Why Terror Networks are Dissimilar: How Structure Relates to Function

Christian Leuprecht and Kenneth Hall

Abstract Theories on international terrorist networks are wrought with contradiction. On the one hand, networks that support or facilitate politically motivated violent extremism are thought to pose a threat because they are centralized and hierarchical. On the other hand, the same networks are thought to pose a threat because they are decentralized and operate autonomously. Social networks analysis (SNA) makes it possible to resolve this apparent contradiction by controlling across countries for characteristics and structure of networks linked to the same terrorist organization relative to different functions that such networks perform. One terrorist organization for which sufficient open-source data exist to mount a systematic comparison is Al-Shabaab (AS). Comparing traits such as brokers, centrality characteristics of nodes, international linkages, and use of funds, the chapter compares AS networks as they relate to recruitment, fundraising and attacks across the United States and Australia with corroborating evidence from Canada, the United Kingdom, the Netherlands and Denmark. Although networks differ markedly across these attributes, unrelated networks performing similar functions are consistent in their nature and structure. These findings suggest that networks are functionally differentiated insofar as they serve as strategic repertoires. This is a significant finding. Knowing how a network's function is related strategically to its structure means being able to infer a network's function if only its structure is known and, conversely, being able to infer a network's structure if only its function is known. Not only does SNA thereby facilitate detection and dismantling of networks, it also suggests that recruitment, fundraising and attack networks require differentiated approaches by defence and security agencies insofar as SNA shows them to be distinct phenomena.

C. Leuprecht (✉) · K. Hall
Royal Military College of Canada and Queen's University, Kingston, Kingston, Canada

A. J. Masys (ed.), *Networks and Network Analysis for Defence and Security*,
Lecture Notes in Social Networks, DOI: 10.1007/978-3-319-04147-6_5,

1 Introduction

How do individuals within networks connect, remain connected, bring others into the fold, connect to other networks, and execute their ultimate objectives while striving to remain undetected? Answers to these questions are pertinent to contain and disrupt both the genesis and diffusion of networks that facilitate terrorist ends. Accordingly, this chapter gauges the extent to which the nature and characteristics of terror networks are a function of their purpose.

This claim is difficult to investigate. To generate hypotheses about terror networks, one needs to be able to control for time and space. Terror networks, however, are notoriously impervious to examination. Moreover, much of their activity transpires in hostile environments that are inhospitable to scholarly fieldwork. Nonetheless, that need not deter us from exploiting available information to generate knowledge about terrorist networks. To this end, this chapter applies Social Network Analysis (SNA) to compare variation across various al-Shabaab (AS) networks. AS is a particularly opportune subject as it is the one terrorist organization that operates across different countries while maintaining a degree of common cause and connection. Although the number of known AS cases is limited, the quality of the available open-source data is sufficient to allow for comparative analysis.

Terror networks such as AS are commonly compared to multinational corporations: hierarchical with centralized command and control structures. Yet, a growing body of research is skeptical about these assumptions. This chapter scrutinizes these assumptions empirically in an effort to stimulate a more nuanced approach to terror organizations and their networks. To this end, it examines variation in AS activity in the United States, Australia and Canada, and compares associated networks and their purposes. Recruitment and financing networks turn out to operate surprisingly independently and different types of activities in the same locale spawn quite different networks. Although these networks sometimes overlap in time and space, they are not connected.

Concern among governments and security intelligence services across democratic countries about "foreign fighters"—residents and citizens who go off to fight in causes abroad—and the consequent risk of homegrown foreign-trained militants returning from abroad and committing violent acts of terrorism is widespread and growing [1, 116]. However acute the problem, exceedingly little is known about local recruitment networks in Western countries. Since open-source intelligence is hard to come by, empirical SNA research in this area is accordingly scant. In this light, AS recruiting and fundraising from the Somali diaspora is a critical case study: the *n* of cases may be limited and the networks relatively small, but the available data are comparatively good, robust and comprehensive so as to allow for methodologically rigorous comparative empirical research.

An estimated 1200 foreigners or ethnic Somalis with a foreign passport are thought to be fighting with AS, including upwards of 40 American, 100 British and 20 Canadian expatriates since 2007 [2]. When the U.S. House Homeland Security

Committee released a report detailing AS' threat to America, Committee Chairman Peter T. King declared: "Right now Al-Shabaab has to be our main concern because of the fact of such easy travel back and forth, because there is a large number of (U.S. recruits), and the fact that there is such open recruitment" [3]. Concerned that the organization will soon be able to muster an attack on American soil, U.S. federal prosecutor W. Anders Folk as well as the U.S. Department of State warned the U.S. government to "take Al-Shabaab seriously" [4, 5].

Expatriates from Maryland to California have reportedly travelled to Somalia to join AS, but most hail from the 'Twin Cities' region of Minnesota, home to America's largest Somali diaspora, whose concentration of 25,000 members represent about one-third of the total Somali diaspora in the United States [6–8].[1] The evidence suggests that a group of men concentrated in Minneapolis and St. Paul formed a network, the activities of which ultimately saw 18 of them leave for Somalia, and 11 of them die there [9–12]. However, reliable data on these individuals are sparse. There are three American networks affiliated with AS for which open-source data are available, the largest of which has 23 verifiable nodes.

Australia also has a sizable Somali diaspora; approximately 11,000 Somali–Australians live in and around the city of Melbourne, where the network under investigation was concentrated [13]. This network was responsible for sending two men to Somalia to train with AS, and was plotting to attack the Holsworthy Barracks near Sydney at the time of their arrest.

This chapter begins with an overview of current scholarship on how terrorist networks are structured and how their members interact, as well as an operationalization of key concepts, such as Morselli's concept of 'brokers' within networks primary. These concepts are central to formulating the subsequent hypotheses that were generated by an earlier version of this study that drew on fewer cases and less complete data. A discussion of the importance and applicability of SNA and small-*n* research to this topic, as well as the methodology used to select, analyze and present these cases follows. After the cases have been presented and analyzed, the hypotheses will be scrutinized using the expanded data, and avenues for future research discussed.

2 Terror Networks: Overview of the State of Knowledge

Insofar as they link actors who are working towards common goals, networks are important means to terrorist ends [14, 15]. They make it possible for terrorists to overcome collective-action problems arising out of complexity and the uneven distribution of assets that they need to carry out attacks. In the 'global Salafi jihad' "the distribution of assets seriously affects its mission against the United States"

[1] Accurate figures for the total US Somali population are hard to come by and range from 35,000 to 150,000.

[16, p. 145]. Networks are used by terrorist groups to recruit, train and prepare for an attack to compensate for inadequate resources, identity, culture, emotions, elite access, ideological support, and recruits [17–21] and to "provide flexibility, adaptability, deniability, multidimensionality, and the capacity to do things at a distance, often through surrogates [22].

This chapter collates two strands of the literature, namely the inter- and intra-organizational connections between networks. The first investigates how larger, discrete, yet loosely affiliated networks interact with each other, such as the connections between al-Qaeda (AQ) and its primary counterpart in South-East Asia, Jemaah Islamiya [23, 24]. The second investigates how a covert or peripheral network operating apart from a central network with which it identifies interacts with this central network and potentially with other networks under the same umbrella organization. Krebs' investigation into the network of the 19 individuals who carried out the 9/11 attacks is an example [25].

Although the very notion of a network contrasts with the notion of top-down decision-making and arbitration and although "networks are never managed by a single (central) authority", the notion of hierarchy pervades research on terrorist networks [17, p. 65]. Different forms of hierarchical control posited in the literature have different implications for the structure and dynamics of the organization and its networks: (1) top-down decisions made about to the goals, objectives and/or function of individual networks (and the dissemination of the information required to carry these out), (2) ideas pertaining to the general goals of the entire organization and the reasoning behind these goals (this could be considered the ideology of the group), and (3) the distribution of funds and resources to networks to advance either the particular or general goals of the group. This chapter addresses only assumptions about the first and third forms of hierarchy. It is less concerned with the more "macro" or "abstract" [26, p. 36] level of terrorism, than with what cells do to further the ideologically motivated goals of a terrorist entity, and how these activities are funded.

It is sometimes assumed that a core network directs, at least to an extent, the operation of peripheral networks. This could include instructions on means and targeting, when to engage or desist from activities such as recruitment or fund-raising, quality and quantity of the membership of the network, and members' characteristics. The 9/11 network was already quite well formed prior to its arrival in America [25, p. 49], and it appears that the plot's targets and even the structure of the network were determined well in advance by AQ authorities outside of the immediate attack network, namely Khalid Sheikh Mohammed, who allegedly proposed the idea for the attacks to Osama Bin Laden as early as 1996 [27]. While 9/11 was notorious for its complexity and the duration of its planning phase, other studies of terrorism also presume a substantial degree of external control over the activities of a particular network. A quote from Ilachinski captures several assumptions about the operation of illicit networks: "the manpower mission requirement is an explicit goal that must be accomplished by the leader of the cell to which a given target is assigned" [28, p. 51]. Ilachinski not only assumes that a

network has a *de facto* or *de jure* leader, and that s/he sets, controls and accomplishes "manpower mission requirements" (which in turn assumes that these networks coalesce in accomplishing a series of discrete tasks), but that the mission towards which this manpower is directed is assigned exogenously.

Similar assumptions are ubiquitous: "a Global Terrorist Organization (GTO) determines the nature and level of terrorist attacks in each country indirectly through its choice of representatives associated with the local terrorist group" [29, p. 238]. Leistedt also assumes that "in most cases, there is one person, typically the founder or cofounder, at the top of the terrorist organisation and structure, and s/he centralises decisions," and proceeds to speculate about their psychological state [30, p. 24]. Similarly, Corman's study of a hypothetical model of AQ depicts the specialized function of some networks as operating at the behest of a central organization, to the point where these specializations correspond with individual top-level council members [26, p. 40], [31, p. 66]. In the same vein, successful networks are thought to require strong individual leaders who can devise strategies in response to rapidly changing conditions and impose their will on sub-ordinates to operationalize their decisions [32, p. 106]. This is reflected in some suggestions for counter-terrorist policy that understands networks to be organized into hierarchical hubs where the removal of the central node or leader will cause disarray and the dissolution of the network. Conversely, the removal of "grassroots," lower-level actors supposedly leaves the leader stranded and powerless [33, p. 70, 34, pp. 1016–1017].

The sort of specialization Corman ascribes to networks is an aberration in the literature on terrorism. Instead, networks are assumed to be multitasking: the same network recruits, fundraises and attacks. The division of labour proceeds by actors, not networks. According to this conception, individuals hold rigid positions within a network with responsibilities for specific tasks, and people are recruited into networks (by a recruitment specialist, of course) to fill particular roles [35, p. 63]. Yang and Sageman [36, p. 301], for instance, assumes that different individuals play highly specified and agreed-upon tasks within a single network. For example, "some key members may act as leaders that control the activities of the whole group while others may serve as gatekeepers to ensure the communication and coordination between different groups of a larger network". This degree of specialization between individual nodes is premised on central decision-making and delegation to define and assign roles.

This underlying assumption is that networks are preoccupied with planning and executing attacks coincident with their location. Tupman, for example, observes: "Western Europe still remains a recruitment target and perhaps a target for a spectacular atrocity, as does the USA," due to the presence of terrorist cells covertly embedded into the fabric of Western society [17, 18]. Another variant of this line of argument acknowledges the post-9/11 flattening of AQ, which has led to an increased focus on autonomous, self-funded groups (discussed below in greater detail). Nonetheless, it assumes that networks, formally disconnected from an umbrella organization but informally linked through ideological solidarity and

self-branding, are ultimately focused on perpetrating attacks in Western democracies.

Even when a decentralized network structure is assumed, the "parent organization" is thought to infuse "start-up capital" into fledgling peripheral cells [37, p. 47]. This scenario has a post-9/11 AQ supplying "money to underwrite conflicts in many parts of the world," including those involving separate but affiliated terrorist entities, and perpetually masterminding or executing attacks [37, p. 27]. Shapiro and Siegel's application of rational choice theory to terrorist funding, for instance, is predicated on this very assumption even though they themselves think it is no longer applicable given the structural changes to AQ post-9/11 [38, p. 426].

Hierarchy, however, runs counter to the very characteristics of networks, which are heralded as "temporary, dynamic, emergent, adaptive, entrepreneurial and flexible structures", a "cutting-edge design" [26, p. 35] [31, p. 66]. Similarly, the rigid depiction of networks contrasts starkly with networks as an organizational structure that consists of "operatives [who] are highly adaptive, compartmentalised [and] mobile" [31, p. 45]. These observations contradict. On the one hand, terrorist networks pose a threat to Western interests because of their resilient connections to declared enemies abroad, such as AQ. On the other hand, such networks are a threat domestically due to their very ability to operate autonomously by being able to complete the variegated tasks of planning, funding, and ultimately executing attacks with little more than ideological support passively offered by a central organization. That is, the emphasis on offensive networks risks obscuring how peripheral networks support a central organization in varied ways, with each manner of support entailing a different relation to the central organization.

3 Variables: Network Structure and Centrality

This section defines and explains terms that are crucial to structuring and analyzing these groups, and thus vital in formulating and expressing our hypotheses. First, network structure matters because it affects the flow of information and resources.

Networks can take different forms—chain, hub, multi-player, all-channel—but only two concern this chapter's findings. A "hub" network features a single node or very small cluster of nodes at the center of three or more other nodes which have few—if any—links. Nodes on the hub's periphery are likely only connected to each other through the center of the hub, which, as a consequence, has a disproportionately large influence on the flow of information and resources through the network. By contrast, an "all-channel" network exhibits a much more horizontal formation which decentralizes the flow of information and resources. Only a few if any individuals in an all-channel network are seen as substantially

more influential and well-connected than the rest, and nodes are generally connected to three or more other nodes in the network.[2]

Three inter-related concepts are useful in describing and analyzing how nodes influence the movement of information and resources within and between networks: brokerage, degree centrality and betweenness centrality. Brokers are conferred positional advantage in a network insofar as they bridge structural holes—two unconnected groups of actors—by virtue of having greater access to information, opportunities and skills [39–41]. Morselli's study of members of the Hell's Angel's motorcycle gang in Quebec found that elite members of the group were directly connected to only a few other members of the network (i.e. low degree centrality) while at the same time many "efficient paths pass[ed] through [the] given node" (i.e. high betweenness centrality) [42, p. 187] [43, pp. 385–386]. These are precisely the traits of a broker: a node with few but influential connections. Ergo, an 'ideal broker' is an autonomous link between a single node in each of two networks where such a link constitutes the only connection between them [43, p. 386].

Brokers are advantageous because they can manage the flow of information and resources between two groups to their benefit and that of the networks they link [44, 72–73]. Especially in illicit situations, members in each network can minimize detection by minimizing connections to illicit individuals [43, p. 384], while maximizing opportunities to further their objectives through potential access to the resources of the other group via the broker [41, p. 347, 353]. In turn, the autonomous ideal broker—the most knowledgeable about both of the networks of all nodes involved—can act opportunistically, in this case by connecting transnational legal and illicit markets. As a result, brokers tend to maximize monetary returns from illicit activity [43, p. 385].

However, such an actor is described as 'ideal' for good reason; more often, one will observe "one or two participants who are high in both degree and betweenness centrality," especially in smaller networks [43, p. 388]. While AS data does not allow for the quantitative precision of Morselli's study, Morselli's 2×2 matrix of the two varieties of centrality outlines four types of actors and their relation to the nodes of these networks offers a useful typology [43, p. 388] (Table 1):

This matrix is useful because the evidence presented below shows that nodes within recruitment and fundraising networks differ substantially in degree and betweenness centrality. They also differ in the special functions that some nodes serve and that are crucial to the overall function and dynamics of those networks. Differences in network structure and the centrality characteristics of nodes aside, their international linkages and the way they use funds are also distinct.

[2] Like hub networks, defining all-channel networks as generally having one or two connections per node avoids conflation with "chain" networks.

Table 1 Centrality matrix

High in degree centrality and low in betweenness centrality	High in both betweenness and degree centralities
Low in both centralities	High in betweenness centrality but low in degree centrality

4 Hypotheses

4.1 Functional Differentiation

The illicit networks studied here reveal patterns that challenge assumptions of current scholarship and lend themselves to generating hypotheses about the relationship between the ways in which terrorist networks in the West are structured and how they function. Corman applies the concept of Activity Focus Networks (AFNs) to terrorist networks, whereby networks are organized around 'activity foci,' defined as categories of activities to which resources and manpower are assigned strategically to achieve the organization's goals [26, p. 38]. He (correctly) acknowledges that networks operating outside of the central network can have specialized functions [26, p. 39], but falls short of inferring that such specialization can have consequences for the very structure of these networks. An initial goal of this study was to identify how existing literature predicts funding and recruiting-oriented networks to be structured, and subsequently to compare these expectations against the empirical evidence presented here. However, the apparent absence of such prediction in the literature suggests that the very notion of a relationship between network structure on the one hand and network function on the other hand is underexplored (if not unexplored) in the scholarship of terrorist networks.

The most striking observation to be gleaned from these findings is the correlation between network structure and its functional objectives. The two recruiting networks described below follow an all-channel structure. Removal of nodes from this network as individuals left for Somalia (and upon the subsequent death of some of the actors there), even in significant numbers over a short period of time, neither dismantled these networks nor compromised their function of recruiting men and funding their travel to Somalia until the last wave of recruits departed in October 2009.

No individual or small group of individuals remained behind to act as a 'conveyor belt,' helping groups of men to radicalize and leave for Somalia under their supervision. While the departure of nodes did not impair the ability of remaining recruits to network and eventually leave for Somalia, the lack of new recruits and apprehension of some nodes by law enforcement dismantled the network. This indicates that there were no nodes, detected or not, that were primarily and/or specifically tasked with recruitment; recruiters that were above the

fray of traveling to Somalia to join the insurgency do not appear to exist within these networks.

Contrary to much of the literature on terrorism, the network's function was highly specialized, while individual functions were undifferentiated. Two hypotheses follow from these observations:

H1 Terrorist networks are functionally differentiated

H2 The structure and characteristics of terrorist networks is a function of their purpose

4.2 Modes of control

Stohl and Stohl assert that terrorist groups such as AQ "[do] not maintain control over who is or is not admitted into the organization" [15, pp. 105, 115].[3] In effect, control over who was allowed into the network appears to have been informal and decentralized. Not only did no one person or group within the network regulate who was to be recruited and groomed for travel to Somalia, the central organization set no goals or quotas as to the quantity and quality of Somalia-bound individuals. Just as no one was controlling who was a part of the network, no particular person seemed to have domain over any specific task.

The recruiting network was also geographically concentrated. All actors lived in or around the Twin Cities area, mostly in Minneapolis, St. Paul and in adjacent suburbs such as New Brighton [45]. This dense distribution of the nodes of the network enabled in-person meetings between a variety of nodes in an assortment of venues including mosques, restaurants, private residences and a university campus. Court documents do not indicate any interactions over telephone or the Internet between actors in Minneapolis and note only one conversation between an actor in Minneapolis and another in Somalia [10]. This is especially noteworthy given the scholarly interest in the role of the Internet in radicalization and recruitment [46, p. 18, 47, p. 222, 48, 49, pp. 205–208, 50, p. 41]. While it is entirely possible that members of the network were exposed to radical videos circulating on the Internet, including those of Al-Awlaki, it seems that these face-to-face meetings were crucial to establishing trustworthiness, essential in convincing these individuals to travel overseas, and devising the plans and procuring the funds for them to do so [32, p. 41]. This is not to say that the role of the Internet is unimportant; Internet propaganda positions AS and its adherents as ideological authorities who ought to be esteemed by aspiring members of this network [51].

[3] Furthermore, this point does not countenance the hierarchical assumptions raised in the introduction, perhaps most succinctly put in Matthew and Shambaugh's dictum that "Networks are easy to create, but hard to control" (2005, pp. 621–622).

However, this ideological hierarchy did not entail top-down controls over the specialized function of the network, namely the recruitment of combatants for AS.

The two fundraising networks both exhibit a similar structure, and one that is distinct from the delinquency homophily—the tendency of individuals to associate with others of the same kind—exhibited by the recruitment network. Not only are the nodes situated in America strewn across at least two states in both cases, but each network also contains individuals located in Somalia who may have never been to America. The connections between these foreign nodes and others in Somalia are shadowy in both cases, but their individual contact with American nodes is well-documented and integral to the successful function of the network, which in both of these cases was to channel money to Somalia.[4] Unlike the recruitment network, some donors were solicited with jihadi rhetoric, and some funds were donated with full knowledge of their illicit purpose [52, pp. 6–7]. Similar rhetoric may have been used in the recruitment network, but there is no discernible effort within either of the fundraising groups to encourage or facilitate travel to Somalia.

Both fundraising networks exhibit a 'hub' network pattern: in each case, a single node (the broker) was primarily responsible for communicating with an AS leader in Somalia and relaying pertinent information to the rest of the American nodes, although the identity of this node can change over time, as we will see. In one case, the group of contacts in Somalia appeared to form a hub-like structure of their own, while in both cases U.S.-based nodes are arranged in a single hub pattern or multiple hubs that are linked to each other by brokers. The broker between the American and Somali nodes need not be the same individual who brokers between U.S.-based hubs. These 'hub' network structures "introduce an element of hierarchy" to the network [17, p. 12], with those positioned at the center having access to information and control over the flow of information and resources that make them de facto leaders of sorts and analytically special within the network in ways discussed below.

Three more hypotheses follow from these observations:

H3 Recruitment-oriented networks rely on domestic all-channel networks that are geographically concentrated (that is, for the purpose of recruitment, proximity matters)

H4 Fund-raising networks rely on transcontinental hub networks (that is, proximity does not seem an impediment)

H5 Control over access to recruitment networks is informal and decentralized

[4] This is, of course, relative. Plane tickets for the Minneapolis recruits reportedly to cost between $1,500 and $2,000 each; but the Minneapolis and St.Louis/San Diego fundraising group each channeled approximately $8,500 and $30,000 to AS operatives in Somalia.

4.3 Presence of brokers

The recruiting networks were comprised of many individuals who are high in both degree and betweenness centrality, as well as a few peripheral nodes that are low in both. In this case, no one node or small groups of nodes appear to be brokers, especially if all or even some of the implied but unspecified linkages described above obtain. That is, this network is notable for a lack of actors who are able to control the flow of information and resources to the extent that they can substantially determine or even influence the activities of the group.

Conversely, the fundraising networks include many individuals with minimal degree centrality (i.e. one link), which logically results in a betweenness centrality of zero. However, within each group a pair or pairs of interacting nodes exhibit high degrees of both betweenness and degree centrality. The link between these pairs constitute the crux of the fundraising operations; without these links, the funds would have to find an alternate sender or receiver: they comprise the main conduit of information and resources for this network.[5] Information (e.g. account numbers) travelled exclusively in one direction (from Somalia to America), while funds travelled exclusively in the other.

The hypotheses that follow are:

H6 Fundraising networks rely heavily on the actions of 'brokers';

H7 Recruitment networks do not rely on brokers.

4.4 Financial dimensions

Most scholarship on hawala centres focuses on how government policy and media attention towards Islamic remittance practices is misplaced and/or futile to stop the minority of hawala transactions that are criminal in nature (see [53, 54, pp. 514–515, 55, pp. 166–167]. The specialized structure of some fundraising networks in the U.S. as elucidated here can give rise to equally specialized strategies for network identification and dismantlement, hence drawing attention away from the vast hawala system and towards targeting individual networks. As Tupman notes, "it is difficult to typologise by financing, as groups resort to a variety of financing activities over time," [56, p. 198]. This potentially holds for AS, as they may utilize other means of accruing funds within Somalia.

Technically, the Minneapolis 'recruitment' network explicitly engaged in fundraising as well as radicalization/recruitment, but the pattern of fundraising and the use of these funds differ qualitatively from the two fundraising networks.

[5] Given, as is the case, that the receiving node controls the information (i.e. the account numbers that correspond to his sub-ordinates) that allows the sending broker to successfully transfer funds to these nodes.

Within the recruitment network, all known fundraising activity was in the form of door-to-door solicitation under false pretense, including sending one of the subjects to Saudi Arabia to study the Koran and supporting orphanages of Somalia. Almost all of these funds were spent in the Minneapolis area to purchase airline tickets for the men travelling to Somalia. Even in the two cases where this rule does not hold, funds were intended for exclusive use by members of the recruitment network while in Somalia.

Fundraising activities coordinated and carried out by this group were necessary to the recruitment function, and in this case the effective use of such recruits required an expensive travel itinerary. What few other funds were raised or distributed by this group were used towards arming specific recruits after their arrival in Somalia. This funding and spending model is not mentioned in the literature: an autonomously funded group disinterested in domestic attacks, sending manpower rather than money to support the central organization. The opposite is true of the other two networks. Funds raised were not consumed by the Western portion of the network; instead, they were transferred directly overseas to members of AS' administrative network in Somalia for general disbursement. When funds were destined for specific purchases, their quantity and use were determined by the central group. Overall, the recruitment network did not raise funds for use beyond the network, while the American nodes of the fundraising networks did the exact opposite. The fundraising networks represent a nuanced form of hierarchy between the centre and the periphery, where the ideological authority of the centre compelled actors in the West to mobilize on behalf of the centre, which in turn relied in part on funds raised by the periphery to achieve objectives in Somalia. This interdependence hinges on ideological authority, or in Bakker et al.'s terms, external legitimacy, which a grievance-driven group, such as AS, needs to maintain to convince people to risk legal prosecution by offering financial support [57, p. 54].

There is no evidence that any of these networks, irrespective of their structure or function, received funds or material resources from AS affiliates outside of the network, nor did they expect such assistance.[6] This financial isolation did not result in a turn to criminal activity to procure funds [7, 58].[7] This is especially interesting in the case of the recruitment network, which contained several individuals with prior criminal records, including at least one individual indicted on charges of theft [59, 60]. The use of hawala services for remitting funds to Somalia and the manner in which these funds were obtained represents an aberration that is under-represented in the literature. This is especially pertinent to the case of AS

[6] While it may have been more expeditious for the individuals in the recruitment network to receive money from AS for airfare, no actors in this network seem to have stayed behind for lack of funds. For example, Abdiweli Isse planned to depart in December 2007, but was held back because his identification needed to travel internationally was not up-to-date. He departed successfully in October 2009.

[7] Door-to-door solicitation (under false pretense or not) for an organization recognized as a foreign terrorist entity is a criminal activity; but door-to-door solicitation separate from the terrorist element is not, unlike activities such as theft or trafficking narcotics.

and Somalia because the failed state does not support Western banking/wiring services such as Western Union; so, this group cannot effectively make use of the Western banking system, as terrorist groups such as Al-Qaida have in the past [54, p. 517, 61, p. 289]. A final hypothesis follows:

H8 Transfer of funds from the central network to peripheral networks is not necessarily indicative of the pursuit of terrorist ends

Table 2 summarizes key differences and similarities between recruitment and fundraising networks observed in this section:

Table 2 Summary of fundraising and recruitment characteristics by network

Network Type	Fundraising	Recruitment
Network Structure	Hub	All-channel
Select nodes function as brokers	Yes	No
Centrality characteristics of nodes	Brokers: High betweenness centrality, low degree centrality All other nodes: Low betweenness centrality, low degree centrality	High betweenness centrality, high degree centrality
International linkages	Yes	No
Intent to commit domestic attacks	No	No
Use of funds	Remittances: American donors to AS contacts in Somalia	Internal domestic activities: mostly to purchase airfare

5 Method/Social Network Analysis

The nature of the evidence perforce imposes limits on Social Network Analysis (SNA) that has implications for its application to terrorist networks: the number of data points is insufficient to employ conventional network metrics. As a result, the application of SNA in this chapter relies more on concepts and visualisation than on quantitative measures. However unconventional, the results warrant the application of SNA. This represents the ideal opportunity for a small-*n* study; cases are few, information is scant but has had its validity tested by courts in multiple jurisdictions, and a study can be carried out with the available information, rather than waiting for more detailed information that might never materialize [62, p. 348].

Owing to their smaller scope, small-*n* studies can be undertaken in a timely manner using government documents [62, p. 347]. While the generation of these documents usually requires those involved to be convicted, this approach can be operationalized without interviews and other information gleaned directly from terror suspects, a daunting task whether they are imprisoned or not. The government

documents to which this study has access focus on recorded interactions between suspects as evidence showing act and/or intent. This kind of information is essential to SNA, which is primarily concerned with determining, mapping and analyzing the structures created by patterns of interaction between individuals [63, p. 2].

Many insights about terrorist networks, including their genesis, purpose, and the way they work, stem from interviews with incarcerated and former terrorists or their associates [64–72]. Yet, such subjective evidence needs to be corroborated.[8] Furthermore, victimization surveys and crime-reporting data were never designed to capture terrorism-related offences; offender reports are difficult to access, and data held by intelligence services are hard to come by [74]. In light of these methodological challenges, this study relies instead on readily replicable data.

The illicit nature of these networks as well as the necessarily covert nature of investigative methods to detect and dismember them encourages secrecy by network members and government officials alike. Identification of the temporal and geospatial patterns of the stochastic networks in this study relied exclusively on open sources, including newspapers, academic research, court records, think tanks, governments and NGOs, and the Internet (caveat emptor). The nature of these sources imposes certain limitations. For example, the network diagrams below represent only links between nodes that are confirmed by these sources. Additional links between an individual and other nodes of a network are known to exist, but court documents are too vague to draw these links reliably.[9]

5.1 Case and Node Selection

This analysis expands an earlier pilot study that investigated the structures and functions of three AS networks operating inside the U.S. between 2007 and 2010

[8] First, interviewees are subject to sampling bias and, consequently, information gleaned from interviews subject to omitted variables and less-robust results, since convicted terrorists are difficult to access and most refuse to be interviewed [73]. Second, we cannot just take the claims of interview subjects at face value without corroborating evidence. Third, *ex post facto* interviews are prone to the psychological phenomenon of hindsight bias: an interviewee's memory is susceptible to distortion when asked to recollect and reconstruct content. They may also intend to deceive. Fourth, interviews may suffer from the Hawthorne effect: people change their answers by virtue of the fact that they know that they are being studied. Fifth, interview results are subject to coding bias. Sixth, information gained through interviews is subject to a priming effect that is inherent in the way questions are posed and the order in which they are posed.

[9] The networks mapped herein include individuals who have interacted and/or coordinated with each other for purposes related to AS. They exclude friends and family members who may have interacted with these individuals during their recruitment yet remained oblivious to their involvement with AS until after their departure and/or death. As a result, not all known connections between radicalized individuals and members of the Somali diaspora are mapped and analyzed; we required a strong indication that advancing of AS-related objectives was part of the relationship between two individuals.

[75].[10]. Not only has more information since come to light on these three networks, but sufficient information has surfaced on an AS network operating in Australia to warrant expanding the scope. International comparison now makes it possible to control for factors endogenous to the United States. Addition of the Australian case also increases the reliability of the findings by virtue of a comparison case for the Minneapolis-based recruiting network.

These are not the only known AS networks, but information about the others is too vague to map the network and perform SNA, especially with a reasonable degree of certainty. For other cases, the absence of court documents significantly hinders the confirmation of biographical detail and interactions between network nodes on which SNA is premised [116].

Toronto, for example, home to a majority of Canada's Somalia diaspora estimated at 150,000, has been linked to an apparent AS network [79]. At least five men left for Somalia to fight with AS where at least two of them died. All originated in the Rexdale/Dixon Park area, worshipped at the same mosque and departed Canada for Somalia within only a few days of each other in October 2009 [80]. However, only one arrest has been made in the case, and the trial is under a publication ban.[11] Our discussion of this group is thus based primarily on media reports and will consequently not be accompanied by a network map and play only a supplementary role.

Similarly, AS networks have been reported in the U.K. and the Netherlands. British authorities reportedly dismantled a network that smuggled Khat from the U.K. to the U.S. and Canada, where it is a controlled substance used almost exclusively by Somali males [82, 83]. This is of relevance to this study because it appears to be a fundraising network that, at first glance, deviates from the fundraising networks based in the United States. Besides brief mentions of a Netherlands-based AS network in the media, a group of Somali men that included the father of AS' then leader Farhan Mohamed Kahiye were arrested in late 2010, but ultimately turned out to centre on a local case of extortion with only loose links to AS, if any [84, 85, 117].

[10] By definition, a network contains >2 nodes. For this reason, "lone wolves" as well as those who worked in pairs are excluded from this study. This is worth noting because as a consequence several prominent AS operatives will be excluded from this study. This includes about a dozen American cases, most notably Omar Hammami, who grew up in Atlanta with Syrian and American parents to become AS' top English-language propagandist before he and AS became disillusioned with each other in early 2013. This also excludes Danish cartoonist Kurt Westergaard's attacker, who acted alone in his attempt to murder Westergaard for his depiction of the prophet Mohammed, as well as two Danish-Somali brothers arrested in 2012 [76–78]

[11] The sole arrested in connection to this group, Mohammed Hersi, has been set to stand trial since December 2011, but a publication ban is in place, and no new information has come to light [81].

6 Evidence

6.1 Minneapolis Recruitment Network

This network consists of 23 individuals, all of whom were American citizens or legal permanent residents of Somali descent, save one American-born Caucasian [86]. The purposes of this network were to (1) radicalize, (2) encourage its members to travel to Somalia to wage *jihad* with AS, and (3) raise funds to defray the costs of travel. All 23 men left for Somalia during two waves about a year apart, with others leaving in-between and later. The first of these waves occurred in early December 2007, when six men aged 22 to 26 boarded planes en route to Somalia in the space of eight days [87, 88] [89, pp. 4–5]. For three months prior, they had met in mosques, restaurants, and private residences to discuss their plans and to co-ordinate fundraising activities to pay for airfare. All meetings involved Mahamud Said Omar (MSO) and Omer Abdi Mohamed (OAM) who encouraged the others to travel to Somalia; MSO also helped raise funds for airline tickets and at least partially funded the tickets for these men [89] (Government's Total Briefing, 2012; pp. 12–16). Of the six, two pairs of men shared the same travel itinerary to Somalia [89, pp. 4–6]. Others left sporadically over the following months—MSO himself in January 2008, Zakaria Maruf (ZM) in February 2008, and Mustafa Ali Salat (MAS) and Mohammed Abdullahi Hassan (MAH) in August 2008, on the same flight [89, pp. 4–6, 90].

The second wave occurred in 2008 when six men aged 17 to 26 vanished from Minneapolis, including at least three in the period of 1–4 November [91–93]. At least four of these men had met regularly in the Carlson building on the University of Minnesota campus in Minneapolis where two of them worked as security guards [91]. The last known departures before federal authorities closed in on the conspiracy occurred in October 2009 when five men left Minneapolis destined for the U.S.-Mexico border at San Ysidro, which three of them ended up crossing en route to Somalia [9, 94, 95, p. 6]. Two other young men have reportedly left Minneapolis since for AS-related reasons, although no connections to this or any other network can be established [87]. MSO and OAM played an important role in the initial wave of departures without departing themselves at that time; in most of these later departures they had less of a role, despite the high interconnectedness of all those who left. More broadly, while OAM, MSO, ZM and CAF helped to radicalize recruits and co-ordinate fundraising roles, they all travelled to Somalia at some point (CAF and ZM died there). This suggests that no node of the network consistently acted as a 'conveyor belt' to recruit individuals and possibly assist in funding their voyage to Somalia.

At first glance, this pattern of departures resembles a series of unrelated conspiracies. SNA, however, reveals a high degree of interconnectivity pointing to an

all-channel network[12] among the co-conspirators: as Fig. 1 shows, of 23 individuals implicated[13] in the plot, only three do not have a confirmed or highly suspected link to another member of the plot.

Additional links, which could not be mapped due to less reliable information that proved more difficult to replicate, corroborate the all-channel nature of this network:

Cabdulaahi Ahmed Faarax (CAF) travelled to Somalia in early 2007, apparently under his own volition, and court documents claim that between September and December 2007 he told some involved in sending the six men to Somalia in December 2007 that he experienced "true brotherhood" there [9, p. 9]. Court documents do not stipulate with which of these eight men he met, but the evidence suggests that CAF is probably connected to more of these nodes than is apparent from Fig. 1.[14]

Although the eight men involved in the December 2007 departures are confirmed to have met multiple times, it is unclear whether all men were at all meetings; therefore, links in Fig. 1 among the six men who left reflect only confirmed interactions and common travel itineraries. Yet, these six men were probably more interconnected than is apparent, lest part of Fig. 1 be (mis)interpreted to depict a 'hub' network pattern surrounding MSO and OAM.

Court records indicate that MSO had contact with at least some of the men who left in November 2008, although the vagueness of these documents makes it difficult to establish definitive links between nodes [89]. Court documents also indicate that he travelled to Somalia between January and April 2008, supplying funds to unspecified members of the network so that they could procure firearms [96].

Three nodes lack any verifiable link to any other node in the network. However, the degree of confidence that these nodes were indeed part of this network is high because:

Court records for Adarus Abdulle Ali (AAA2) have him meeting with a group of men to discuss plans to travel to Somalia for the purposes of assisting AS and accompanying one of these men to the airport [97, p. 1]. However, the court report does not indicate the group of men with which he attended that meeting or which individual he accompanied.

Links between Adbikadir Ali Abdi (AAA) and the other members of the plot cannot be confirmed, although the fact that he was indicted in the same document

[12] All-channel networks tend to be horizontal with a high interconnectivity of nodes. If any nodes appear to be especially central and interconnected, they are few and only marginally more influential than the rest.

[13] 'Implicated' means that the individual was either indicted by an American court on terrorist charges related to these activities, and/or the individual has personally admitted involvement or is widely acknowledged by AS, but was killed before she could be indicted. Burhan Hassan, who departed in November 2008, exemplifies the latter.

[14] This refers to the six men that departed in December 2007, as well as Mahamud Said Omar and Omer Abdi Mohamud.

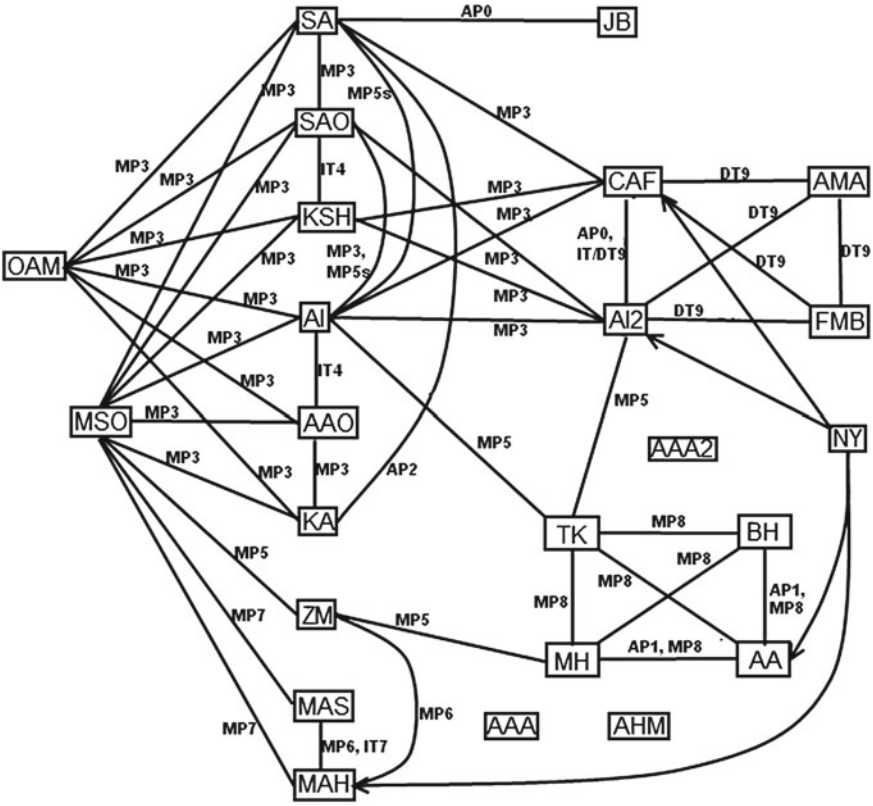

Figure 1 Legend

Node Identity			Link Quality		Link Duration	
AA	Abdisalan Ali		**IT**	**i**nternational **t**ravel for the furtheranceof illicit objectives	**1**	2005 - 2008
AAA	Abdikadir Ali Abdi					
AAA2	Adarus Abdulle Ali		**DT**	**d**omestic **t**ravel for the furtherance of illicit objectives	**2**	March 2007
AAO	Ahmed Ali Omar					
AHM	Ahmed Hussein Mahamud		**AP**	**a**ssociates **p**rior to involvement in illicit network	**3**	September – December 2007

Fig. 1 Minneapolis recruitment network (It should be noted that the links here represent the quality and duration of links *between* people; therefore, international or domestic travel independent of other network nodes is not indicated on this sociogram, but is indicated in the text.)

as ten of the other individuals here as well as his departure during November 2008 intimate links to at least some of the nodes of the network [12].

AHM is confirmed to have raised funds for several of the men who departed between August and November 2008. On three separate occasions between April 2009 and April 2010, once they had travelled to Somalia, he also provided two of the men with money at their behest [98, pp. 2–3]. However, court documents do not indicate to whom AHM was linked.

AI	Abdifatah Isse					
AI2	Abdiweli Isse		→	(placed at receiving end of link) transfer of funds for furtherance of illicit objectives	**4**	December 2007
AMA	Abdow Munye Abdow					
BH	Burhan Hassan					
CAF	Cabdulaahi Ahmed Faarax		**i**	placed by arrow, indicates **i**nternational transfer	**5**	Early 2008
FMB	Farah Mohamad Beledi					
JB	Jamal Banna		**d**	placed by arrow, indicates **d**omestic transfer	**6**	February – August 2008
KA	Khalid Abshir					
KSH	Kamal Said Hassan		**'n'**	Number placed by arrow indicates the number of transfers (if n>1)	**7**	August 2008
MAH	Mohamed Abdullahi Hassan					
MAS	Mustafa Ali Salat					
MH	Mohamud Hassan		**MP**	≥1 **m**eeting in **p**erson for the furtherance of illicit objectives	**8**	Fall 2008
MSO	Mahamud Said Omar					
OAM	Omer Abdi Mohamed		**MT**	≥1 **m**eeting by **t**elephone for the furtherance of illicit objectives	**9**	October 2009
SA	Shirwa Ahmed					
SAO	Salah Ahmed Osman					
TK	Troy Kastigar		**FP**	furtherance of network objectives under **f**alse **p**retenses	**0**	Unknown/unverifiable
ZM	Zakaria Maruf					
			UK	unknown/unverifiable		

Fig. 1 (continued)

Stohl and Stohl hypothesize that ties of friendship and acquaintance can form the bedrock of a resilient network, and are often strong ties that appear to be weak when scrutinized [31, pp. 101–102, 25, p. 49]. There are a few confirmed links between individual nodes that pre-dated any known radicalization or illicit activity, but such antecedent ties probably existed, especially considering the geographic concentration of the nodes as well as the substantial number of subjects who attended the same educational institutions as well as the Abubakar As-Saddique mosque in Minneapolis. One confirmed example are Shirwa Ahmed and Jamal Bana. The latter has no other verifiable links to the network, despite his departure concurrent with five others in November 2008.

Within the recruitment network, all known fundraising activity was in the form of door-to-door solicitation under false pretense, including sending one of the subjects to Saudi Arabia to study the Koran and supporting orphanages of Somalia. Almost all of these funds were spent in the Minneapolis area to purchase airline tickets for the men travelling to Somalia. Even in the two cases where this rule does not hold, the funds were intended for use by individual members of the network while in Somalia. This includes MSO's trip to Somalia between January and April 2008, where he supplied money to help unspecified members of the MRN to purchase weapons, and AHM's transfer of small sums of money (three transactions totaling $200) to help unspecified members of this network to purchase firearms.

In addition to raising money for themselves and others within the MRN to travel to Somalia, one node within the network funded several nodes' trips to Somalia without the intention of leaving for Somalia herself. Nima Yusuf (NY) funded individual combatants from the MRN while they were in Somalia, but unlike MSO, this node is a woman who never intended to travel to Somalia. She is confirmed to have sent money to four nodes within the MRN (AA, AI2, CAF, and MAH) [99, pp. 2–4]. These connections reinforce the all-channel structure of the network; NY did not fund just a single sub-group of the larger network (e.g. the group of AI2, AMA, CAF, and FMB that met together repeatedly at the University of Minnesota), but two individuals within this group as well as two others with no documented contact with A12, CAF or each other. While this funding is distinct from the larger sums directed towards the general cause that fundraising networks generate, this seems to be relatively common behaviour in recruiting networks, undertaken by MSO, NY, as well as SEA in the Australia Recruiting Network.

In sum, the MRN appears to be the largest publicly known AS network in the West. Although almost two years separate the first known departure from the last, a majority of nodes are highly interconnected and exhibit no discernible hub or chain patterns. In terms of their activities and objectives (1) there is no indication that they were in any way plotting an attack on American soil, (2) funds raised by the network were solely to facilitate members' travel to Somalia and (3) many nodes raised at least a portion of their own travel funds [12, 100, pp. 12–16].

6.2 Australia Recruiting Network

At first glance this group of individuals, who were indicted on charges of conspiring to attack the Holsworthy Barracks near Sydney, Australia in 2009, appears to run counter to trends established by the MRN. In stark contrast to the MRN, members of this network attempted to hatch a domestic plot; as opposed to funding the travel of recruits to Somalia to be under the command of AS leaders there, this network sought to plan its own offensive and execute it domestically [101]. However, an investigation of the group reveals that its initial intentions were in fact very similar to those of the MRN. In late 2008, Walid Osman Mohamed (WOM) left Australia for Somalia to fight for AS (Fig. 2).

Wissam Mahmoud Fattal (WMF) accompanied WOM with the same intent, but lacked a proper visa for the first leg of the voyage to Kenya [102]. The plan for the domestic attack was concocted only once WMF had determined that securing the appropriate visa would take too long [102]. Furthermore, Yacqub Khayre (YK) travelled to Somalia to train with AS from April until shortly before his arrest in August 2009 [103]. Why he returned is not known, but it does not appear that this training was for use back in Australia. The network includes conspirators who never attempted to travel to Somalia, but it is unclear whether these individuals were oriented towards a domestic attack prior to WMF's inability to travel to

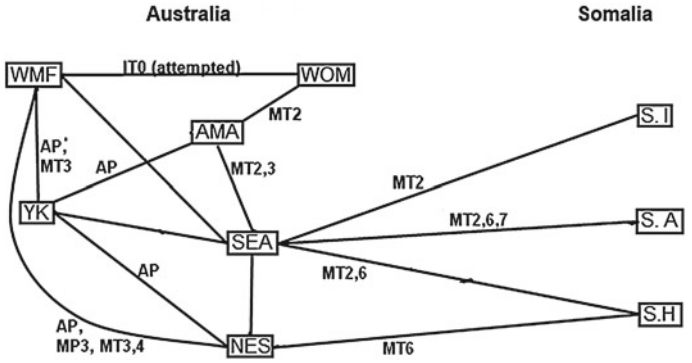

Figure 2 Legend

Node Identity			Link Quality		Link Duration	
AMA	Abdirahman Mohamud Ahmed	**IT**	**i**nternational **t**ravel for the furtherance of illicit objectives	**0**	December 2008
NES	Nayef El Sayed	**DT**	**d**omestic **t**ravel for the furtherance of illicit objectives	**1**	January 2009
SA	Sheikh Abdirahman	**AP**	**a**ssociates **p**rior to involvement in illicit network	**2**	February 2009
SH	Sheikh Hayakallah	→	(placed at receiving end of link) transfer of funds for furtherance of illicit objectives	**3**	March 2009
SI	Sheikh Ikrama	**i**	placed by arrow, indicates **i**nternational transfer	**4**	April 2009
SEA	Saney Edow Aweys	**d**	placed by arrow, indicates **d**omestic transfer	**5**	May 2009
WMF	Wissam Mahmoud Fattal	**'n'**	Number placed by arrow indicates the number of transfers (if n>1)	**6**	June 2009
WOM	Walid Osman Mohamed	**MP**	≥1 **m**eeting in **p**erson for the furtherance of illicit objectives	**7**	July 2009
YK	Yacqub Khayre	**MT**	≥1 **m**eeting by **t**elephone for the furtherance of illicit objectives		
*identified as such in court documents		**FP**	Furtherance of network objectives under **f**alse **p**retenses		
		UK	unknown/unverifiable		

Fig. 2 Australia recruitment network

Somalia. Saney Edow Aweys (SEA) supported WOM before and after his travel to Somalia, and he was also the main conduit among a trio of AS-affiliated sheikhs (SA, SH, and SI) situated in Somalia [102]. However, it was unclear how he came into contact with the sheikhs, and their first documented interaction took place in February 2009, two months after WMFs aborted departure from Australia [102].

Interaction with AS authorities in Somalia is documented in the two fundraising networks, but not in the MRN. Interaction between the Somali and Western networks is mediated by a broker, a single node situated in the Western network which receives and discriminately discloses information from Somalia to other

Western nodes. While Naser el-Sayed (NES) at one time joined SEA in a conference call to SH in June 2009, NES never spoke to the sheikhs alone; SEA was responsible for all other interaction with the sheikhs and thus is clearly a broker for the ARN receiving instructions and advice from authorities within the central AS network [102]. Had the ARN followed the advice of the sheikhs, the function of the group would have remained limited to sending able men to Somalia to fight. After months of deliberation and hesitation, SA, SH, and SI decided to deny the ARN the fatwa they had repeatedly requested for the attack on the Holsworthy Barracks [102]. The plot targeting the Barracks was not far along when Australian authorities intervened; the most substantial action had been WMF'S trip from Melbourne to Sydney to perform some naively superficial surveillance on the Barrack's exterior walls [102]. This attack was actively discouraged by the central AS network as an alternative to travelling to Somalia, which was deemed too costly. Notwithstanding the network's domestic plot, it is comparable to the MRN.

The overall failure of the ARN to facilitate travel of potential AS combatants to Somalia aside, the network is similar to the MRN in key respects. While the MRN has many more nodes than the ARN, the Western portions of both are unequivocally all-channel networks, in contrast to the fundraising networks' distinct hub patterns. All six of the Australian nodes have documented connections to at least two other domestic nodes, and four of the six have connections to at least three. While some connections between nodes are stronger than others; for example, it was noted in court that WMF and SEA had less contact with each other than their co-accused, NES, had with either of them [102]. It also seems that the all-channel structure of this network was reinforced by documented regular interaction between nodes outside of their illicit activities in a more substantial manner than observed in the MRN. Not only did media reports claim that several of the six men attended Preston Mosque in Melbourne together, but NES, WMF and YK worked together as bricklayers beginning early in 2009 until their arrest in August of that year [102, 104].[15]

In addition, funds were sent to Somalia (by SEA to WOM) to help fund combatants who had travelled there after joining the domestic network [102]. This differs from the two fundraising networks insofar as money was raised and sent to Somalia to aid AS' general cause as determined by authorities there, and not by nodes within the Western network. Furthermore, the MRN and the domestic nodes of the ARN are geographically concentrated, unlike those of the fundraising networks. Just as the MRN is concentrated in Minneapolis and St. Paul, Minnesota, all of the ARN's domestic nodes lived in Melbourne and surrounding suburbs.

[15] While accompanying one another to the Preston Mosque is worth noting, reports of this behaviour were not specific enough to confirm interactions between specific nodes in this regard.

6.3 Toronto Recruitment Network

A group consisting mostly of young men[16] in Canada also have links to AS, and while information about them is too scant to render a network map, what little data is available suggests an all-channel network focused on sending young men to fight in Somalia. Like the MRN and ARN, the individuals who make up this group are quite geographically concentrated; besides all residing in Toronto, the majority lived in the Rexdale/Dixon Park area of Toronto, a region known for its high concentration of Somali-Canadians [105, 107, 108]. Among these are six young men who left for Somalia in October 2009. At least two have since been killed while fighting for AS, one as recently as April 2013 [109, 110]. For reasons aforementioned, information on these individuals and their interactions are scarce. The only locus at which all of these nodes intersect is the Abu Huraira Centre in Rexdale, which three of the six had begun attending before their departure, and where they were described as "occasional" congregants [107].

While there is no indication that authorities at the mosque facilitated or condoned these activities, the mosque presents a social atmosphere where interactions away from religious leaders are common and vital to the community. Similarly, all six Australian members of the ARN attended Preston Mosque in Melbourne, and many MRN members attended Abubakar As-Saddique in Minneapolis. In all three cases, no mosque leaders have been connected to these networks, and information about whatever interactions may have occurred is too vague to draw precise, node-to-node links. Mohamed Hersi, who also worshipped at Abu Huraira, was arrested as he attempted to leave Canada for Somalia in March 2011, about a year and a half after the initial group of six [108]. It is (currently) unknown if he is connected to this group, but he is also the only person to have been arrested in Canada in connection to AS. Ergo, information from his trial will likely be crucial to understanding more about any networking activity amongst the Toronto recruits, and whether he is actually linked to the others.

6.4 Minneapolis Fundraising Network

At about the same time as the MRN, three individuals in Minneapolis and one in Columbus, Ohio conspired to provide financial support to AS. However, they did

[16] Most in this group are young men, with the notable outlier Abdulli Ali Afrah a.k.a. "Aspro", who rose through AS' ranks during its first few years to be killed in a mortar attack in early 2008 at age 56. Furthermore, two young Somali-Canadian women from Toronto have also mysteriously left for Somalia and are rumoured to be there aiding AS. One of these women is Asli Nur, the 19-year-old niece of Mohamed Abdullahi Mohamed, former Prime Minister of Somalia. None of these individuals have been connected to the Abu Huraira Islamic Center or to the other recruits in any other known way, and so these cases may be lone wolves unconnected to a potential network likely based around Abu Huraira [105, 106].

not also conspire to leave the U.S. for Somalia. Their activities focused solely on fundraising and transferring funds to established contacts in Somalia for the purpose of furthering unspecified AS objectives. This network appears to consist of two hub networks, situated in Somalia and the U.S., respectively.

Beginning in September 2008, Amina Farah Ali (AFA) of Minneapolis was confirmed to have been in contact with an AS militant in Somalia, described in court documents as "UC1", a financial representative for the organization who was promoted to an administrative governor of several AS-controlled regions in February 2009 [52, pp. 2–3]. Court documents identify four other contacts in Somalia who were subordinates of UC1 and who do not appear to have interacted with one another, three of whom oversaw accounts to which AFA transferred funds [52, pp. 2–3]. The account numbers corresponding to these individuals were supplied to AFA by UC1 with whom AFA was in contact repeatedly between September 2008 and July 2009 [52, pp. 6–8]. Court documents have AFA corresponding directly with two of these subordinates, interacting with one only once in May 2009, and contacting the other in October 2008 to arrange for him to be a guest speaker at a fundraising teleconference that same month [52, pp. 6–8] (Fig. 3).

In America, AFA was in contact with three individuals, one of whom assisted with bookkeeping and recording pledges, while the other two collected funds from donors and directed them to AFA for transfer to Somalia. One of these actors was explicitly instructed by AFA to collect funds under false pretense, while she tasked the other with collecting pledges made during one of the teleconferences [52, pp. 2–3].[17] The available information suggests that these three nodes never interacted. Unlike the MRN, there are no detectable ambiguities to suggest further links. Notwithstanding the geographic overlap between the MRN and some of the nodes of the MFN, an exhaustive search revealed no apparent connections between these networks. The conclusion to be drawn is that the MFN appears to be composed of two hub networks with AFA as the broker between the Minneapolitan and Somali hubs. While the individuals in Somalia may have other unknown functions in the larger AS network there, the conspirators in America appear to be concerned exclusively with supplying funds to be used at the discretion of AS operatives in Somalia.

[17] Of this network, only Ali and the book-keeper (Hawo Mohamed Hassan) were indicted on charges by the United States government. Information about un-indicted co-conspirators was crucial to justifying these indictments and is important here (and in the third network, to be discussed shortly) in accurately portraying the nature of this network's activities and the structure of the network necessary for these activities. Information on non-indicted individuals in the Minneapolis recruitment network is not included because no such individuals can be credibly implicated in any of the network's illicit activities, despite numerous calls from the community alleging complicity of the religious leadership of the Abu-Bakar As-Saddique mosque in Minneapolis.

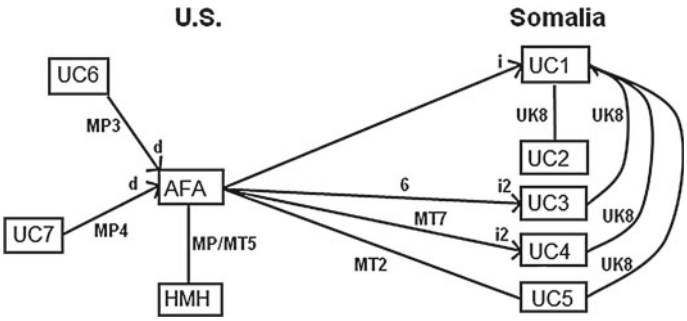

Figure 3 Legend

Node Identity			Link Quality		Link Duration	
AFA	Amina Farah Ali		**IT**	**i**nternational **t**ravel for the furtherance of illicit objectives	**1**	September 2008 – July 2009
HMH	Hawo Mohamed Hassan		**DT**	**d**omestic **t**ravel for the furtherance of illicit objectives	**2**	October 2008
UC1	Uninidicted Conspirator 1*		**AP**	**a**ssociates **p**rior to involvement in illicit network	**3**	November 2008
UC2	Uninidicted Conspirator 2*		→	(placed at receiving end of link) transfer of funds for furtherance of illicit objectives	**4**	January 2009
UC3	Uninidicted Conspirator 3*		**i**	placed by arrow, indicates **i**nternational transfer	**5**	February 2009
UC4	Uninidicted Conspirator 4*		**d**	placed by arrow, indicates **d**omestic transfer	**6**	April 2009
UC5	Uninidicted Conspirator 5*		**'n'**	Number placed by arrow indicates the number of transfers (if n>1)	**7**	May 2009
UC6	Uninidicted Conspirator 6*		**MP**	≥1 **m**eeting in **p**erson for the furtherance of illicit objectives	**8**	Unknown/ unverifiable
UC7	Uninidicted Conspirator 7*		**MT**	≥1 **m**eeting by **t**elephone for the furtherance of illicit objectives		
*identified as such in court documents			**FP**	Furtherance of network objectives under **f**alse **p**retenses		
			UK	unknown/unverifiable		

Fig. 3 Minneapolis fundraising network

6.4.1 St. Louis/San Diego Fundraising Network

Akin to the MFN, the SL/SD FN, active between January 2008 and March 2009, was concerned exclusively with raising funds and transferring them to contacts in Somalia for use there, including the purchase of a vehicle to transport AS militants [111, pp. 10–12]. Akin to the MFN, the function of the SL/SD FN relied on repeated contact with AS operatives in Somalia, which were more demanding than those in the MFN: they requested specific amounts of money for particular purposes. While court documents are unclear on how these funds were raised, the manner in which these funds were transferred to Somalia is indicative of a network

similar in structure to the MFN. The main actor in this network was Mohamud Abdi Yusuf (MAY) of St. Louis, MO. From January to July 2008, he was repeatedly in contact with Basaaly Saeed Moalin (BM), based in San Diego, California. In February 2008 BM communicated with Aryow (A), then the leader of AS, and BM received funds with instructions from MAY to transfer them to "Omar Mataan" (OM) based in Somalia [111, pp. 4, 9, 12–13]. Yusuf himself sent five installments to Duane Mohamed Diriye (DMD) in Somalia, and interacted with "Sheeik Saaid" (SS),[18] a contact in Somalia introduced to him by DMD [111, pp. 8–10]. MAY also had multiple conversations with an unknown acquaintance in Somalia with whom he discussed skirmishes between AS and Ethiopian forces [98, pp. 12–13].

Court documents unsealed in early 2013 show that the development of the SD/SL FN is more complex than information available at the time of the pilot study indicated. It now seems that BM acted as a broker among three men collecting funds for al-Shabaab in and around San Diego and Ayrow, who was purported to be a top leader within AS until he was assassinated on May 1, 2008 [112, p. 14]. Independent of MAY or the other nodes in St. Louis, BM co-ordinated a number of hawala transfers totalling several thousand dollars in the first several months of 2009 [112, pp. 8–14]. While BM was crucially aided by one of the network nodes (ID), who worked at a San Diego hawala service and assisted both BM and MM in transferring funds to A in Somalia, all information concerning these transfers (e.g. the aliases the funds were transferred under, when they were sent and how much they total) passed through BM [112, p. 13].

Not only did BM broker information in a manner observed in the MFN and the network BM and his co-conspirators would link up with after A's death, but this network also exhibits a hub pattern, with little interaction among the three fundraisers that depended on BM for information. Only a single phone call between ID and MM is documented, and it concerns a hawala transfer requested by A and co-ordinated by BM [112, p. 12]. Thus, this network exhibits the structure and dynamic posited earlier as characteristic of fundraising networks, qualities these nodes maintain after Ayrow's death.

Despite BM's apparent autonomy in communicating with Ayrow and co-ordinating transfers of funds to Somalia, he had been in contact with MAY in St. Louis about sending funds to AS prior to Ayrow's death, as early as January 2009 [111, p. 9]. After A's death, BM was given money by MAY to transfer to one of MAY's contacts in Somalia [111, pp. 12–13]. This activity relied on MAY's brokerage of information, whereas BM's role was simply to act on MAY's instructions. MAY became the broker of the network because of his resilient contacts in Somalia, where BM relinquished his status as broker due to A's death. Interestingly, BM remained a broker between his associates in San Diego and the

[18] This name as well as "Omar Mataan" are always in quotations in court documents, leading to the suspicion that they are known to be code names by American authorities. This further obscures the nature of relations between the nodes situated in Somalia, which are unknown except for the link between Diriye and "Sheeik Saaid".

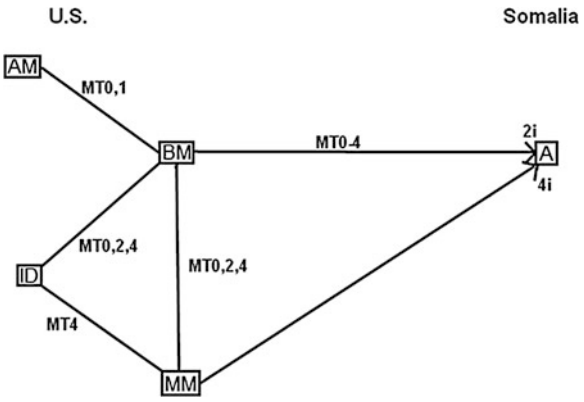

Fig. 4 St. Louis/San Diego fundraising network—before Ayrow's death

hub centered around MAY in San Diego. MAY only spoke with nodes in San Diego other than BM on one occasion, a conference call between MAY, BM, ID and MM in July 2008 [112, p. 16]. Otherwise, MAY and BM were the centers of their respective hubs, each being the primary contact for the other. Who served as a broker between fundraising efforts in the West and AS leaders in Somalia appears to be largely determined by the strength of pre-existing ties to these authorities. However, there is no information on how these initial contacts were formed, or how BM in San Diego came to associate with MAY in St. Louis [112, p. 14] (Figs. 4 and 5).[19]

From May 2008 until March 2009, Yusuf was also linked to Abdi Mahdi Hussein (AMH), an employee of Qaran Financial Express, LLC, a *hawala* remittance firm with a branch in Minneapolis. AMH agreed to make 14 remittances to an unknown contact in Somalia in a manner that obscured the identities of the sender and the receiver, and in amounts small enough to avoid requiring the sender to provide and verify their identity. However, court documents and the criminal charge against AMH indicate that he was unaware of any connection to AS [111, pp. 20–23]. MAY interacted with four other individuals about various aspects involved in sending money oversees to support AS, and AMH met one of them once in May 2008 [111, p. 21]. This is the only direct link between individuals in America with whom Yusuf discussed his illicit activities.

The activities of the SL/SD FN were coordinated by nodes broken down into hubs. MAY is the most active node on the American side, connected to five other nodes of which only two had contact on a single occasion. One of these contacts, BM, was also at the center of a hub with six individuals aside from MAY, also with no documented connections except through BM. As in the other fundraising network, no node expressed any desire to travel to Somalia. Connections between America and Somalia other than through MAY are inconsequential; BM had a

[19] While a contact of BM's identified as "Kay" did successfully refer BM to Mahad Karate, an AS member in Somalia, no money was ever remitted to him from the Western nodes.

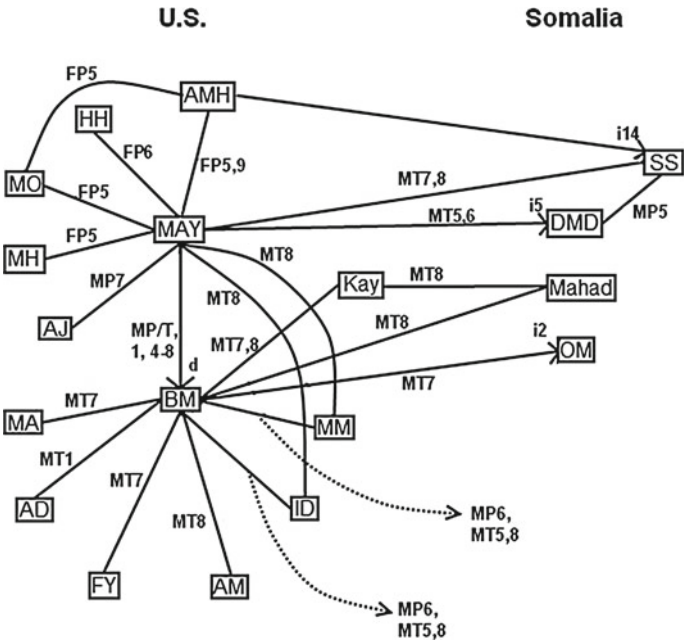

Figure 4-5 Legend

Node Identity			Link Quality		Link Duration	
A	Aryow	**IT**	**i**nternational **t**ravel for the furtherance of illicit objectives	**0**	December 2007
AD	*	**DT**	**d**omestic **t**ravel for the furtherance of illicit objectives	**1**	January 2008
AJ	*	**AP**	**a**ssociates **p**rior to involvement in illicit network	**2**	February 2008
AMH	Abdi Mahdi Hussein	→	(placed at receiving end of link) transfer of funds for furtherance of illicit objectives	**3**	March 2008
BM	Basaaly Saeed Moalin	**i**	placed by arrow, indicates **i**nternational transfer	**4**	April 2008
DD	Duane Mohamed Diriye	**d**	placed by arrow, indicates **d**omestic transfer	**5**	May 2008
FY	*				
HH	*	**'n'**	Number placed by arrow indicates the number of transfers (if n>1)	**6**	June 2008
ID	Isse Doreh				
Kay	*				
Mahad	*	**MP**	≥1 **m**eeting in **p**erson for the furtherance of illicit objectives	**7**	July 2008
MA	*				
MAY	Mohamed Abdi Yusuf	**MT**	≥1 **m**eeting by **t**elephone for the furtherance of illicit objectives	8	August 2008
MH	*				

Fig. 5 San Diego/St. Louis fundraising network—After Ayrow's Death

MM	Mohamed Mohamed Mohamud	**FP**	furtherance of network objectives under **f**alse **p**retenses	9	March 2009
MO	*	**UK**	unknown/unverifiable		
NM	Ahmed Nasir Taalil Mohamud				
OM	Omar Mataan*				
SS	Shiekh Saaid*				

Fig. 5 (continued)

single conversation with a high-ranking AS official and sent funds to Somalia, but the quantity and destination of these funds were determined by MAY with some instruction from his two contacts in Somalia. Of the nodes in Somalia, DMD was the most important; while SS seems to exert influence over the quantity, timing, and use of the Somalia-bound funds, MAY was introduced to SS through DMD.

The SL/SD FN matches Morselli's predictions for small networks. The individuals connected to MAY and DMD who were situated in America exhibit a low degree centrality and almost non-existent betweenness centrality. Here, brokers play a slightly less crucial role than observed in the MFN because there are multiple links across which funds and information flowed between America and Somalia within this network. However, one pair of brokers, MAY in America and DMD in Somalia, appears to be pivotal to the network's function. While both Hussein and BM sent money to Somalia, and BM had a relatively high betweenness centrality due to his links to MAY as well as A and in Somalia, MAY received and controlled the flow of information from the AS operative in Somalia and controlled the timing and quantity of funds remitted after A's death. Like the Minneapolis network, the removal of the link between MAY and DMD and/or SS (a link forged due to MAY's prior link with DMD) compromised the functionality of the network.

7 Findings and Discussion

The addition of the ARN and the TRN to the initial pilot application of SNA largely confirm the initial hypotheses. The two most striking differences between the MRN and the ARN are the presence of brokers as well as intent to commit a domestic attack. These will be addressed in turn.

In both cases, fundraising networks required a pair of brokers—one in Somalia and one in the U.S. respectively—to facilitate a flow of information that in turn allowed for the remittance of funds to Somalia. As the brokers are essential to the function of these networks (as evidenced by the changes to the SD/SLFN following the death of Ayrow, who was the Somali component of the pair of brokers

at the center of that network), fundraising networks are thought to depend on the actions of brokers. The ARN did not rely on brokers in this sense, as they did not rely on (or even follow) information and advice given to them by SA, SH, and SI. Had this advice been heeded, this network's actors would have oriented their efforts towards recruitment. However, individuals joined the group and departed for Somalia before any documented contact with SA, SH, and SI; so, they did not rely on brokers for this function either. The ARN (and perhaps recruiting networks in general) may contain nodes that act as brokers, but nowhere are they seen to rely on these brokers to maintain their network or achieve their objectives.

The presence of a domestic plot may strike more deeply at the initial hypotheses, because it seems to indicate that networks need not be specialized at all; this network exhibits the two distinct functions of recruitment (for foreign training and combat) and planning a domestic attack. However, this discrepancy is mitigated by other available information. As discussed above, the function of recruitment began chronologically prior to a domestic plot being hatched, and the failure to travel abroad is confirmed to have encouraged the idea of an attack within Australia. This presents a counter-intuitive case insofar as security measures (in this case, the particular agreement between Australia and Kenya as to what documentation is required to travel between the two states) actually encouraged an attack on Western soil rather than preventing it. However, it also serves to demonstrate that the recruiting function was the primary aim of this group, and that it fits the scope conditions of a recruitment network. It is possible that terrorist networks aiming to perpetrate a domestic terrorist attack will also organize into an all-channel network, but as of yet there is no known network that fits the parameters of this study; so, further analysis is not yet possible.

Table 3 distinguishes attributes of fundraising and recruitment networks and compares these traits to the ARN:

The ARN deviates somewhat from the structure and dynamic of a recruitment network as posited by the pilot study. While these deviations, for reasons discussed above, do not fundamentally challenge the hypotheses, they introduce certain nuances into the discussion.

H1 Terrorist networks are functionally differentiated

H2 The structure and characteristics of terrorist networks is a function of their purpose

These hypotheses are confirmed by the ARN, and potentially hold true for the TRN. These networks were focused on recruiting and sending individuals to fight in Somalia until the travel plans of a high inter-connected node were frustrated. The ARN exhibited an all-channel structure reminiscent of the MRN, and distinct from the two fundraising networks. The TRN appears to have a similar structure.

H3 Recruitment-oriented networks rely on domestic all-channel networks that are geographically concentrated (that is, for the purpose of recruitment, proximity matters)

Table 3 Asssessment of fundraising and recruitment characteristics by type of network, with comparison to ARN

Network Type	Fundraising	Recruitment	Australian Recruitment Network[a]
Network Structure	Hub	All-channel	Hub
Select nodes function as brokers	Yes	No	Yes
Centrality characteristics of nodes	Brokers: High betweenness centrality, low degree centrality All other nodes: Low betweenness centrality, low degree centrality	High betweenness centrality, high degree centrality	High betweenness centrality, high degree centrality
International linkages	Yes	No	Yes
Intent to commit domestic attacks	No	No	Yes
Use of funds	Remittances: American donors to AS contacts in Somalia	Internal domestic activities: mostly to purchase airfare	Internal domestic activities: mostly to purchase airfare

[a] Due to that aforementioned limits on what can be known about the TRN, only the ARN is compared in this table. The TRN will be discussed along with the ARN in the ensuing comments

H4 Fund-raising networks rely on transcontinental hub networks (that is, proximity does not seem an impediment)

H5 Control over access to recruitment networks is informal and decentralized

The TRN appears to be confined to a single city, much like the MRN. Much of the ARN was concentrated in the city of Melbourne, but also contained three nodes who resided in Somalia during the ARN's operation. Although the ARN contained international linkages, it did not rely on these linkages for recruitment activities or the preparation for a domestic attack that followed. The contention that "for the purpose of recruitment, proximity matters" still obtains, as neither the presence nor the activities of SA, SH, and SI in Somalia affected recruitment activities. The importance of geographical proximity to different types of terrorist activity makes this hypothesis particularly useful to the study of illicit networks, and the interaction between SA, SH, and SI with the Australian nodes of the ARN ought not detract from this finding.

The additional information on BM and the fundraising network he brokered prior to his involvement with MAY shows that fundraising networks adopt a hub pattern even on very small scales. Furthermore, there is no evidence to suggest that anyone from any of the networks under investigation controlled or even made an attempt to control the membership of the ARN; admittance to both fundraising and recruitment networks appears informal and decentralized across all cases.

H6 Fundraising networks rely heavily on the actions of 'brokers';
H7 Recruitment networks do not rely on brokers

Like the MRN, the TRN currently appears devoid of brokers. The claim that recruitment networks do not contain brokers whatsoever cannot be made in light of the ARN, but useful claims can still be consistently made as to the function of brokers within different types of networks. The ARN did not rely on brokers, but instead contained a node (SEA) who had substantially more contact than any other node with SA, SH, and SI. Ergo, SEA may have been in a position to broker the flow of information between the network's Somali and Australian nodes, but this information appears to have been inconsequential to the ARN's tactics, especially since they disregarded the sheikhs' advice regarding the proposed domestic attack. As before, funding networks rely heavily on brokers to coordinate international transfers of funds. Juxtaposing the activities of brokers in the fundraising networks with those in the ARN shows that the latter's brokers are irrelevant.

H8 Transfer of funds from the central network to peripheral networks is not necessarily indicative of the pursuit of terrorist ends

This final hypothesis is strengthened by the ARN. Not only did the central network (SA, SH, SI) not send money or other resources to the peripheral network, but they discouraged the domestic attack and advised the group to specialize solely in recruitment. At least in the case of AS, the dynamics of support between the centre and the periphery run counter to prevailing assumptions about hierarchical, top-down flows of funds and personnel. Conversely, the central AS network relies on networks situated within Western states for infusions of cash and manpower. While the successful transfer of funds requires coordination between the peripheral and central networks, recruitment networks appear to function rather independently, recruiting individuals and funding their travel without advice or expectations from the central network.[20]

8 Conclusion

In a large-scale study of terrorist groups, Piazza divides them into two broads categories based upon the nature of their ultimate objectives and the means used to achieve them. These types are "universalist/abstract" and "strategic". The former is characterized by esoteric goals that are often broad in scale, and by contrast the latter by goals which can be empirically measured and are often more directly

[20] This should not indicate that members of the recruitment networks were not exposed to propaganda available on the Internet that has been produced by AS operatives in Somalia such as Omar Hammami. However, this is obviously distinct from communicating with the central network to co-ordinate the activities of the peripheral network.

achievable because of these concrete goals and a typically smaller scope [113, p. 65]. In turn, the former attempts to achieve these goals mostly through acts designed to draw broad attention and unite some under an ideology while demonizing others, while the latter achieves their objectives through more localized, tactical activities [113, p. 65].

AS is a critical case precisely because it straddles these two categories: not only is AS intent on establishing an Islamic caliphate in Somalia by raising an international militia and combating states' armies, but it also engages in high-profile kidnappings of Westerners and sporadically refers to global jihad [114, 115, 2, pp. 203–204]. It is difficult to think of another terrorist group with the combination of substantial activity among multiple separate networks and reliable documentation of these interactions and activities with the presence of both a central network and subsidiary networks in the West that is hypothesized and fantasized about by much of the current literature on terrorism and many Western politicians.

On the one hand, the sample in this study may be small, thus limiting the inferences that can be drawn from the findings and their generalizability. On the other hand, the evidence on which the study draws is relatively robust. To compare networks across the same time and space makes it possible to control for similarities and differences in ways that would otherwise be more difficult methodologically if context and conditions were held less constant. The initial hypotheses need further empirical scrutiny and validation, both through comparison to other AS networks and through comparison to other terror networks about which reliable information is available, so that brokers can be identified where they exist, linkages confirmed, and an accurate model of the entire network and its relations to a central organization constructed. The fact that the great majority of the nodes in these networks are Somalis living in Western diasporas raises the importance of diasporas and ethnic capital as means of decreasing marginal and transaction costs as an issue that also warrants further study. Ethnic identity compounded by radical Islamist/jihadist ideology certainly had a hand in congealing these networks.

The findings of this study of all known Western networks connected to AS challenges some of the conventional wisdom surrounding the structure and function of terrorist networks, especially those in the West. Most importantly, this study finds that such networks have specialized functions, and that the structure of such networks seems to correlate with these functions. These different functions determine the nature of their relationship with the central organization. This has implications for law enforcement and counter-terrorism.

First, information about the function of a network, even when many of its nodes and linkages remain obscure, can be indicative of its structure and, therefore, how best to intercept it. For example, knowledge that the network is oriented towards raising and remitting funds would warrant the search for a 'broker' node whose disruption would debilitate the function of the network, at least temporarily. By contrast, networks specializing in recruitment appear to be more robust and resilient to the removal of even multiple nodes. As Bakker et al. confirm, much work remains to be done on how networks replace nodes, re-establish links or reroute flows of information and/or resources through other nodes; so, it is difficult to

predict how effective the removal of nodes would be over time [57, pp. 56–57]. However, the possibility that a network's function and structure are related is a promising step towards a more nuanced strategy to contain and deter such networks: not all terror networks are alike. This is a significant empirical finding for counter-terrorism. Knowing the function of a network makes it possible to counter it by detecting and debilitating its nodes. Conversely, knowing the structure of a network makes it possible to surmise its purpose.

References

1. Zelin AY (2013) European foreign fighters in Syria. International Centre for the Study of Radicalization, http://icsr.info/2013/04/icsr-insight-european-foreign-fighters-in-syria-2/. Accessed 23 June 2013
2. Shinn D (2011), Al-Shabaab's foreign threat to Somalia. Orbis 203–215
3. Robertson N and Cruikshank P (2012), Somali AQ's western reach, CNN, 24 Feb 2012. http://homeland.house.gov/news/cnn-somali-AQs-western-reach. Accessed 21 Sept 2012
4. IPT News (2011) Prosecutor warns not to ignore al Shabaab, investigative project on terrorism (Dec 6). http://www.investigativeproject.org/3323/prosecutor-warns-not-to-ignore-al-shabaab-threat. Accessed 21 Sept 2012
5. Labott E, State dept: as core weakens, al Qaeda affiliates are top terror threat CNN Security Clearance, http://security.blogs.cnn.com/2012/07/31/state-dept-as-core-weakens-AQ-affiliates-are-top-terror-threat/. Accessed 21 Sept 2012
6. Dunbar E (2010) Survey: nearly 1 in 3 US Somalis live in Minnesota. Minnesota Public Radio News, USA
7. BBC (2012) Former U.S. soldier Craig Baxam 'helped al-Shabab' (Jan 9)
8. Stickney R, Kreuger P (2010) Accused terrorist was "kind, peaceful man": friends. NBC, San Diego, 6 Aug 2010
9. District of Minnesota, state of Minnesota (2009) Affidavit of Michael N. Cannizarro Jr., United States of America vs. Abdiweli Yassin Isse and Cabdulaahi Ahmed Faarax (Oct 8)
10. New York Times (2011) Joining the fight in Somalia (Oct 30)
11. United States District Court, District of Minnesota (2009) Affidavit in Support of Request for Extradition, United States of America v. Mahamud Said Omar (20 Nov 2009)
12. United Sates District Court, District of Minnesota (2009) Third superseding indictment, United Sates of America v. Ahmed Ali Omar et al (23 Nov 2009)
13. Zwartz B, Cooke D (2009) A battered faith. The Age (6 Aug 2009)
14. Powell WW (1990) Neither market nor hierarchy: network forms of organization. Res Organ Behav 12(1):295–336
15. Stohl C, Stohl M (2007) Networks of terror: theoretical assumptions and pragmatic consequences. Commun Theor 17:93–124
16. Sageman M (2004) Understanding terror networks. University of Pennsylvania Press, Philadelphia
17. Eilstrup-Sangiovanni M, Jones C (2008) Assessing the dangers of illicit networks: why al-Qaida May be less dangerous than many think. Int Secur 33:7–44
18. Giraldo JK, Trinkunas HA (2007) Introduction. In: Giraldo JK, Trinkunas HA (eds) Terrorism financing and state responses: a comparative perspective. Stanford University Press, Stanford, pp 7–20
19. Gunning J (2009) Social movement theory and the study of terrorism. In: Jackson R, Smyth MB, Gunning J (eds) Critical terrorism studies: a new research agenda. Routledge, London

20. Jereon Gunning J (2008) Terrorism, charities, and diasporas. In: Biersteker TJ, Eckert SE (eds) Countering the financing of terrorism. Routledge, London, pp 93–125
21. Matthew R, Shambaugh G (2005) The limits of terrorism: a network perspective. Int Stud Rev 7:617–627
22. Sheffer G (2005) Diasporas, terrorism and WMD. In: Blum A, Asal V, Wilkenfeld J (eds) Nonstate actors, terrorism and weapons of mass destruction. Int Stud Rev 7:133–70
23. Abuza Z (2003) Terrorist funding in Southeast Asia: the financial network of Al Qaeda and Jemaah Islamiya. Contemp SE Asia 25:169–199
24. Magouirk J, Atran S, Sageman M (2008) Connecting terrorist networks. Stud Confl Terrorism 31:1–16
25. Krebs VE (2002) Mapping networks of terrorist cells. Connections 24:43–52
26. Corman SR (2006) Using activity focus networks to pressure terrorist organizations. Comput Math Organ Theor 12:35–49
27. BBC (2003) Suspect 'reveals terrorist planning' (Sept 22)
28. Ilachinski A (2012) Modelling insurgent and terrorist networks as self-organised complex adaptive systems. Int J Parallel Emergent Distrib Syst 27:45–77
29. Siqueira K, Sandler T (2010) Terrorist networks, support, anddelegation. Public Choice 142:237–253
30. Leistedt SJ (2013) Behavioural aspects of terrorism. Forensic Sci Int 228:21–27
31. Stohl M (2008) Networks, terrorists, and criminals: the implications for community policing. Crime, Law Soc Change 50
32. Vertigans S (2011) The sociology of terrorism: people, places and processes. Taylor and Francis, New York
33. Asal V, Rethemeyer RK (2006) Researching terrorist networks. J Secur Educ 4
34. Keller JP, Desousa KC, Lin Y (2010) Dismantling terrorist networks: evaluating strategic options using agent-based modelling. Technol Forecast Soc Chang 77:1014–1036
35. Shapiro JN (2008) Terrorist organizations' inefficiencies and vulnerabilities. In: Giraldo JK, Trinkunas HA (eds) Terrorism financing and state responses: a comparative perspective. Stanford University Press, Stanford
36. Yang CC, Sageman M (2009) Analysis of terrorist social networks with fractal views. J Inf Sci 35:299–320
37. Acharya A (2009) Targeting Terrorist Financing. Routledge, New York
38. Shapiro JN, Siegel DA (2007) Underfunding in terrorist organizations. Int Stud Quart 51:405–429
39. Burt RS (2004) Structural holes and good ideas. Am J Sociol 100:349–399
40. Burt RS (1992) Structural holes: the social structure of competition. Harvard University Press, Boston
41. Burt RS (2000) The network structure of social capital. In: Sutton RI, Straw BM (eds) Research in organizational behavior. JAI Press, Greenwood, pp 345–423
42. Horne C, Horgan J (2012) Methodological triangulation in the analysis of terrorist networks. Stud Conflict Terrorism 35:182–192
43. Morselli C (2008) Assessing vulnerable and strategic positions in a criminal network. J Contemp Crim Justice 26:382–392
44. Morselli C, Roy J (2008) Brokerage qualifications in ringing operations. Criminology 46:71–98
45. Associated Press (2009) Third man pleads guilty in Somali terror case. 12 Aug 2009
46. Asal V, Nassbaum B, Harrington DW (2007) Terrorism as transnational advocacy: An organizational and tactical examination. Stud Confl Terrorism 30:65–74
47. Chen H, Qin J, Reid E, Zhou Y, Sageman M, Weinmann G (2008) Uncovering the dark web: case study of Jihad on the web. J Am Soc Inform Sci Technol 59:1347–1359
48. Joseph J (2011) Terrorists move to Skype, frustrate eavesdroppers. The Economic Times, India
49. Ogun MN (2012) Terrorist use of internet: possible suggestions to prevent the usage for terrorist purposes. J Appl Secur Res 7:203–217

50. Sageman M (2008) The next generation of terror. Foreign Policy 165:36–42
51. Schmidle RE (2010) Positioning theory and terrorist networks. J Theor Soc Behav 40:65–78
52. United States District Court, District of Minnesota (2010) Indictment, United States of America vs. Amina Farah Ali and Hawo Mohamed Hassan
53. Dougherty JM (2006) Hawala: how terrorists move funds globally. Corp Fin Rev 10:333–335
54. de Goede M (2003) Hawala discourses and the war on terrorist finance. Environ Plann D: Soc Space 21:513–532
55. Looney R (2003) Hawala: the terrorist's informal financial mechanism. Middle East Policy 10(1): 164–167
56. Tupman WA (2009) Ten myths about terrorist financing, J Money Laundering Control, 12(2):189–205
57. Bakker RM, Raab J, Milward HB (2012) A preliminary theory of dark network resilience. J Policy Anal Manage 31:33–62
58. U.S. Attorney's Office, District of Minnesota (2009) Terror charges unsealed in Minnesota against eight defendants. Justice Department Announces (23 Nov 2009)
59. Kron J (2011) American identified as bomber in attack on African Union in Somalia. New York Times, USA
60. Yuen L (2011) Family IDs Minn. man allegedly behind Somali suicide bombing. Minnesota Public Radio News, USA
61. Razavy M (2005) Hawala: an underground haven for terrorists or social phenomenon? Crime, Law, Soc Change 44:277–299
62. Eck JE (2006) When is a bologna sandwich better than sex? A defense of small-n case study evaluations. J Exp Criminol 2:345–362
63. van Duijn MAJ, Vermunt JK (2006) What is special about social network analysis? Methodology 2:2–6
64. Bowyer-Bell J (2000) The IRA 1968–2000: An analysis of a secret army. Frank Cass, London
65. Bruce S (1992) The Red Hand: Protestant Paramilitaries in Northern Ireland. Oxford University Press, Oxford
66. Coogan TP (1995) The IRA. Harper-Collins, London
67. Della Porta D (1995) Social movements, political violence and the state. Cambridge University Press, Camridge
68. Fair CF (2008) Who are Pakistan's militants and their families? Terrorism Polit Violence 20:49–65
69. Hegghammer T (2006) Terrorist recruitment and radicalization in Saudi Arabia. Middle East Policy 13:39–60
70. Jamieson A (1989) The heart attacked: terrorism and conflict in the Italian state. Marian Boyers, London
71. Taylor M (1988) The terrorist. Brassey's, London
72. White RW (1993) Provisional Irish republicans: an oral and interpretive history. Greenwood Press, Westport
73. LaFree G (2008) Generating Terrorism event databases: results from the global terrorism database, 1970 to 2008. In: Lum C, Kennedy LW (eds) Evidence-based counterterrorism policy. Springer, New York, pp 41–64
74. Chermak SM, Freilich JD, Parkin WS, Lynch JP (2011) American terrorism and extremist crime data sources and selectivity bias: an investigation focusing on homicide events committed by far-right extremists. J Quant Criminol 28:91–218
75. Leuprecht C, Hall K (2013) Networks as strategic repertoires: functional differentiation among Al-Shabaab terror cells. Global Crime 14:287–310
76. Adams S (2012) 'Just been shot in neck by assassin': American jihadist live-tweets attack in Somalia and shows picture of his bloody neck. The Daily Mail, UK
77. BBC (2012) Danish–Somali terror suspect accused of training five weeks in Al-Shabaab camp (June 4)

78. Danish cartoonist hid in 'panic room' during attack (2010, Jan 2) CNN
79. Hiiraan Online (2006) Ontario municipal election: Somali Canadian prospective (Dec 10)
80. Freisen J, Freeze C (2009) Are Somali–Canadians fighting for the shadowy al-Shabab?. The Globe and Mail, Ontario
81. O'Toole M (2009) Terror suspect Mohamed Hersi to head directly to trial. The National Post, Ontario
82. Greenwood C, Bates D (2012) Seven held over smuggling of a banned stimulant from England to U.S. to fund terror. The Daily Mail, UK
83. Hartley A (2012) This is khat: The natural high available on British streets and suspected of funding terrorism. The Daily Mail, UK
84. Abdulle A (2010) Dutch police arrest Al shabaab commander's father over foiled blasts. The Suna Times, Somalie
85. Associated Press (2010) Dutch arrest 12 Somalis on terror suspicions. CBS, New York
86. Meryhew R, Walsh J (2009) Young men: searching for something better. Minneapolis Star Tribune, USA
87. Yuen L (2012) Terrorist pipeline continues to flow from Minn. to Somalia. Minnesota Public Radio 26 Oct.
88. Shirwa's Journey (2009) Minneapolis star tribune
89. United Sates District Court, District of Minnesota (2009) Indictment, United States of America vs. Mahamud Said Omar (20 Aug 2009)
90. Yuen L (2009) Man killed in Somalia may have recruited others to the cause. Minneapolis Public Radio, USA
91. Elliot A (2009) A call to Jihad, answered in America. New York Times, USA
92. Elliot A (2009) Charges detail road to terror for 20 in U.S. New York Times, USA
93. Meryhew R (2009) Minneapolis Somali man killed in homeland. Minneapolis Star Tribune, USA
94. District of Minnesota, state of Minnesota (2011) Affidavit of Michael N. Cannizarro Jr.', United Sates of America vs. Abdow Munye Abdow (Oct 9)
95. United States District Court, District of Minnesota (2010) Government's sentencing positioning paper, United Sates of America vs. Abdow Munye Abdow (13 July 2010)
96. Jones BT, Cooney JF (2011) Man extradited from Netherlands appears in federal court on charges of supporting terrorists. United Sates Department of Justice, USA
97. United Sates District Court, District of Minnesota (2009) Information, United Sates of America vs. Adarus Abdulle Ali (27 Oct, 2009)
98. United Sates District Court, District of Minnesota (2012) Plea agreement and sentencing stipulations, United States of America v. Ahmed Hussein Mahamud
99. United States District Court, Southern District of California (2011) Plea agreement, United States of America v. Nima Yusuf
100. United Sates District Court, District of Minnesota (2001) Government's total brief, United Sates of America vs. Omer Abdi Mohamed (14 July 2001)
101. Fife-Yeomans J, Vollmer T (2009) Rant in court by one of four man who appear in court accused of terrorism offences. The Daily Telegraph, Australia
102. The Supreme Court of Victoria, Melbourne Criminal Division (2011) VSC 681, R. vs. Wissam Mahmoud Fattal, Saney Edow Aweys and Naser El Sayed, 16 Dec 2011
103. An uncle's regret (2009, Aug 6) A flight from Somalia gone wrong. Sydney Morning Herald, Australia
104. Warne-Smith D, Wilson L (2009) Somali terror suspects 'new to mosque'. The Australian, 6 Aug 2009
105. Aulakh R (2009) Did five Torontonians join jihad in Somalia?. The Toronto Star, Canada
106. Shephard M (2008) Canadian insurgent 'Asparo' killed in Somalia. The Toronto Star, Ontario
107. Bell S (2009) Imam tries to calm fears about missing Somali-Canadians. The National Post, Ontario

108. Freeze C, MacArthur G (2011) Man jailed in new kind of terrorist case for Canada. The Globe and Mail, Ontario
109. Bell S (2013) Canadian linked to terrorist group was killed in suicide attack in Somalia: community source. The National Post, Ontario
110. Bell S (2010) Martyr video claims Toronto man 'succeeded'. The National Post, Ontario
111. United Sates District Court, Eastern District of Missouri, Eastern Division (2010) Indictment, United Sates of America v. Mohamud Abdi Yusuf, Duane Mohamed Diriye and Abdi Mahdi Hussein (21 Oct 2010)
112. United States District Court, Southern District of California (2013) United States' trial memorandum, United States of America v. Basaaly Saeed Moalin, Mohamed Mohamed Mohamud, Issa Doreh and Ahmed Nasir Taalil Mohamud (28 Jan 2013)
113. Piazza JA (2009) Is islamist terrorism more dangerous?: an empirical study of group ideology, organization, and goal structure. Terrorism Polit Violence 21
114. Al Jazeera (2013) French agent 'executed' by al-Shabab (Jan 17)
115. Maclean W, Khamis N, Ahmed M (2012) Special report: in Africa, a militant group's growing appeal. Reuters, 30 May 2012
116. The Amsterdam Herald (2013) First Dutch militia fighter killed in Syrian conflict. http://www.amsterdamherald.com/index.php/rss/748-20130320-first-dutch-militia-fighter-killed-syrian-conflict-delftmilitia-delft-aivd-intelligence-netherlands-dutch-security. Accessed 20 March 2013
117. Radio Netherlands Worldwide (2012) Al-Shabaab plotting attacks in Netherlands. http://www.rnw.nl/english/bulletin/al-shabab-plotting-attack-netherlands. Accessed 28 May 2012