terrorist attacks, Mohammed Atta scored the highest on degree and closeness centrality, but not betweenness centrality, where he scored the second highest, and in Roberts & Everton (2011:11), Noordin Top scored highest on all three measures of centrality. While these three centrality measures provide different perspectives on the roles played by entities, when taken together, an entity that consistently scores high on all three can be considered a key figure in an organization. These three measures of network importance are used to discuss the Vaal Dam plot network in the following section.

3. THE VAAL DAM PLOT NETWORK

Fifteen people are linked to the Southern group that were convicted of planning to blow up the Vaal Dam: Leon Thomas Peacock, Werner Smith, Eduard Johannes Gagiano, Jaco Theron, Marthinus Petrus Janse van Vuuren, Magiel Richard, Steyn Smit, Hennie Erasmus, Koos du Plessis,[2] Mike du Toit, Frikkie Potgieter, Lourens du Plessis, Ettienne Crouse, Allen Rautenbach and Hercules Michael Viljoen. Note however that not all of these people were involved in the plot: Jaco Theron for instance attended only one meeting, and his connection to the plot is therefore slight. At some point, almost all of these members met each other, as the following circle layout of this network shows:

2 It is unclear whether this is "Rooikoos" du Plessis, who was found guilty of high treason and was part of the Northern group. The High Court of South Africa (2004:14) only mention Koos du Plessis once when describing the August 2001 meeting at the Gariep Dam, which was also attended by Mike du Toit. If Koos du Plessis is the same person as Rooikoos, he would provide another connection between the Northern and Southern group. At this time, however, no additional information is available, and rather than err by including an uncertain connection, it was decided to treat these as two different people.

Figure 1: Connections of the Southern group



In this sociogram, darker lines of course indicate stronger relationships, meaning that these members met more often. Although all are closely connected, a visual analysis suggests that Werner Smith, Hercules Michael Viljoen and Leon Peacock had some of the highest numbers of ties to other members, but these figures are best represented in tables. The following table represents the ranking of individuals according to degree, betweenness, and closeness centralities:

Degree centrality indicates that Peacock was the most active of all these entities, in that he formed the highest number of connections with other entities, and his closeness centrality score indicates that he had the shortest path to most other entities, more so than any other person in this network. Note that Peacock scores highest in all three measures, which suggests that he was the key figure in this group. In the court case document that refers to the failed appeal, after relating the events immediately preceding Peacock's arrest, the judge notes: "More compelling evidence than this to show that the first appellant [Peacock] was the ringleader is hard to find" (High Court of South Africa 2004:27). In terms of this court document, an SNA approach therefore confirms the judge's statement. If

Mohammed Atta is considered the ring leader of the 9/11 plot and scored highest on two of these three centrality measures, Peacock is certainly the leader of the Southern group when scoring highest on all three measures of centrality.

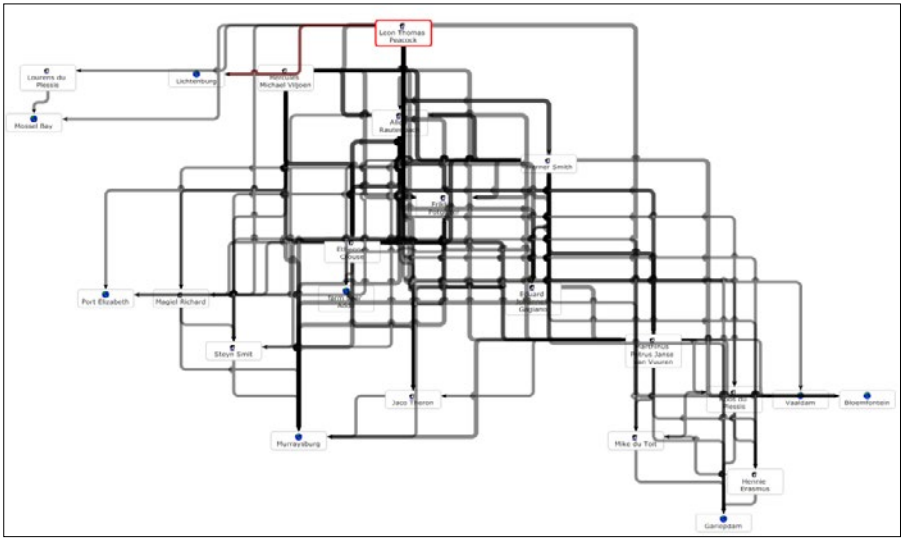
Table 1: Centrality scores of people linked to the Vaal Dam plot

Person	Degree	Person	Betweenness	Person	Closeness
Leon Thomas Peacock	24	Leon Thomas Peacock	1.0000	Leon Thomas Peacock	1.0000
Werner Smith	23	Werner Smith	0.3583	Werner Smith	0.8519
Ettienne Crouse	19	Marthinus Petrus Janse van Vuuren	0.2147	Marthinus Petrus Janse van Vuuren	0.7931
Marthinus Petrus Janse van Vuuren	18	Ettienne Crouse	0.1068	Ettienne Crouse	0.7419
Hercules Michael Viljoen	15	Hercules Michael Viljoen	0.0461	Hercules Michael Viljoen	0.7188
Allen Rautenbach	14	Frikkie Potgieter	0.0234	Allen Rautenbach	0.6970
Frikkie Potgieter	11	Allen Rautenbach	0.0131	Frikkie Potgieter	0.6765
Eduard Johannes Gagiano	9	Eduard Johannes Gagiano	0.0000	Eduard Johannes Gagiano	0.6389
Jaco Theron	8	Jaco Theron	0.0000	Jaco Theron	0.6389
Magiel Richard	7	Magiel Richard	0.0000	Magiel Richard	0.6216
Steyn Smit	7	Steyn Smit	0.0000	Steyn Smit	0.6216
Hennie Erasmus	6	Hennie Erasmus	0.0000	Hennie Erasmus	0.6053
Koos du Plessis	6	Koos du Plessis	0.0000	Koos du Plessis	0.6053
Mike du Toit	6	Mike du Toit	0.0000	Mike du Toit	0.6053
Lourens du Plessis	2	Lourens du Plessis	0.0000	Lourens du Plessis	0.5349

Another way of identifying brokerage roles, apart from betweenness centrality, is through the use of cutpoints. Cutpoints identify those nodes that, if removed, would disconnect the network, and therefore "just like bridges, cutpoints are crucial to the flow of resources in a network" (Everton 2009:163; see also Roberts & Everton 2011:8 and FMS Advanced Systems Group 2012:111). In the following sociogram,

using a hierarchical layout, the only cutpoint in this network, Leon Peacock, is highlighted in red:

Figure 2: Leon Peacock as the cutpoint



One of the reasons for Peacock's high betweenness centrality score and his identification as a cutpoint is his connections with those who are not otherwise connected, in particular with Lourens du Plessis, as the above sociogram shows (Du Plessis is the entity on the left). The above centrality measures not only identify those that are *most* central to this network, but also those that are *least* central. Although peripheral entities are not very active in the network under consideration, they are often part of other networks that are not currently considered, and because they provide ties with other networks, they often serve important roles in bridging different networks, as Petraeus (2006:B14) argues:

> "Nodes on the periphery receive very low centrality scores. However, peripheral nodes are often connected to networks that are not currently mapped. The outer nodes may be resource gatherers or individuals with their own network outside their insurgent group. These characteristics make them very important resources for fresh information not available inside their insurgent group."

Nowhere is this clearer than in the above calculations of degree, betweenness, and closeness centrality that indicate Mike du Toit and Lourens du Plessis as the least central actors in this network. Du Toit and Du Plessis were of course involved with the Northern group, where Du Plessis was initially identified as one of the leaders (see Maluleke 2002:4; Viljoen 2002:18; Carstens 2002:13), but he was

released after four months without charge when he turned state witness (Otto 2003:3). However, in 2004, Judge Rampai still refers to Du Plessis as the leader of the Northern group (High Court of South Africa 2004:20). Du Toit was named as the leader of the Boeremag until early in 2002 (when he was succeeded by Tom Vorster), the author of Document 12, and convicted of high treason (De Wet 2012:9; SAPA 2012:5; Swart 2012:6). Du Plessis and Du Toit's first degree ties in this network are shown in the following sociogram (Figure 3):

Figure 3: First degree ties of Du Toit and Du Plessis

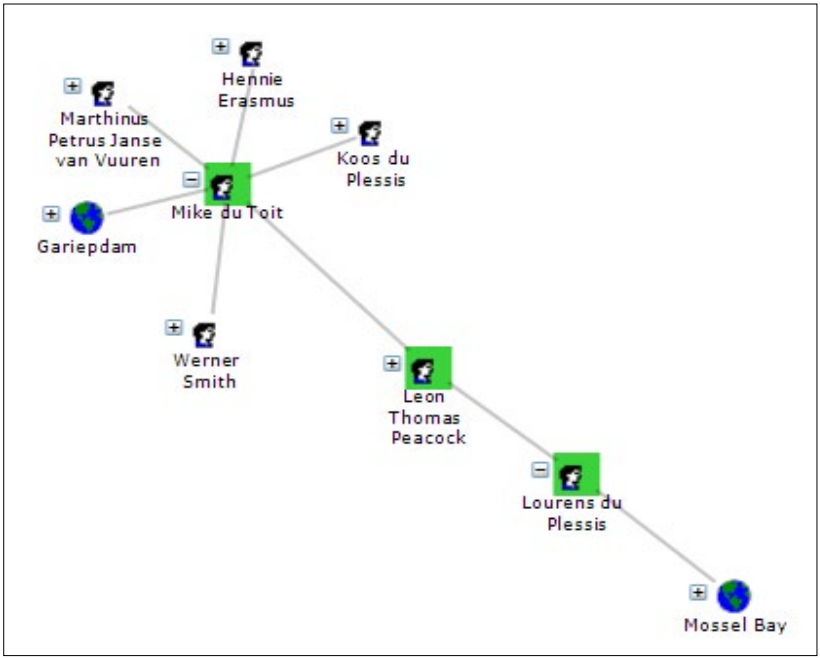


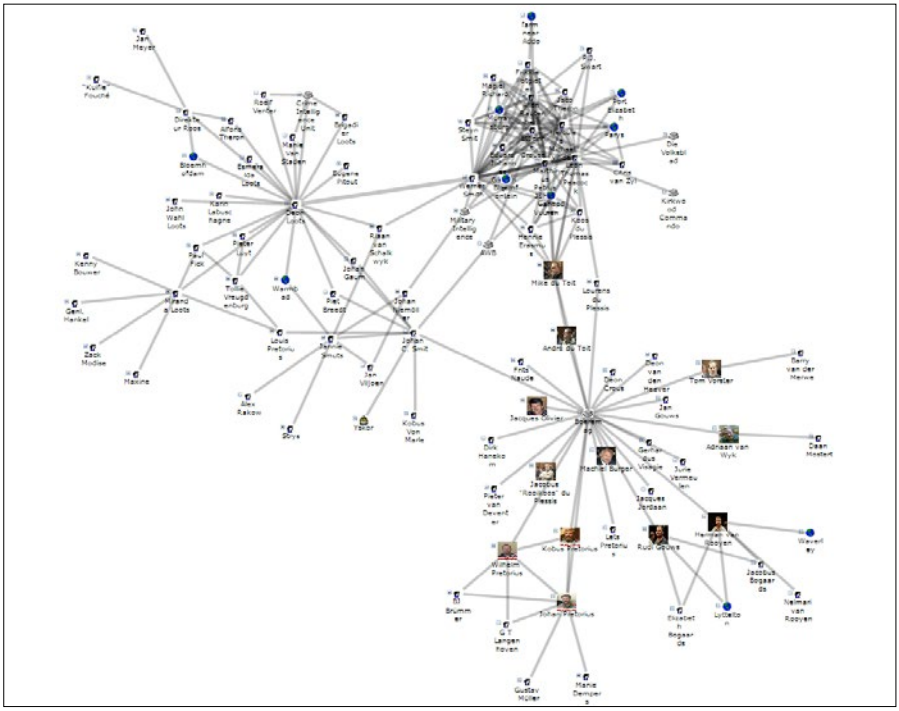
Figure 3 shows that both Du Toit and Du Plessis met with Peacock, although at different places (High Court of South Africa 2004:14, 20), with Du Plessis meeting Peacock in Mossel Bay, and Du Toit meeting Peacock at the Gariep Dam. Du Toit also met with Koos du Plessis, Hennie Erasmus, Marthinus Petrus Janse van Vuuren and Werner Smith at this location. The Southern group's connections to Du Toit and Du Plessis are crucial connections, because these two actors provide the only actual ties with the Boeremag, and, in addition, both were identified as key players in the Northern plot. The content of their meetings is also significant: At the meeting between Du Plessis and Peacock in 2001, Du Plessis asked Peacock "to mobilise the right-wing sympathisers in the Eastern Cape" (High Court of South Africa

2004:20-21), which suggests that Du Plessis played a leadership role, as originally identified in press reports. Peacock also travelled to Lichtenburg in June 2001 to meet with the Boeremag, which shows his active brokerage and leadership role.

The only other tie between these two groups is through the police informant, Werner Smith. Smith is for instance linked directly to Deon Loots (Loots 2013:7), the police handler who subsequently argued that the police fabricated evidence and helped plan the plot concerning the Northern group. Note also that Smith scores very high on all centrality measures, along with another informant, Ettienne Crouse. Loots's claims were dismissed by the court, but as the above centrality scores indicate, had Smith and Crous not been state witnesses and police informants, this network analysis would have identified them as key players in the Southern plot. They were therefore deeply integrated in the network, which – when not taking Loots's claims into account – indicates a particular aptitude for undercover work.

Peacock's fourth degree connections show the above ties between the Vaal Dam plot, the security forces and the Boeremag:

Figure 4: Peacock's fourth degree connections



The dense cluster at the top right is the cluster of the Vaal Dam plot, the one on the left signifies the Crime Intelligence Unit, while the cluster at the bottom right consists of the Northern group (the Boeremag). As can be seen in this sociogram, only Mike du Toit and Lourens du Plessis link the Boeremag with the Vaal Dam plot members, while Werner Smith provides the link with the Crime Intelligence Unit through handlers such as Deon Loots and Riaan van Schalkwyk. Note, however, that data on the Northern group and the Crime Intelligence Unit is incomplete, and of course not all people linked to the Northern and Southern group were involved in the plot (even the Bogaards, who sheltered Rudi Gouws and Herman van Rooyen, are indicated above).

The above measures can of course also be used to identify the places of their meetings. When degree, betweenness, and closeness centrality is used, it is clear that meetings held at Peacock's home town of Murraysburg were key meetings where most members were present (Table 2).

Table 2: The centrality scores of places

Place	Degree	Place	Betweenness	Place	Closeness
Murraysburg	11	Murraysburg	0.0131	Murraysburg	0.6970
Gariepdam	6	Gariepdam	0.0000	Gariepdam	0.6053
Bloemfontein	3	Bloemfontein	0.0000	Bloemfontein	0.5610
Farm near Addo	3	Farm near Addo	0.0000	Farm near Addo	0.5476
Port Elizabeth	3	Port Elizabeth	0.0000	Port Elizabeth	0.5476
Mossel Bay	2	Mossel Bay	0.0000	Mossel Bay	0.5349
Vaaldam	2	Vaaldam	0.0000	Lichtenburg	0.5227
Lichtenburg	1	Lichtenburg	0.0000	Vaaldam	0.4894

The degree, betweenness, and closeness centrality scores of places then further reinforce the above indication that Peacock was the leader of the Southern group. Note also that the Gariep Dam was an important meeting point. The court document notes that at the Gariep Dam, Peacock (High Court of South Africa 2004:26) "acted as an intermediary between the southern group and the northern group" – explicitly stating his role as broker between the two groups, which is also seen in his high betweenness centrality score. Both in terms of network structure and in his actions at locations, Peacock therefore acted as broker between the two groups.

The Gariep Dam was an important location in more ways than one. Firstly, this was to be the meeting point if chaos erupted in South Africa: "It was resolved

that the survivors of the night of terror would have to come together at Gariepdam in brown military uniform" (High Court of South Africa 2004:17). Secondly, according to Peacock, at a meeting held here in October 2001, a split surfaced between the Northern and the Southern group (2004:21), with the Northern group advocating an offensive strategy, while the Southern group advocated defence in case of an attack on whites. The court document notes: "The two groups did not officially cut off ties at Gariepdam. The southern group subsequently held a separate meeting where it resolved to break away from the northern group" (2004:21). The Gariep Dam thus functioned as both the connection and the separation between these two groups, and the importance of this location is reflected in the fact that this location scores second highest on all three of the above centrality measures.

Note also that Lichtenburg and the Vaal Dam score lowest on degree and closeness centralities respectively. The betweenness centrality of Lichtenburg is zero because the attendees of this meeting are not named in the court document, in which case the low degree centrality of Lichtenburg is noteworthy. Since this was the meeting of Peacock (the only tie with Lichtenburg) with the Northern group, this location has a special significance: as with the centrality scores of people, the centrality scores of locations can indicate a link with other networks that are not currently under consideration. If both the Northern and Southern groups are taken into account, Lichtenburg would score high on betweenness centrality, along with Mossel Bay and the Gariep Dam, for these were the meeting points between the Northern and Southern groups.

4. CONCLUSION

According to Bradbury (2011:8): "Social networks open up a whole new world of information, because at least as much value is contained in the relationships between entities as in the entities themselves." This article has shown the importance of social connections in a dark network by mapping the ties between the members of the Southern right wing group, who were convicted of conspiring to blow up the Vaal Dam. It was shown how all three the centrality measures used (degree, betweenness, and closeness) highlight Peacock as a key figure in the group, and, in addition, even his home town was highlighted as the most important location for this network.

The article also showed the important structural roles played by Lourens du Plessis and Mike du Toit in connecting the Northern and Southern groups, who, despite claims to the contrary, did share some connections, even if they were not completely integrated within a unified plan. The connections between the Northern and Southern groups, along with the most centrality measures, also highlight the role played by Werner Smith, the police informant, in not only connecting the two

groups, but it was also shown that he played an important structural role within the Southern group itself. Although such a network analysis does not necessarily lend credence to Loots's claims of police collaboration in the plot, a structural analysis of the network suggests that he was particularly well integrated, which at the very least testifies to his skill as an undercover agent.

This article is the first South African academic application of SNA to the study of dark networks, and numerous other studies could be conducted with this method. The network structure of the Northern group (the Boeremag) remains unexplored, and so is the network structure of the People Against Gangstarism and Drugs (PAGAD), not to mention organised and transnational criminal networks, or historic insurgency networks such as the ANC or the 1914 Afrikaner Rebellion.

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