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CORENET: THE FUSION OF SOCIAL NETWORK ANALYSIS AND TARGET AUDIENCE ANALYSIS

by

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December 2014

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The purpose of this capstone is to highlight and explain how the target audience analysis (TAA) process can be enhanced by incorporating aspects of influence theory, social movement theory (SMT) and social network analysis (SNA). While a large body of literature addresses influence theory, SMT and SNA, little has been written within military information support operations (MISO) doctrine recognizing SNA in the analytical process. This capstone creates a method to apply SNA, SMT, and influence theory to existing MISO doctrine while also developing a scalable web-based application that assists with visualizing and analyzing open source data to draw meaningful conclusions and assist decision making on given operational problem sets. The web-based interface, COREnet, is a high fidelity prototype derived completely from open-source technology. The examples utilized are from a 2006 data set of an Indonesian terrorist network to demonstrate how SNA can be fully integrated into the TAA process.

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The purpose of this capstone is to highlight and explain how the target audience analysis (TAA) process is enhanced by incorporating aspects of influence theory, social movement theory (SMT) and social network analysis (SNA). While a large body of literature addresses influence theory, SMT and SNA, little has been written within military information support operations (MISO) doctrine recognizing SNA in the analytical process. This capstone creates a method to apply SNA, SMT, and influence theory to existing military information support operations doctrine while also developing a scalable web-based application that assists with visualizing and analyzing open source data to draw meaningful conclusions and assist decision making on given operational problem sets. The web-based interface, COREnet, is a high-fidelity prototype derived completely from open-source technology. The examples utilized are from a 2006 data set of an Indonesian terrorist network to demonstrate how SNA can be fully integrated into the TAA process.

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LIST OF ACRONYMS AND ABBREVIATIONS

DOD	Department of Defense
DSPD	Defense Support to Public Diplomacy
IED	Improvised Explosive Device
KPP	Key Player Problem
KPP-Neg	Key Player Problem-Negative
KPP-Pos	Key Player Problem-Positive
MISO	Military Information Support Operations
MISOC	Military Information Support Operations Command
MOE	Measure of Effectiveness
OSD	Office of the Secretary of Defense
PO	Psychological Objective
PSYACTS	Psychological Actions
PSYOP	Psychological Operations
PTAL	Potential Target Audience List
SMT	Social Movement Theory
SNA	Social Network Analysis
SO	Special Operations
SPO	Supporting Psychological Objective
TA	Target Audience
TAA	Target Audience Analysis
TAAW	Target Audience Analysis Worksheet
TSOC	Theater Special Operations Command
TTP	Tactic Techniques and Procedures
USAJFKSWCS	United States Army John F. Kennedy Special Warfare Center and School
USSOCOM	United States Special Operations Command

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I.   INTRODUCTION AND PROBLEM

A.   BACKGROUND

Throughout the range of military operations (ROMO), strategists and operational-level warfighters interact with non-traditional adversaries, as well as friendly and neutral populations. Understanding these populations and the social, political, economic, and cultural influences on their collective behaviors is increasingly critical to mission success. Military doctrine provides a guideline for the systematic analysis of human behavior, yet doctrine is incomplete regarding a specific situation with complex interactions among socio-cultural factors. Therefore, the military needs analytical methods that enable quick, effective, and reliable analysis about human behavior to comprehend the complexities of the mission.

Military information support operations (MISO), formerly known as Psychological Operations (PSYOP), has been a long-standing function within the U.S. military. These forces support both conventional and Special Operation (SO) missions by "influencing, informing, and directing foreign audiences and populations in a manner consistent with U.S. national objectives" (FM 3-53, 2013, p. 1-1). The responsibility to support both military and interagency operations requires MISO operations "during peacetime military engagements, defense support to public diplomacy (DSPD), limited interventions, contingency operations, irregular warfare, and major combat operations" (FM 3-53, 2013, p. 1-1). When used appropriately and effectively, MISO is a "force multiplier" with the ability to inform and influence foreign audiences through kinetic and non-kinetic methods (Sammons, 2004).

This research attempts to fill a gap that exists between the utilization of social network analysis (SNA) and the Target Audience Analysis (TAA) process in MISO. While a great deal of literature has been written discussing the importance and effectiveness of SNA, MISO doctrine does not recognize SNA in the analytical process. However, doctrine does place emphasis on understanding why a target audience (TA) behaves in a particular manner as stated in FM 3-05.301:

TAA is the cornerstone of effective PSYOP. To change a group's behavior, PSYOP Soldiers must understand why the TA behaves as it does. Conducting effective TAA is one of the most vital skills that a PSYOP Soldier can cultivate. PSYOP will be ineffectual or even detrimental to mission accomplishment without this critical analysis of the TA. (p. 2-1)

It is due to this emphasis on understanding the TA that SNA, as a theory and methodology, is particularly useful for MISO and should be included to complement its existing doctrine. Furthermore, MISO is dynamic yet highly dependent on doctrine to develop programs aimed at influencing foreign TAs to elicit behaviors supportive of military objectives. A critical step to determine how to influence a TA is to understand what drives people to make decisions, join groups, and the impact of social factors on those decisions. This analytical process is derived from other social theories such as influence theory and social movement theory (SMT). When these are combined with SNA, they can create a powerful method to visualize, measure, and understand the TA, which can aid analysts in crafting effective strategies. This research attempts to fill a gap that exists between the utilization of social network analysis (SNA) and the Target Audience Analysis (TAA) process.

B. PURPOSE AND OBJECTIVES

The purpose of this capstone is two-fold: 1) Create a method to apply SNA, SMT, and influence theory to existing MISO doctrine, and 2) develop a scalable web-based application that assists with visualizing and analyzing open source data to draw meaningful conclusions and assist decision making on a given operational problem set. The web-based interface provides a means to utilize SNA and apply the results to doctrinal target audience analysis. The end result is a stand-alone application that is cost effective, adaptable, and reproducible by theater special operations commands (TSOCs), military information support operations command (MISOC), and deployed operational units. This capstone is not intended to become the solution for all MISO analytical requirements, but rather an example of how to adapt new research methods and technology to operate in rapidly changing environments.

C.   RESEARCH QUESTION

This capstone addresses two questions: How can SNA, SMT, and elements of influence theory be included into the Target Audience Analysis (TAA) process to improve effectiveness? And using open source technologies, what capabilities would a SNA application bring to the Target Audience Analysis Worksheet (TAAW) and how should it be integrated into a HTML5 web-based Target Audience Analysis Worksheet TAAW?

D.   SCOPE AND METHODOLOGY

This is a three-phase capstone project. The first phase examines the applicability of SNA, influence theory, and social movement theory to TAA. Specifically, it highlights how the combined methodologies provide not only the mental representation of the environment, but an improved manner for analyzing, explaining and proscribing possible solutions to achieve military and interagency objectives.

The second phase includes the development and testing of a web-based interface that integrates SNA into the target audience analysis process. Additionally, instructions will demonstrate the use of the interface and application of SNA to the doctrinal target audience analysis process. The interface mirrors the MISO doctrine and acts as a stand-alone program. The demonstration of the interface will utilize an open-source dataset, the Southeast Asian terrorist group Noordin Top, obtained from the International Crisis Group (Asia Report, 2006, N114; Asia Report, 2009, N95) to identify strengths and weaknesses of the design.

The final phase consists of soliciting expert feedback on the methodology and user-interface from USSOCOM, TSOCs, and USAJFKSWCS (US Army John F. Kennedy Special Warfare Center and School) instructors. The findings provide pragmatic recommendations for project refinement and enhance the overall usability to the force. This phase includes recommendations for future work and discusses ways to implement the interface within USAJFKSWCS and MISOC operators throughout the world.

E.   CHAPTER REVIEW

Chapter II provides a review of literature relevant within Military Information Support Operations (MISO) activities. It begins with an overview of influence theory, social movement theory, as well as social network analysis. Chapter III reviews MISO doctrine and methods, specifically target audience analysis (TAA) and describes how to incorporate SNA into the TAA process using the SNA measures for informing the TAA. In addition, Chapter III describes the data set that will be utilized to explore and simulate the use of SNA in the creation of the Target Audience Analysis Worksheet (TAAW). Chapter IV demonstrates how to utilize the web-based-interface to create the TAAW utilizing the data described in Chapter III. In addition, Chapter IV discusses the results from the simulation exercise and provides insight into potential areas the network may be influenced to achieve the overall objective. Chapter V contains recommendations from USSOCOM, TSOCs, and USAJFKSWCS instructors on the overall methodologies utilized and the interface, as well as, the future use and development of the web-based-interface within the MISO community.

F.   CONCLUSION

The development of the proposed interface creates a template for other operators to capitalize on the expansiveness of open source technology. As noted by Goolsby (2013), the military must develop socio-technical competence to rapidly adapt to and manage to spectrum of crises throughout the world. Gaining this competence requires education, experimentation, and testing. The end result is not one particular software solution, government contract, or application, but rather a dynamic development environment that enables operators to manage and adapt to the speed of the information age while applying applicable theories and methodologies to a given problem.

II. ENHANCED ANALYSIS: INFLUENCE, SOCIAL MOVEMENTS, AND NETWORKS

A. INTRODUCTION

Applying academic theories to military doctrine is a difficult task; however, social science literature offers important insights into influencing target audiences, which is the goal of MISO. In particular, social movement theory (SMT), social network analysis (SNA) and influence theory hold potential for informing how to best to target and influence key actors and groups.

This chapter begins by providing a brief overview of MISO doctrine. It then describes SMT, SNA and influence theory with the goal of providing a foundational understanding of the elements of these theories for military operators and analysts and for providing a framework for the application of the theories in chapters III and IV. This approach will help to better inform how and whom the military should be influencing.

B. MISO DOCTRINE AND METHODS

Military Information Support Operations (MISO) "are planned operations to convey selected information and indicators to foreign audiences to influence their emotions, motives, objective reasoning, and ultimately the behavior of foreign governments, organizations, groups, and individuals in a manner favorable to the originator's objectives" (Joint Publication 3–13.2, 2010, VII). The use of MISO provides commanders an avenue into not only the psychological needs of the target audience (TA), but their vulnerabilities and susceptibilities as well. Typically, MISO are "employed to counter adversary propaganda and to sow disaffection and dissidence among adversaries to reduce their will to fight and ultimately to induce their surrender" (Roberts & Everton, 2011, p. 6). Given the mission it is imperative that PSYOP practitioners understand the theories that provide the foundation for influence, networks, and social movement.

To clarify, MISO refers to the actions and operations being conducted, and PSYOP are the soldiers and officers conducting MISO. For the purposes of this capstone every effort is made to ensure a clear delineation is made between MISO and PSYOP

even though doctrinal terms are not completely updated. The confusion and general misunderstanding of MISO (PSYOP) not only in doctrine, but also in practice, is easily understood. MISO has a long history of name changes starting with Propaganda in WWI, PSYWAR in WWII, PSYOP in the early 1960s and effective April 2011, MISO. Colonel (Retired) Curtis Boyd describes utilizing terms such as, Military Support to Public Diplomacy, International Public Diplomacy and even Information Operations as ways to "soften" the term PSYOP and aid in the use of PSYOP in the political realm (Boyd, 2010, p. 25).

In addition to name changes, in January of 2013, the United States Army John F. Kennedy Special Warfare Center and School (USAJFKSWCS) released FM 3-53, *Military Information Support Operations*, replacing FM 3-05.30, *Psychological Operations* (FM 3-53, 3-7). While FM 3-53 supersedes FM 3-05.30, it does not supplant the Tactics, Techniques, and Procedures (TTP) manual FM 3-05.301, *Psychological Operations TTP,* or FM 3-05.302, *Tactical Psychological Operations* or the Officer Training Program manual, *Officer Foundation Standards II Psychological Operations – STP 33-37II-OFS.* FM 3-53 terminates the use of the seven-phase PSYOP process, the officer STP, FM 3-05.301 and .302 and JP 3-13.2, *Joint Publication Military Information Support Operations*; however all manuals still reference the seven-phase process when describing MISO. These manuals, in other words, have further contributed to the confusion over terminology and MISO activities.

As with several of the manuals, this capstone uses the seven-phase MISO process. FM 3-05 describes the seven-phase MISO process as, "a standardized, nonlinear framework by which [MISO] are planned and conducted in support of a broad range of missions" (FM 3-05.301, 2005, p. 2-3). Table 1 provides an overview of the process and the associated phases.

Table 1.   Seven-phase MISO process

Phase	Description
Phase I	Planning: the Psychological Operations objective (PO), Supporting Psychological Operations objective (SPO), the potential target audience list (PTAL), initial assessment criteria, and baseline data are identified
Phase II	Target audience analysis (TAA): refines the PTAL and determines the best approach to influence the TA's behavior
Phase III	Series development: determines the use of multiple products, messages, and actions to achieve the desired SPO
Phase IV	Product development and design: utilizes the product action worksheet (PAW) to develop prototypes using analysis from phases I-III
Phase V	Approval: The MISO series is examined through an internal review board, and after approval, is staffed to the appropriate sections for complete series approval and signatures
Phase VI	Production, distribution, and dissemination
Phase VII	Evaluation: Determines to what extent SPOs are achieved and if the series is effective

This capstone focuses specifically on phase II, or target audience analysis (TAA). Phase II refines the potential targeting analysis list (PTAL) of phase I and determines the best approach to influence the TA's behavior. Within phase II the Target Audience Analysis Worksheet (TAAW) is developed and remains a working document that captures all the analysis conducted on a TA (FM 3-05.301, 2005, p. IX). Although the process appears linear, it is reliant upon constant refinement. Figure 1 shows the fluidity of the entire process. The solid lines indicate the direction of the process while the dotted lines illustrate the need to constantly refer back to, or refine, previous analysis.
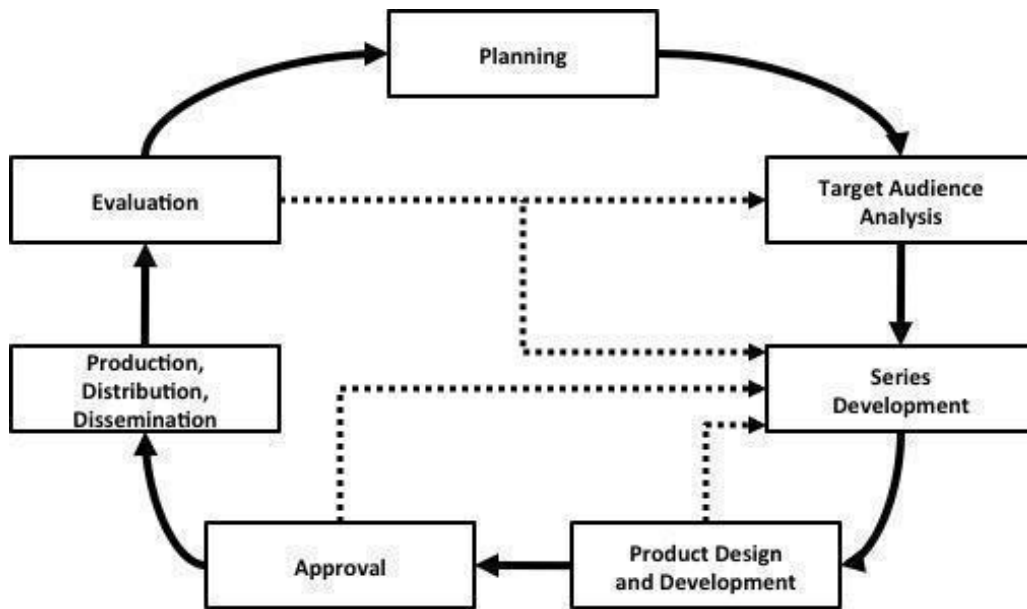
Figure 1.   MISO process

As with all military doctrine, the seven phase MISO process is intended to act as a baseline for operators and analysts to begin work. The limits of doctrine are that it takes time to correct and update the information relative to the operational environment. Furthermore, as new methods and technologies become available, it is unreasonable to assume analysts will naturally apply the new techniques in a doctrinal manner. As such, MISO doctrine only incorporates an elementary level of sociological and influence theories, and SNA is completely absent. This capstone applies these three theories to the doctrine and acts as a guide to incorporate them in complex operational environments.

C.   INFLUENCE THEORY

"Think twice before you speak, because your words and influence will plant the seed of either success or failure in the mind of another" –Napoleon Hill

Like all social psychological theories, influence theory draws on scientific methods "to understand and explain how the thought, feeling and behavior of individuals are influenced by the actual, imagined or implied presence of other human beings" (Allport, 1985, pp. 3–5). Broadly, influence theory attempts to understand the dynamic between individual-to-individual, individual-to-group, group-to-individual, and group-to-

group interactions. While it seeks to explain how thoughts, feelings and other factors impact behavior of individuals, little focus within the field has been applied to understand the role that influence plays in the formation networks and how networks act as influencers.[1] The understanding of social influence and group dynamics are useful for MISO and help provide a foundation for assessing correct messaging to a specific TA; these points will be discussed further below.

1. Social Influence

Normative and informational influences are two factors that drive social influence. *Normative influence* occurs when an individual modifies his or her behaviors in order to be accepted by a group (Hogg & Vaughan, 2005). Peer pressure and reciprocation are classic examples of normative influence. The power of reciprocation, or as Cialdini (1984) puts it, "essentially thou shall not take without giving in return," demonstrates how normative influence impacts individuals.

Informational Influence is based on our need to be right (Deutsch, M. & Gerard, H. B, 1955, pp. 629–636). Cialdini describes this principle as "social proof" (2007, pp. 129-130). In situations where we do not know how to respond, we look to see how others are responding assuming those around us have more knowledge. The more well-known experiments researching the effects of informational influence include Milgram's electric shock experiment (Milgram, 1963, pp. 371–378), and the Asch line estimation experiment (Asch, 1953, pp. 31–35). Each of these experiments yielded similar results; when actors were unsure how to respond in given situations, they were prone to follow the group's behaviors.

Within the MISO TAA process, analysts must determine the motives or factors that create the TA's current behavior. By identifying these factors, the analyst is better equipped to craft and identify the appropriate type of appeal, or tone, to utilize in the presentation of the main argument (FM 3-05.301, 2007, p. 2-25). Thus, fully understanding normative and informational influence is required to ensure valid TAA.

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[1]A notable exception is Friedkin and Johnson (2011).

2.   Rules of Social Influence

Social influence focuses on how our actions, attitudes, and beliefs are influenced by others (Aronson, 2004). Within social influence, Christakis and Fowler describe five rules that highlight the significance of the interconnection of people and relationships (2009, pp. 17–26).

We shape our network. Individuals affect the makeup of their network by determining who is in it, how many members, and how well they choose to be connected with those in their network. The tendency is for individuals to connect with others similar to themselves, whether it be through similar interests, beliefs or social status (2009, p. 17). The phrase "birds of a feather flock together" refers to a behavior called homophily. Homophily literally means "love the same" (p. 17); when networks are formed they are generally based on some form of homophily. Churches, clubs and even terrorist organizations reflect the principle of homophily. However, while networks are generally formed through homophily, some relationship formation and network behavior occur at random through nondeterministic reasons.

Our network shapes us. Christakis and Fowler (2009) state "[o]ur place in the network affects us in turn" (p. 20). In addition to the amount of friends and connections within your network, your location in the network impacts how you view the world. Our networks not only provide us with purpose, they constrain our behavior (Everton, 2012, p. 5). In addition, as actors within your network become more connected to each other, you become more central. If analysts are able to identify central actors within an organization, they can target influence messages towards them with the aim of yielding a better opportunity for spreading information (Everton, 2012, p. 12).

Our friends affect us. In addition to the shape of our network, the actual information and resources that flow within the network are important. The plethora of friends, family members, and associates within your network present numerous opportunities to be influenced. Christakis and Fowler note that individuals have a tendency to mimic the behaviors of those with whom they are connected. Examples include: students who become more studious when their roommate is studious and

individuals eating more when they are seated next to big eaters (Christakis & Fowler, p. 22). Identifying the connections of actors within the network can provide the analysts with a greater understanding of the factors that not only influence its members, but the network itself. By understanding some of these factors PSYOP soldiers can design influence messages specifically addressing these areas.

Our friends' friends' friends affect us. "It turns out that people do not copy only their friends. They also copy their friends' friends, and their friends' friends' friends" (p. 22). The authors discuss the concept of *hyperdyadic spread,* or how behaviors spread from actor to actor outside your direct social ties (p. 22). Christakis and Fowler studied obesity amongst individuals and found that overweight actors were "more likely to have friends, friends of friends, and friends of friends of friends who were obese than would be expected due to chance alone" (Christakis & Fowler, p. 108). This type of influence represents the "Three Degrees of Separation" rule which states we influence and are influenced by those three steps away from us (Christakis & Fowler, pp. 27–28).

In situations where norms and behaviors are being spread, it is unlikely that simple contact by one individual will elicit a change in the actor's behavior. Rather, it is more likely that a modification in one's behavior or norms will occur when there is contact from multiple actors within the network. By utilizing SNA analysts can identify these connections within the network and leverage them to reinforce the desired behavior change.

The network has a life of its own. A network's properties and functions can only be understood by studying the network as a whole, not through simple examination of individual actors. Complex networks can possess properties and functions that actors have no power over or that they do not even recognize (Christakis & Fowler, p. 24); only through examining the entire structure and its workings can the analysts gain these insights. Traffic jams, flocks of birds, and schools of fish demonstrate networks that can only be understood by examining the entire network (p. 25). Through analysis of the entire network, PSYOP soldiers can gain a greater understanding of the attributes and functions of the network and leverage them within their influence campaign.

In addition to the rules noted by Christakis and Fowler, an examination of how conformity, compliance and obedience impact social influence is necessary (Aronson, 2008). Conformity is the tendency for individuals to model their actions on the behaviors and rules of their social group to fit in better (Breckler, Olson, & Wiggins, 2006). These behavioral changes can be based on real or imagined influences from others. Through Solomon Asch's experiments in the 1950s, he concluded that, when a group consisted of three or more members, the likeliness of conformity from actors outside the group increases, especially when all the members' behaviors inside the group mirror one another (Asch, 1956, p. 70).

Compliance is changing one's behavior at the request, order, or pressure from someone else (Breckler et al., 2006). The November 1978 Jonestown mass suicide, in which nearly 1,000 people committed suicide at the behest of Reverent Jim Jones, provides an ideal example of the power of the crowd and how the use of compliance can influence human behavior.

Obedience involves performing an action under the orders of an authoritative figure (Breckler et al., 2006). Whereas compliance consists of changing one's behavior at someone's request, conformity involves modifying one's behavior to "fit in" with the group. The critical piece to obedience is that *the order* comes from someone with a higher status and likely exhibits social power.

The concept of network density is directly related to the likeliness that members in a given network will follow expected norms and behaviors (Everton, 20012, p. 10), and helps explain the three characteristics of social influence. Network density is simply the members interconnectedness within the group. Dense networks provide more accessibility for members to monitor and enforce the behaviors of others (Granovetter, 1992). As a result, members are unwilling to risk severing those ties over failure to follow the norms of the group (Finke & Stark, 2005). By measuring the level of density, analysts have a greater opportunity to estimate the likeliness of an actor following network norms.

3. Group Dynamics

Dorwin Cartwright and Alvin Zander, two well-known researchers within the field of social influence, describe group dynamics as a "field of inquiry dedicated to advancing knowledge about the nature of groups, the laws of their development, and their interrelations with individuals, other groups, and larger institutions" (1968, p. 7). Researchers who study groups assert that, in order to understand individuals and their behaviors, one must examine groups. In essence, human behavior is, more often than not, derived from the groups with which they are associated, and as Forsyth (2006) points out, it is "[t]hrough your membership in groups, you define and confirm your values and beliefs and take on or refine a social identity" (XVII). Generally individuals join groups that share common norms, beliefs and social status of their own (p. 22). Through group influence members develop not only perceptions towards their own members, but also of other groups. The term "in-group/out-group" depicts how those within a particular group generally view group members favorably, while those external to the group are viewed negatively.

Group dynamics bridge the individuality of influence theory and the network and community aspect of social movement theory. In other words, influence and social movement are on a continuum where group dynamics fall between the two. Important for this capstone, TAA does not strictly adhere to any particular theory; studying dynamics is a valid starting point for analysis, and is naturally congruent with the methods and theories of SNA.

D. SOCIAL MOVEMENT THEORY

A second theory of importance when considering influencing activities and social network analysis is social movement theory (SMT). One of the aims of SMT is to identify the factors influencing social mobilization. Typically, three broad sets of factors need to fall in place before a group can successfully mobilize: (1) the political-socio-cultural environment needs to be vulnerable to change, (2) the aggrieved group needs to possess sufficient resources, and (3) the group needs to frame grievances in ways that

resonate with the target audience (McAdam & Snow, 2010). What interests us here is the process of framing.

1.   Framing

Frame theory explores how ideas affect social movements. It is rooted in interactionism studies and highlights how assumptions of events are interpreted and shared. Contrary to rational choice theory, it holds that framing information either positively or negatively can lead to different outcomes. A positive frame presents the decision to the audience with a "sure win" versus a potential loss. A negative frame presents choices as "sure losses" versus chancy gambles.

Research has shown that humans tend to avoid losses, even in light of possible gains (Rhoads, 2004; Tversky & Kahneman, 1981). This suggests that framing a choice as a loss should provide more motivation than framing it as a possible gain (Rhoads, 2004). Understanding how to frame an influence campaign and where to inject the influencing strategy within the network is what SMT and SNA provide when utilized together.

2.   Motivations

The foundation for social movement theory resides in the belief that the motivations behind any movement, whether religious, political, social, or any other grievance are aimed at furthering the ideas of a particular group. Snow and Benford state that "[m]ovements function as carriers and transmitters of mobilizing beliefs and ideas, to be sure; but they are also actively engaged in the production of meaning for participants, antagonists, and observers" (1988, p. 198), and it is within the movement itself that meaning is born. If a movement frames its goals and beliefs in a manner that resonates with the TA, then changing the participants' frame requires altering the meaning associated with the movement. Given this observation, PSYOP analysts should examine the TA and recognize new ways to connect participants with different movements, effectively removing them from the problematic group of which they are a member.

Finally, frame analysis is a method of understanding how individuals view the world; altering individual's perceptions through the alignment process contributes significantly to behavior changes. Through the use of frame alignment, PSYOP soldiers can design frames that resonate stronger with individuals than the current frames, thus increasing the likeliness the TA will change their behavior.

3. Frame Alignment Process

According to Snow and Benford, frame alignment occurs in four ways: bridging, extension, amplification, and transformation. Frame bridging involves linking two or more frames that are ideologically compatible but structurally incongruent regarding a particular problem or issue (Snow, Rochford, Worden, & Benford, 1986, pp. 467–468). It involves linking a movement to immobilized public opinion preference clusters or individuals with similar views but with no organizational base. Despite the fact that there has been minimum systematic focus on the alignment process, it is among the most prevalent of the four framing strategies.

By utilizing the alignment process, analysts can design an influence campaign targeting individuals or clusters of actors within a network. While influence can be enhanced through understanding the structural makeup of a network, frame analysis helps to understand how best to craft the message and where to inject it in the network.

Frame amplification involves clarifying and invigorating "an interpretive frame which bears on a specific problem, issue or set of events" (Snow et al., 1986, p. 469). It is an interpretive process that focuses on the invigoration, clarification and embellishment of beliefs and values (p. 469); thus most movements seek to amplify extant values and beliefs. In this process, some issues are highlighted and accented as being more salient than others. For example movement slogans like "Power to the People," "Homeless, Not Helpless," and "We Shall Overcome" act as motivators that provide the TA with a strong sense of moral obligation to act (pp. 470–471). Amplifying these values and beliefs in a TA can have a profound effect on mobilizing.

Frame extensions represent efforts of a movement to incorporate the interests, sentiments or views of the targeted groups (Snow et al., 1986, p. 472). At times, a social

movement's organizational values and beliefs may not completely mirror those of the TA; it is at this point the movement must expand its framework to include points that the TA associates with in order to be successful (p. 472). For example, the Peace Movement of the 1980s continually exaggerated their goals and activities in the hopes of attracting actors who generally would not be involved in the group. By incorporating rock-and-roll and punk bands at their disarmament rallies, the movement reached out to a broader pool of actors (Snow et al., 1986, p. 472). Furthermore, instead of focusing on their differences, the Peace Movement focused on common points of interest amongst themselves and their TA to build their pool of constituents.

Frame transformation becomes an essential form of frame alignment when the proposed frames do not resonate with the movement. The end result of frame transformation is to take issues that are accepted as a part of life and transform them into issues that require immediate attention and action (Snow et al., 1986, p. 474). Mothers Against Drunk Drivers (MADD) demonstrates the use of frame transformation. In 1979, Beckie Brown lost her son to a drunk driver. Beckie and a small group of mothers transformed how society viewed the loss of a loved one to drunk driving and redefined how drunk drivers are viewed in society. By establishing the first MADD chapter in Northern Florida and organizing the first MADD national conference Beckie was able to share her story on a large stage. In addition, she was able to put a face and a story to the victim drawing on peoples' emotions.

Framing is an ongoing and dynamic process. However, the effects of influence from members within these movements may not be obvious to the PSYOP analysts initially and require lengthy analysis to uncover social and cultural contexts. Although hypothetically any factor can affect framing processes, the continuity and character of the consequent frames points to three factors: the targeted audiences, political opportunity structure, and cultural constraints and opportunities. This evolving framing perspective enhances the understanding of social movements and casts analytic light on aspects and areas of the dynamics of social movements that other perspectives have ignored altogether. Framing has an analytic utility for understanding the social movement

processes and illuminates the diffusion, generation and functionality of mobilization and counter mobilization of ideas.

E.   SOCIAL NETWORK ANALYSIS

Social network analysis (SNA) is a collection of theories and methodologies that assume people, or actors, are connected through relational ties. These ties can be between almost any people, ranging from familial to co-worker, to bowling leagues. Although the sociological aspect of SNA focuses on the interaction between people, SNA methods can be utilized to explain inanimate networks, such as improvised explosive device (IED) component networks (Childress & Taylor, 2012). Most commonly, however, it is used to explain interactions between groups, organizations, countries, and other collective bodies. Within the world of SNA everything is seen as a network (Everton, 2012, p. 6).

There is a long list of associated mathematical measures to explain the behavior of networks and the actors embedded within them (Everton, 2012), but this project will focus on basic centrality measures, as well as key player, centralization, and clustering algorithms. These metrics allow analysts to visualize and describe network and actor behavior in ways that create precise points for intervention or manipulation. Centrality measures focus on the number and pattern of ties of each actor in the network. Key Player algorithms determine how fragmented a network will become if certain actors are removed, and which actors are best suited to diffuse information throughout the network (Borgatti, 2006). Centralization and clustering algorithms provide an indication of the typography of the network, or what the structure of the network looks like; for example, is the network hierarchical or heterarchical?

A network "is a set of relationships" (Kadushin, 2012, p. 14) and these relationships are characterized by the ties between two or more actors. For example, a friendship network may consist of two friends, Tim and Joe. The actors of the relationship are Tim and Joe. The friendship between the two is characterized as a relationship. Graphically, this two-actor relationship is shown as:

Tim ↔ Joe

This relationship is characterized as symmetrical because the link (edge) between them is multidirectional. Likewise, networks can consist of a directional link (arc) where the relationship moves in a single direction from one actor to the other.

$$Tim \rightarrow Joe$$

This arc suggests that the relationship is "one-way," or directed. For instance, Tim gives money to Joe, but Joe does not give money to Tim. This leads us to the next aspect when discussing intermediaries and paths.

The usefulness of a two-node relationship is limited since networks consist of several actors. For instance, in the example below a third actor is added, Robyn.

$$Tim \rightarrow Joe \leftrightarrow Robyn$$

In this scenario, Tim has a tie to Joe, and Joe has a tie to Robyn. In order for Tim to communicate to Robyn, he must communicate through Joe. This situation makes Joe an intermediary (Kadushin, 2012, p. 15). The length of the path from Tim to Robyn is two. As network complexity increases there are several varying path distances from one actor to another while the shortest path is referred to as a geodesic. Knowing whether a tie is an arc or an edge becomes increasingly important, as in the example above, since both Joe and Robyn are unable to pass information to Tim. The concepts of path and geodesic are important to TAA as it dictates where information is inserted into a network to ensure that the target receives the message.

As a network becomes more complex and additional actors and relations are compiled, the requirement for mathematics becomes increasingly important to discern who the important actors are relative to the question. Chapter III explains the fundamentals with a more detailed application. Additional information on SNA measures can be obtained from Everton (2012); de Nooy, Mrvar, and Batagelj (2005); or visiting academic websites such as the Journal of Social Structure at http://www.cmu.edu/joss/index.html, or Introduction to Social Network Methods at http://faculty.ucr.edu/~hanneman/nettext/.

Social networks consist of actors where some are more "central" than others, meaning they have more access to knowledge or resources, or they are in a "better position to spread information" (Everton, 2012, p. 12). The four predominant measures associated with centrality are degree centrality, closeness centrality, betweenness centrality, and eigenvector centrality.

Degree centrality is the total number of ties an actor has. Joe, from the example above, has two ties, one to Tim and one to Robyn, and therefore has a degree centrality of two. In the expanded sociogram in Figure 2 we can see that Tim has a degree centrality of five while Joe has a degree centrality of three. This suggests that Tim will generally have more power in the network due to his larger number of connections. Generally, actors with high degree centrality "tend to have favored positions, and hence more power" (Hanneman & Riddle, 2005).
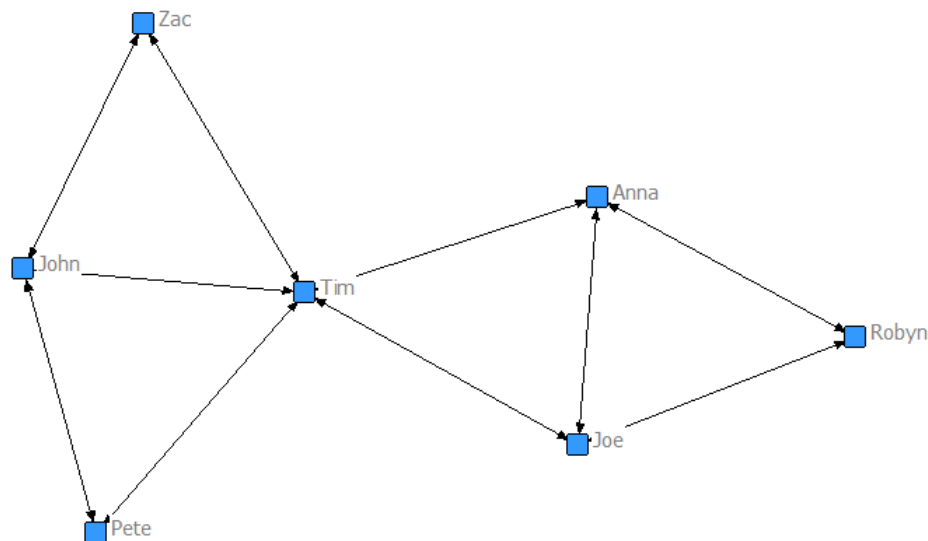
Figure 2.   Sociogram of the Tim network

Actors with high degree centrality can be valuable for influence operations since they are often in positions to broker deals, reallocate resources, or spread information.

However, as discussed by Roberts and Everton (2011), single measures do not provide a complete picture of a network. The following measures provide a better understanding of network behavior.

Closeness centrality is the "average geodesic distance that each actor is from every other actor in the network," or shortest path between two actors (Everton, 2012). Calculating closeness centrality without the aid of software is extremely difficult with large networks. In the case of the Tim network, the actors with the highest closeness centrality appear as the largest nodes in Figure 3.
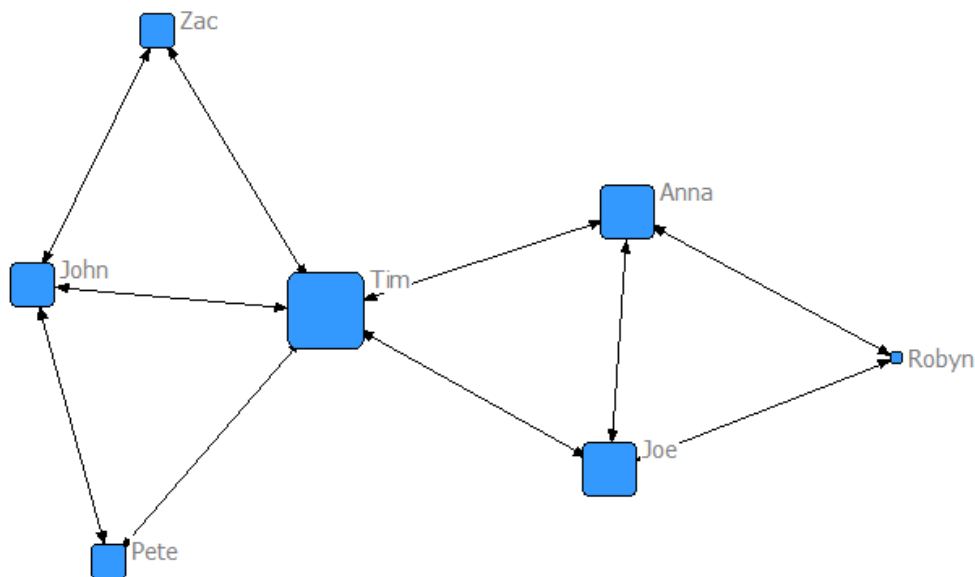
Figure 3.   Closeness centrality

Tim is represented by the largest node because he is, on average, closer to every other actor in the network. Conversely, Robyn is represented by the smallest node since she is, on average, farther from every other actor. The significance of closeness centrality to TAA is that typically the most central actor in a network is unreachable, or cannot be directly influenced or targeted. To overcome this problem, the analyst is able to select actors such as Anna, Joe, or John to target for information diffusion. Although, closeness

centrality can be utilized as determining alternate diffusion points, betweenness centrality provides more granularity on using intermediaries.

Betweenness centrality measures the extent to which an actor lies on the shortest path between all other actors. To illustrate, additional actors are added to the Tim network: Kristen, Brandon, and Rex. With a degree centrality score of 5, Kristen and Tim have equivalent degree centrality scores. However, Kristen has a higher score of betweenness centrality because she has the shortest paths to all other actors, meaning she is a good intermediary for information diffusion. In other terms, "the greater an individual's actual or potential intermediary value to all members of a network, the greater his control over communication flow and independence of others to communicate" (Degenne & Forsé, 1999, p. 136). Although Tim is the predominant actor in the network, Kristen is more reachable for influence, making her a viable intermediary.
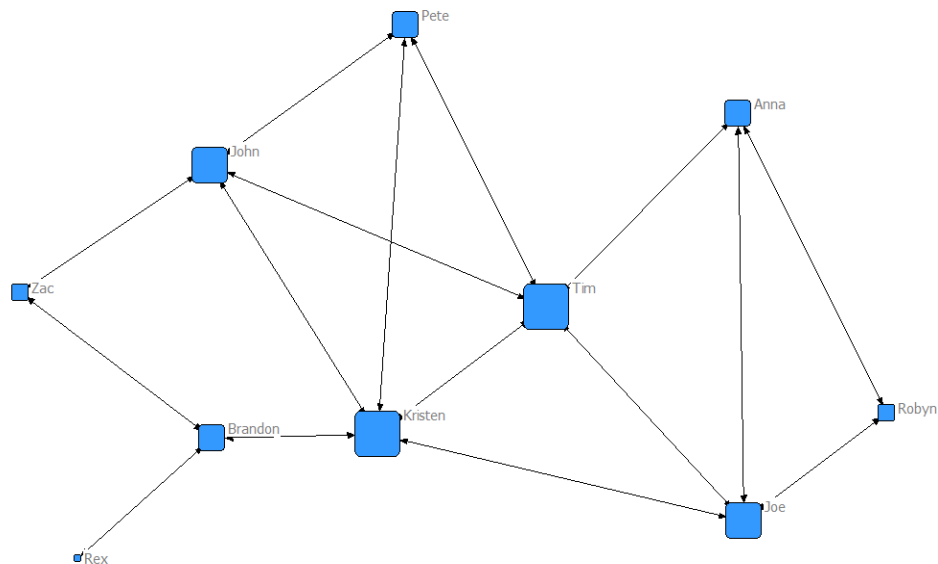
Figure 4.   Betweenness centrality

Eigenvector centrality "assumes that ties to highly central actors are more important than ties to peripheral actors" (Everton, 2012). This means that a tie to an actor with high degree centrality is "more important" than an actor tied to a less central actor.

Moreover, Pete and Anna (highlighted in red in Figure 10) both have a degree centrality of three, Pete has a higher eigenvector centrality score since he is tied to actors with a higher degree centrality. This is illustrated by having a slightly larger node size to differentiate between the two. Regarding TAA, eigenvector centrality suggests that to influence Tim it is probably more beneficial to influence Pete instead of Anna since Pete is tied to more central actors.
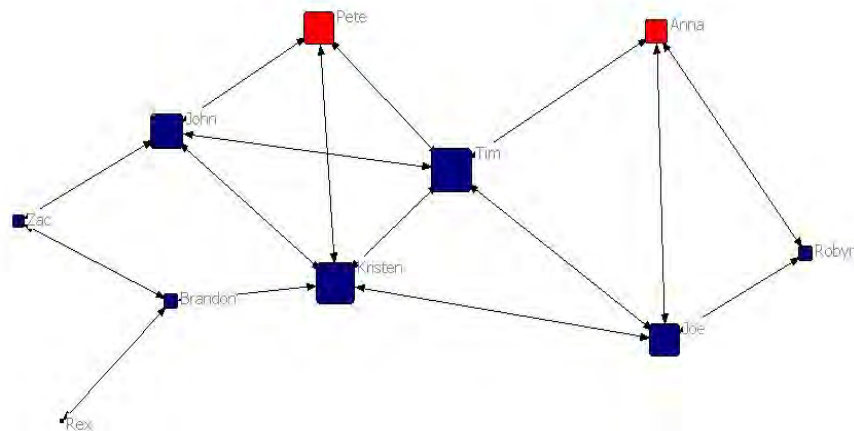
Figure 5.   Eigenvector centrality

Density and centralization are topics concerning the topography, or structure, of the overall network. In other words, the structure of the network greatly influences the extent to which the centrality measures are derived. Density "captures the interconnectedness of a network" meaning that the actual amount of ties are compared to the amount of all possible ties (Everton, 2012, p. 11). Using UCINET, it is determined that the density of the Tim network is 0.3556, ~35%, out of a theoretical maximum of 1.00, which indicates that everyone in the network has a tie with one another. The score suggests the network is not overly dense and the speed at which information or resources can spread is less than that of a denser network. One must use density with caution because there is an inverse relationship with the size of the network and density. As nodes are added to a network, the number of potential ties grows exponentially, but the number of ties that actors can maintain typically do not. Thus, small networks tend to be

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denser and large networks less so, suggesting that average degree may be more effective in explaining behavior for large networks.

Centralization calculates the extent to which a network is dominated by particular actors (Hawe & Ghali, 2008). A highly centralized network, shown in Figure 6, exhibits inequalities in the structure of the network where one or a few actors dominate the rest of the network. If one of the centralized hubs is removed then the network becomes fragmented, or disconnected.
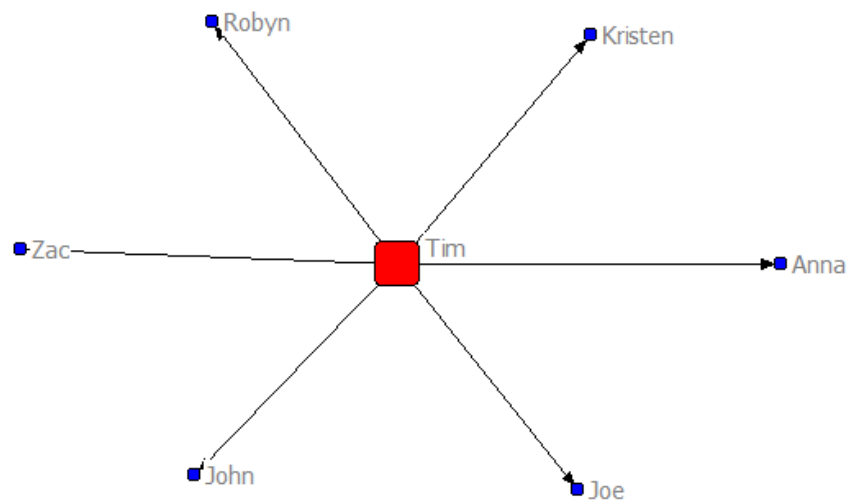
Figure 6.   100% network centralization

The network in this case has a network centralization of 100% meaning that Tim dominates the network in relation to the other six actors. This can be seen as a pure hierarchical network where everything must go to and from the "boss" without interaction between the subordinates. Another peculiarity of the network is the density of this star network, calculated using UCINET, is 0.1429, indicating that only 14% of the possible ties of the network are in existence. It is unlikely to see a 100% centralized network in the real world, but something like Figure 7 is probable.
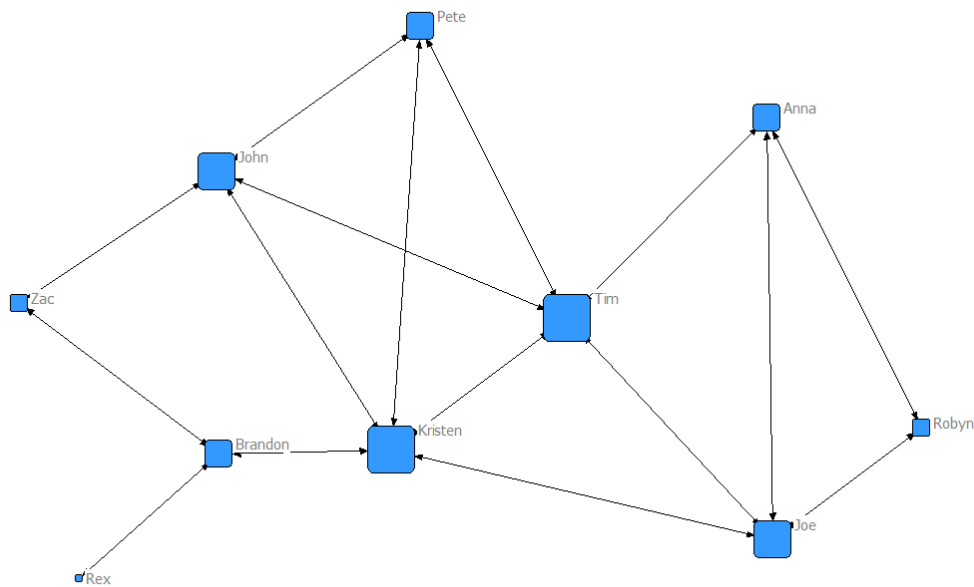
Figure 7.   Network centralization

In the case of the Tim network, the density is 0.3556, meaning that approximately 35% of the possible ties exist. Network centralization is 25% suggesting the inequality of the network is far less than the star network. In regards to TAA, the analyst needs to understand that the network is not hierarchical and using actors identified through the various centrality measures will determine who and where to target kinetic and non-kinetic actions.

Identifying clusters is another aspect of SNA that helps clarify the typography of the network by detecting cohesive subgroups, or subnetworks within a larger network (Everton, 2012, p. 12). Identifying clusters becomes important in TAA for singling out the most important aspects of the network to target or influence with limited resources.

Importantly, clustering becomes evident when applying social movement theory and influence theory applications to a given TA. This is because cohesive subgroups of actors generally suggest that "social interaction is the basis for solidarity, shared norms, identity, and collective behavior, so people who interact intensively are likely to consider themselves a social group" (de Nooy et al., 2005, p. 61). With greater knowledge of the network, there are several perspectives that one can use to determine subgroups. One

default method is to determine the clusters based on attributes; however, as discussed earlier, focusing on attributes limits the validity of the analysis since attributes do not alter with different social contexts. To remedy this shortfall, SNA focuses on the patterns of social relations that alter depending on the context.

There are several methods to analyze subgroups including cores, components, factions, and Newman Groups.[2] These are not all-inclusive, but merely illustrate that there are a multitude of ways detect communities to further analyze and understand network behavior. The Newman Group algorithm is of particular interest because it is perhaps the mostly widely known (Everton, 2012, p. 195). It calculates the betweenness scores of the edges within a network and the edge with the highest score is removed from the network. The process is repeated until all the edges are removed. Each time a new cluster breaks away, the algorithm calculates the modularity score of the network which "compares the ties within and across blocks to what one would expect in a random graph of the same size and having the same number of ties" (Everton, 2012, p. 192), and the higher the modularity score, the better the fit. Typically, analysts will want to choose the clustering that yields the highest modularity score. To demonstrate, Figure 8 shows the Tim Network with three separate visuals. The first is the network with two clusters, the second with three, and the third with five. Each network's modularity score is also indicated, and in this case, partitioning the network into three clusters yields the highest modularity score and thus the best estimate of where the natural divisions are within the network.

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[2] A detailed explanation of various clustering algorithms can be found in chapter 6 of *Disrupting Dark Networks* (Everton, 2012), chapter 3 of *Exploratory Social Network Analysis with Pajek* (de Nooy, Mrvar, Batagelj, 2005), and chapter 4 of *Introducing Social Networks* (Degenne & Forsé, 1999).
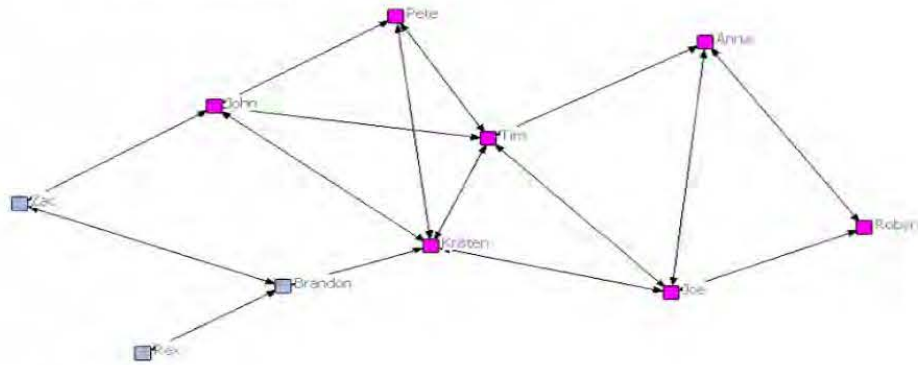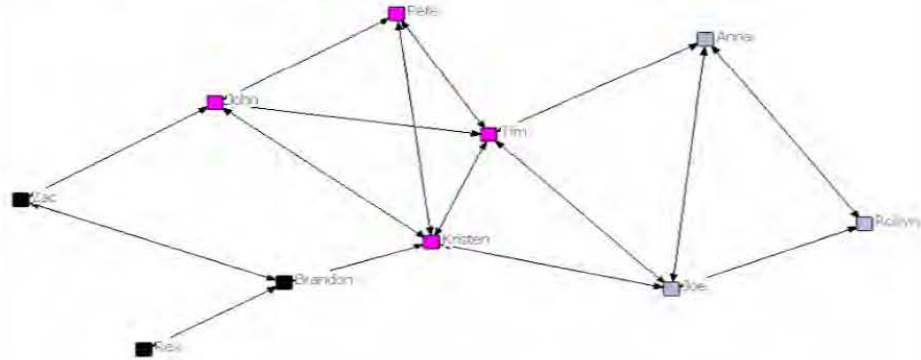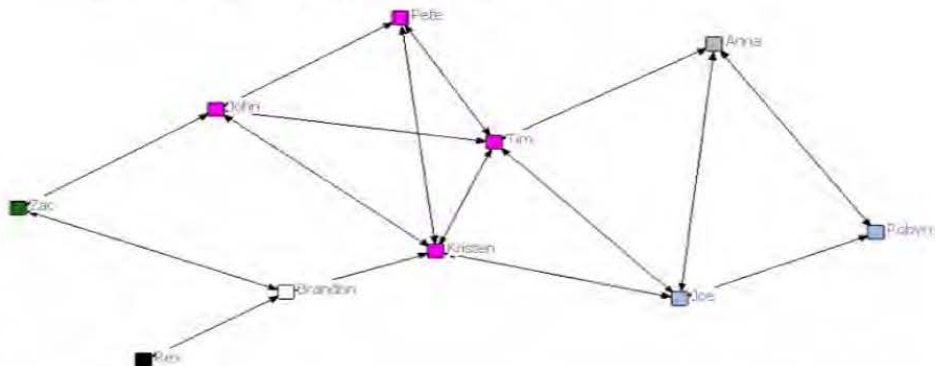
Figure 8.   Girvan-Newman clusters and modularity scores

Identifying clusters and subgroups delineates the natural relational differences in large networks, and separating these groups from the larger network provides insight into what points to target for disruption or influence purposes. For instance, a terrorist cell will have several layers of relational ties; some may be functional (i.e., recruiting ties), while others may be operational or funding relations. Knowing the type of cluster will determine what methods are used to target that specific aspect of the network.

Another useful set of algorithms are those developed by Borgatti (2006): Key Player Positive (KPP-Pos) and Key Player Negative (KPP-Neg). KPP-Pos and KPP-Neg enable the analyst to determine the most important actors within a network to either 1) diffuse information throughout the network (KPP-Pos), or 2) to identify actors whose removal will best fragment the network (KPP-Neg). Practically, these measures are important for TAA since the overarching goal of MISO is to influence foreign audiences to behave in a manner congruent with U.S. goals and interests. The KPP measures help take some of the guess work out of the analysis by providing useful metrics to illustrate what could happen to the structure of the network if information is diffused appropriately, or how fragmented the network would be if key actors were removed. Although measures of effectiveness (MOE) are not within the scope of this project, using the KPP algorithms facilitate where analysts should look to determine the effectiveness of an operation.

A topic missing in SNA literature is how to incorporate SMT and influence theory into the creation and maintenance of networks. Much of the literature on SNA helps explain what has happened to a network, but not necessarily how to alter behavior of individuals and how that affects networks in the future. Incorporating SMT and influence theory provides a mechanism for "looking forward," especially as it relates to TAA. Specifically, SMT offers insights into the role of framing for mobilizing and maintaining a network; understanding and potentially altering frames could change the network. Influence theory offers means for changing behaviors of individuals, which in turn could alter the networks in which they operate. Taken together, SMT, influence theory and SNA provide the means for understanding what motivates the network, how to change behaviors of targeted individuals, and measuring how these changes affect the network (Table 2).

Table 2.   Summary of theories

Social Movement Theory	Influence Theory	Social Network Analysis
● Three factors shape social mobilization: political opportunities; resources; and framing ● Framing is particularly important for understanding mobilization and behaviors of networks	● Explains the dynamic between individual-to-individual, individual-to-group and group-to-group interactions ● Groups are key for understanding what influences human behavior	● Provides a method to visualize and explain connections between individuals in a group using statistical methods ● Incorporates various ways for analyzing network structure

F.   CONCLUSION

By studying social science and the theories associated with influence, analysts are able to identify accurately and understand the motivations, properties and structures within social interactions. In addition, a thorough understanding of social influence, group dynamics, social movement theory and frame alignment prepares analysts to be better equipped to not only identify factors that may be target of opportunities for an influence campaign, but they are now able to provide insight to how the target may be disrupted.

Studies on social movements and the actors involved have shown that "[t]ypically, social movement activists and sympathizers are linked through both "private" and "public" ties well before collective action develops" (Diani, 2003, p. 7). Through the use of SNA, analysts can identify the nodes, relationships and pre-existing conditions within the network. Although SNA can identify specific actors' positions or their resources, it cannot explain their motivations. A thorough understanding of both influence and social movement theories provides a solid foundation for a MISO program to be more effective.

The three theories described here—influence theory, SMT and SNA—highlight the complexity and theoretical underpinnings of TAA, and how it is impractical to assume that a single analyst will have an understanding of all three theories to adequately apply them in a complex environment. Doctrine is limited in scope to provide analysts with all the necessary theoretical applications across the range of military operations, but it does serve as a baseline where it can be enhanced by other academic disciplines. Therefore, a mechanism to improve collaboration among analysts is critical for maximum effectiveness in a resource and authority constrained environment.

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III.   ENHANCED TARGET AUDIENCE ANALYSIS

A.   INTRODUCTION

Expanding MISO doctrine to include SNA requires a fundamental understanding of existing doctrinal principles, and a creative approach to apply the theories and methods from SNA, SMT, and influence theory. Phase II of the MISO process is concerned with Target Audience Analysis (TAA), and is arguably the most important aspect of MISO (FM 3-05.301, p. 2-1). In this phase, the analyst is charged with identifying the Target Audience (TA), defining the causes of the current behavior, determining whether or not the TA is capable of a behavior change, developing arguments and proposing psychological actions (PSYACTS) to achieve the desired behavior, and creating the criteria to which the behavior change is assessed. This chapter expands on the literature examined in Chapter II, and demonstrates how to apply the three academic theories to the TAA process.

UCINET and NetDraw are the predominant software programs utilized to illustrate the application of SNA. A multitude of other programs are equally sufficient, but for the purposes of this chapter it was determined to use these software packages for explanations.[3] Instruction regarding the software is beyond the scope of this capstone; however, detailed instructions can be obtained from *Disrupting Dark Networks* (Everton, 2012). The network data that we use to illustrate how SNA can inform the TAA process is the Noordin Top terrorist network.[4] Background information on the Noordin network was obtained from the International Crisis Group (Asia Report, 2006, N114; Asia Report, 2009, N95). Although the Noordin Top data utilizes individuals, analysts can easily substitute individuals with organizations, communities, or any other appropriate grouping to meet the objective.

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[3] Other commonly used analytical software packages include Organizational Risk Analyzer (ORA), Pajek, and Gephi.

[4] The network data was provided by Dr. Sean Everton and further information can be obtained from *Disrupting dark networks,* New York, Cambridge University Press, 2012.

B.   TARGET AUDIENCE ANALYSIS (TAA)

The first step in the target audience analysis process is associated with identifying and refining the appropriate TA for further exploration and analysis. Initially, the TA is broad and considered a best estimate as to which segment of a population can achieve the supporting psychological objective (SPO) (FM 3-05.301, p. 1–29). Defining the potential TA list (PTAL) early limits the analysis to correctly associate the PO and SPO with a specific target audience. Failure to adequately define this association causes a misapplication of SMT, influence theory, and SNA, resulting in ineffective MISO. Refining the TA to a network associated within the boundaries of the PO and SPO is critical for understanding the current TA behavior (Everton 2012, p. 77). Even with the boundaries of the TA appropriately defined, estimating the behavior of a group, or network, is difficult without thoroughly researching relational ties among actors.

Beginning with the stated objectives, the initial TA provides a starting point for further analysis. The PO is a pre-approved objective by the Office of the Secretary of Defense (OSD) (JP 3–53, 2003, V-1), while the SPO can be pre-approved or developed by the analyst submitted for approval at the operational level headquarters. The potential TA is also pre-approved, but the refined TA is determined through further analysis. Table 3 is an example of what the PO, SPO, and potential TA could be for Noordin Top's network.

Table 3.   Objectives and target audience

Psychological Objective:	Increase defections within the Noordin Top terrorist network
Supporting Psychological Objective:	TA provides information to local authorities on network operations
Potential Target Audience:	Mid and low-level network members

Currently, doctrine places emphasis on demographics, that is, characteristics of individuals, organizations, leaders, key communicators, and gender or race, which are

referred to as attributes within SNA. The inherent problem with basing analysis towards attributes is that attributes remain the same across social contexts but individual behavior does not (Everton, 2012, p. 14). Thus, attributes cannot be used to explain how an actor's behavior changes from one setting to the next. However, attributes are important when trying to understand a group since the TA may be a terrorist cell and the behavior of the cell is important for the objective. The difference between relations and attributes must be clear to not lead a commander to make an operational decision based solely on demographics.

Through use of a "codebook," the TA is refined and includes consistent terminology used throughout the analytical process; see appendix A for an example codebook. If the TA is associated with a terrorist organization, then a common ontology must be followed to not conflate actors of different organizations. For example, the operational leaders of an organization are those actors that make operational decisions on what actions to take or not take; financiers are those actors that are concerned with gaining or disbursing funding to the organization; cell members are those that carry out the orders, or actions; bomb makers provide the technical expertise to develop ordnance; and so on. Some actors may hold multiple positions, so it is important to ensure that all the actors are clearly defined.

After the TA is defined, an initial sociogram of the network should be visualized to provide the analyst with an understanding of how the TA functions as a group. Further analysis conducted throughout the TAA process highlights what vulnerabilities and susceptibilities exist, and if there is significant gaps in information that require more intelligence collection and analysis. Figure 9 provides a visual of the complete known Noordin network. The links between the actors consist of 10 types of relations: former classmate, friendship, kinship, soulmate, logistic, meeting, operational, training events, communication, and business and finance ties. This gives a useful visual of the network, but it is highly complex and fails to provide any meaningful direction to who is important to target for MISO.
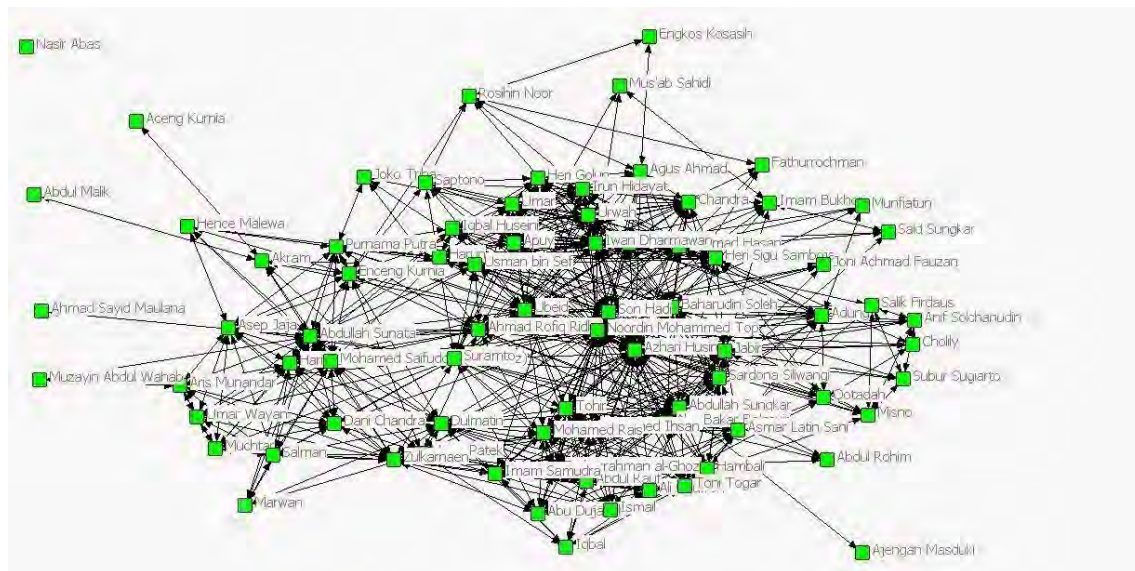
Figure 9.   Complete network

Refining the network to a usable TA requires understanding the nature of the ties, and making some assumptions as to who has the capacity to achieve the SPO. There are ten layers of relations for this network and each one must be analyzed separately. For instance, Figure 10 provides a visual of who is linked to whom through operational ties only. Since Noordin Top tightly controlled operations, it is less likely that defections would occur from that network layer. Friendship, soul mate, and kinship ties are also difficult to break as they are enduring and extend beyond a functional role.
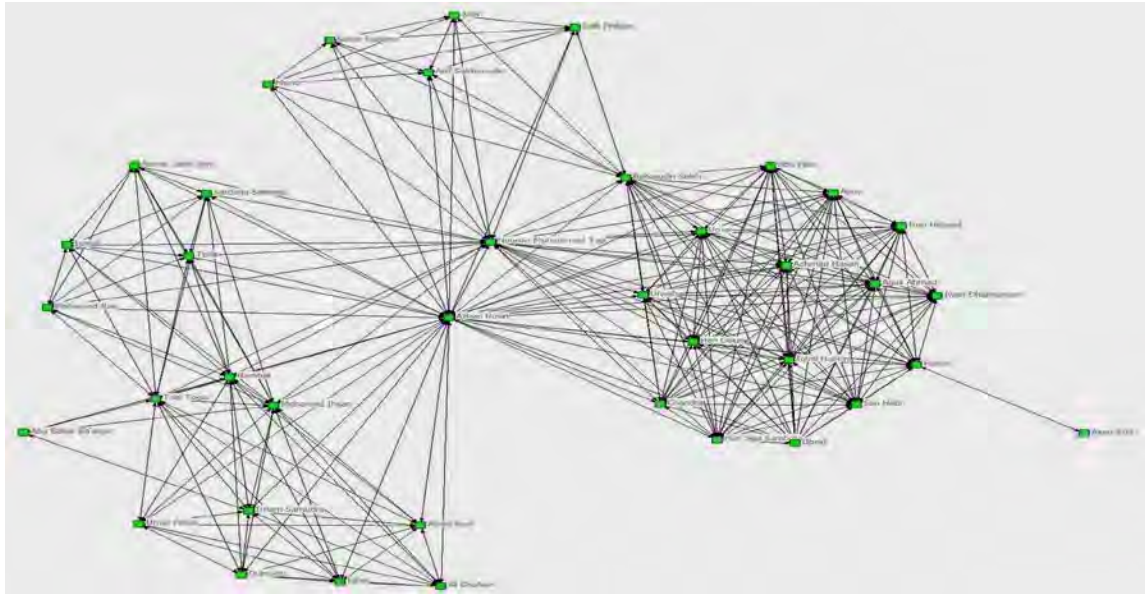
Figure 10.   Operations network

A different approach is to consider the communication layer. These ties are aligned more with function than close personal relationships. The operations network is more constrained meaning the relations between the actors are redundant and there are few actors with only a single tie. The communications network, Figure 11, is less constrained and has many actors with only a single tie. A network that consists mostly of redundant ties is less likely to be influenced by outside actors since all the information flow remains internal to the network. A network with several actors that only have a single tie is likely to exhibit an acceptance of outside information or influence. Hence, actors within the operations network are less likely to be vulnerable to external influence because it more densely connected, while the communications network is more vulnerable because several actors only have a single connection. On average the amount of ties each actor has, or average degree, in the operations network is 6.76 while it is 5.06 in the communication network. This is important because highly constrained networks are less vulnerable to outside influence due to a lack of external ties. Moreover, when trying to influence a network it may be beneficial to target actors on the periphery rather than more central actors. Although some of the actors exist in both network layers, as a refined TA the communication network is a more viable perspective to use than the operations or complete network.
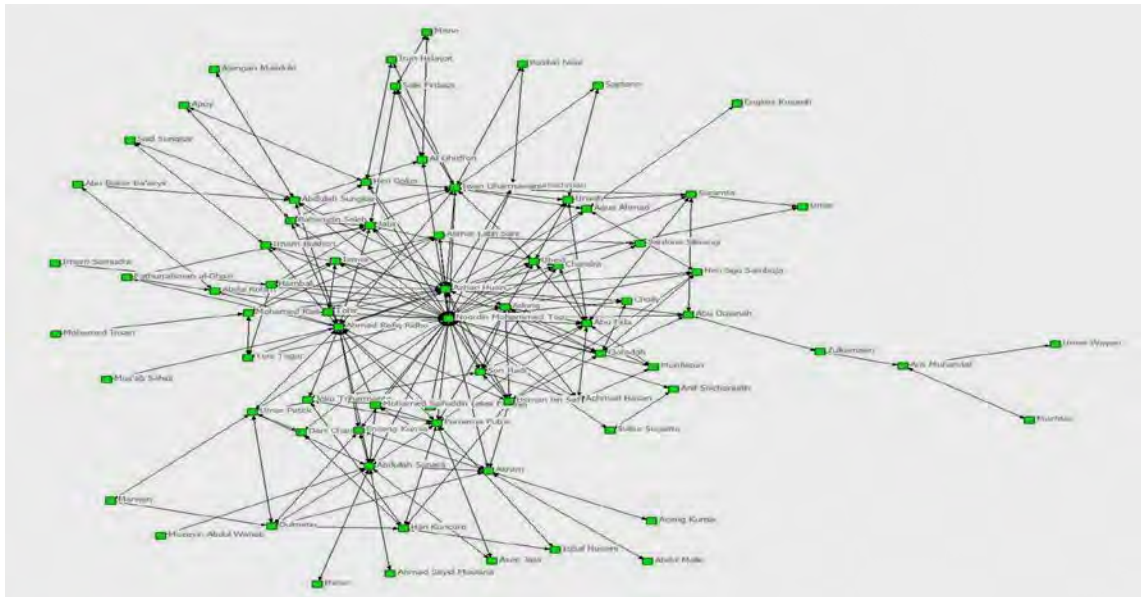
Figure 11.   Communication network

The result of defining the TA in this manner provides the analyst with the ability to answer three preliminary questions outlined in the FM 3-05.301: "1) what TA's are engaging (or likely to engage) in the targeted behavior, 2) what TA's are directly or indirectly influencing the behavior of the primary actors, and 3) what are the subcategories among the primary and secondary actors?" (2-6). If the initial sociogram is inadequate, then it is likely that additional layers, or sociograms, need development to illustrate the behavior of the network from multiple perspectives such as trust or familial networks. The Noordin Top sociograms above provide a visual of the network, who the central actors are, and who is on the periphery. However, even though the communication network is the primary TA, the other layers of the network are useful to understand various aspects of the network's behavior. The analyst can now begin applying TAA with the relevant social and psychological theoretical constructs.

C.   EFFECTIVENESS

Determining the effectiveness of the TA to achieve the desired objective is the second step in the TAA process. More specifically, this section aims to validate the marriage between the TA and objectives. SNA enables the analyst to visualize the TA network, and identify relations between actors that either constrain or enable the desired

behavior based on the location of the actor in the network. Certain actors within the network may be constrained because others prevent them from behaving in the desired manner. Conversely, actors on the periphery are less constrained by the network and may have the power to enact the desired behavior (de Nooy et al., 2005, p. 146). Some constraints extend beyond relationships and include factors such as economics, environmental restrictions, or political restrictions (PSYOP Target Audience Analysis Handbook, p. 4). The litmus test for this is to quantitatively ascertain what network behaviors are occurring and the likelihood that the objectives are congruent with existing behaviors. If the TA cannot fully achieve the objective, then can a portion of the objective be achieved? Or, is the chosen TA competing with others in a manner that inhibits the objective achievement? These questions must be answered prior to proceeding to subsequent portions of the TAA.

First, the degree of power, or control, the TA has in regard to the desired behavior is analyzed. A high degree of power demonstrates "TA members have some control over their environment, they have the authority to act or make decisions, and they have the power to accomplish a goal" (FM 3-05.301, pp. 2–7). Highly constrained actors have little ability to shift behavior due to too many connections, or connections that require some form of approval from other actors as in the operations network described earlier. Conversely, actors that lie between clusters or on the periphery of the network are less constrained and are probably more prone to outside influence.

Determining who has the power to achieve the desired objective allows analysts to verify the restrictions of its effectiveness. The TA is analyzed to ascertain physical, political, economic, legal, sociological, or psychological restrictions that prevent the actors from behaving in the desired manner. After this determination, the final step is to hypothesize how the SPO will be achieved if the TA performs the desired behavior. For example, if actors in the network divert funding from an established internal process, will there be a decrease in IEDs? Rarely, if ever, will this be conclusive, but it does provide insight into what indicators to look for after implementing the MISO plan.

A complete assessment of the TA's effectiveness provides the analyst with the ability to rate the TA on the basis of achieving the SPO, five being very effective and

zero being undetermined. Although this is a subjective approximation made by the analyst, it is informed by mathematical underpinnings of SNA and the theoretical posits from SMT and influence theory. To expound, a highly dense network is less likely to exhibit the desired behaviors (SPO) due to homophily, which suggests a low rating, whereas a less dense network will have elements less constrained by the group and more likely to achieve the SPO, which results in a higher score. The end result is that the analyst is now capable of considering what aspects of SMT or influence theory may be possible as a means to achieve the objective.

Adding the SNA measures to the effectiveness portion and visualizing the metrics in a sociogram, an array of information is created that assists a deeper understanding of who, or what entity, can have an effect on the SPO. Since the goal is to degrade the effectiveness of the network behavior through encouraging defections, a relevant starting point is to not only consider actors with low centrality measures, but to also target those actors that are structurally less constrained.

D.   CONDITIONS

After determining the effectiveness of the TA to perform the desired behavior, the next step is to explain the elements of the current behavior. Conducting the analysis in this portion of the TAA is particularly suited for SNA. This analysis is "after the fact" meaning that the behavior has already occurred. For instance, analyzing the 9/11 hijackers, it is relatively easy to discern the behaviors and the network structure after the event, "Within one week of the attack, information from the investigation started to become public. We soon knew there were 19 hijackers, which planes they were on, and which nation's passports they had used to get into the country" (Krebs, 2002, p. 44). Granted, the 9/11 attack was an event that led to an enormous amount of publicly available information, but the fact remains that the behavior occurred and was used to analyze the network's behavior. Understanding the current and past behavior requires dedicated analysis structured in a manner that provides layers of relations and attributes rather than a single aggregation of the information.

Current conditions and behaviors require that the analyst define the parameters on how to structure the data. In other words, a thorough understanding of the current behavior will determine if the refined TA and desired behavior remain valid for further analysis. The PSYOP TAA Handbook suggests that this is the "who, what, when, where, and why" (p. 7). Providing there is enough information available, SNA methodology provides a template for segmenting each related element into a structure for a visual and mathematical representation of behaviors. For instance, if group A attacked group B, then it is possible to analyze the event from the behaviors of the individuals involved, their financial support, along with their communications, trust, and operational networks. Accumulating the various layers of the same group allows analysts to compare the differences and similarities between the actors from different perspectives. The resulting analysis highlights conditions to SMT, influence theory, or any other relevant theoretical views as international relations theoretical subsets, etc. (Grube et al. 1994, p. 154).

To begin, take the network used in the identification of the TA as the baseline, and begin creating a sociogram that highlights communication ties. In other words, only "link" individual actors that are associated with communication events. At this point, it is important to reference the codebook to ensure consistency among analysts. Using the Noordin Top data, the network will look similar to Figure 12.
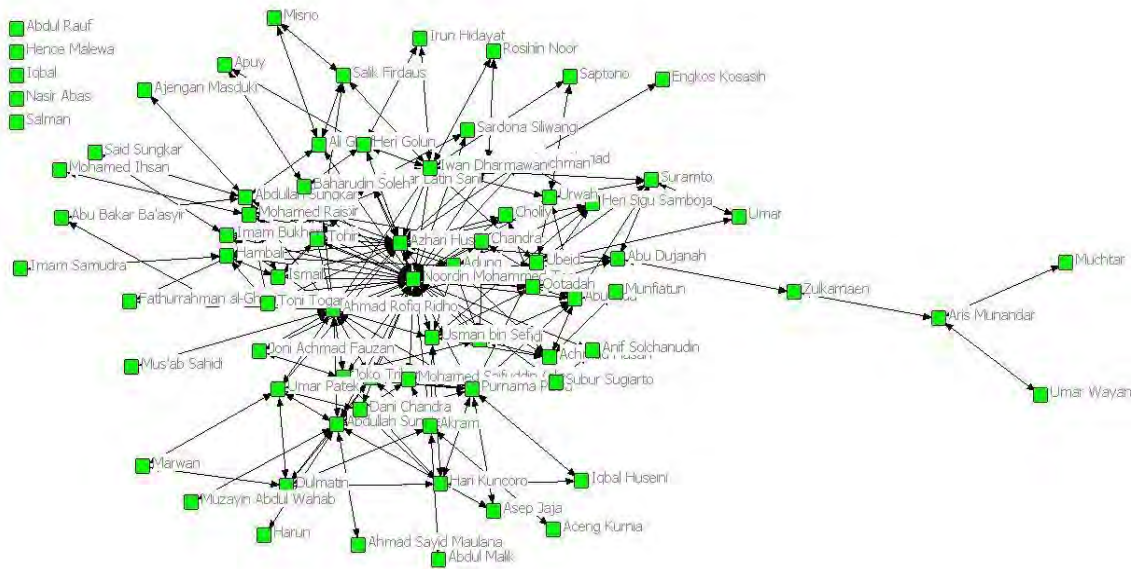
Figure 12.   All actors with communication ties

The communication network is informative as a standalone visualization of the network but, to identify truly the conditions that may cause the behavior, it is helpful to estimate a few SNA measures. Failure to do so may lead to strictly kinetic actions, or just misunderstanding the behavior of the network. To gain more insight, an illustration of the network depicting centrality measures provides information as to who is important from an operational perspective. Figure 13 is the same network where the size of each actor's node reflects its betweenness centrality. Larger nodes indicate a higher score. For the purpose of encouraging defectors, actors with high betweenness and degree centrality scores may be counter-productive since their behavior may be constrained. Thus, the focus of the conditions portion of the TAA should reflect the why those ties to the network periphery exist, and what external factors keep the TA loosely connected to the core of the network.

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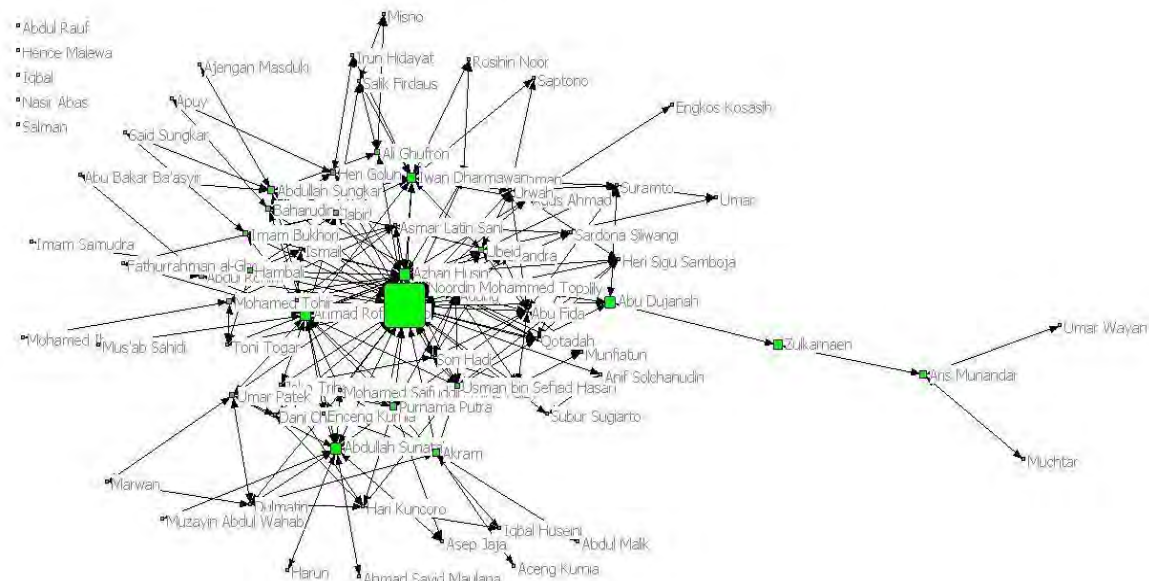
Figure 13.   Communication network and betweenness

Although the sociograms above begin to provide a method to understand the network behavior, it is important to determine why certain actors are central, have high betweenness scores, and so on. One method is to identify subgroups within the operational network to provide a guide as to where to look for more information. The analysts will want to know why certain actors are close to one another and what enables other actors to broker information between the groups. Figure 14 is the Noordin Top network viewed from a subgroup perspective using the Girvan-Newman algorithm.[5] There are five subgroups identified by colors. Although more or less subgroups can be viewed, the modularity score with five subgroups is 0.392, while all other possible subgroup combinations scored lower. This suggests that the five divisions, or partitions, within the network indicate natural boundaries are less likely to occur by random chance then other subgroup combinations.

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[5] See *Disrupting dark networks* (2012) for further information on the Girvan-Newman measure.
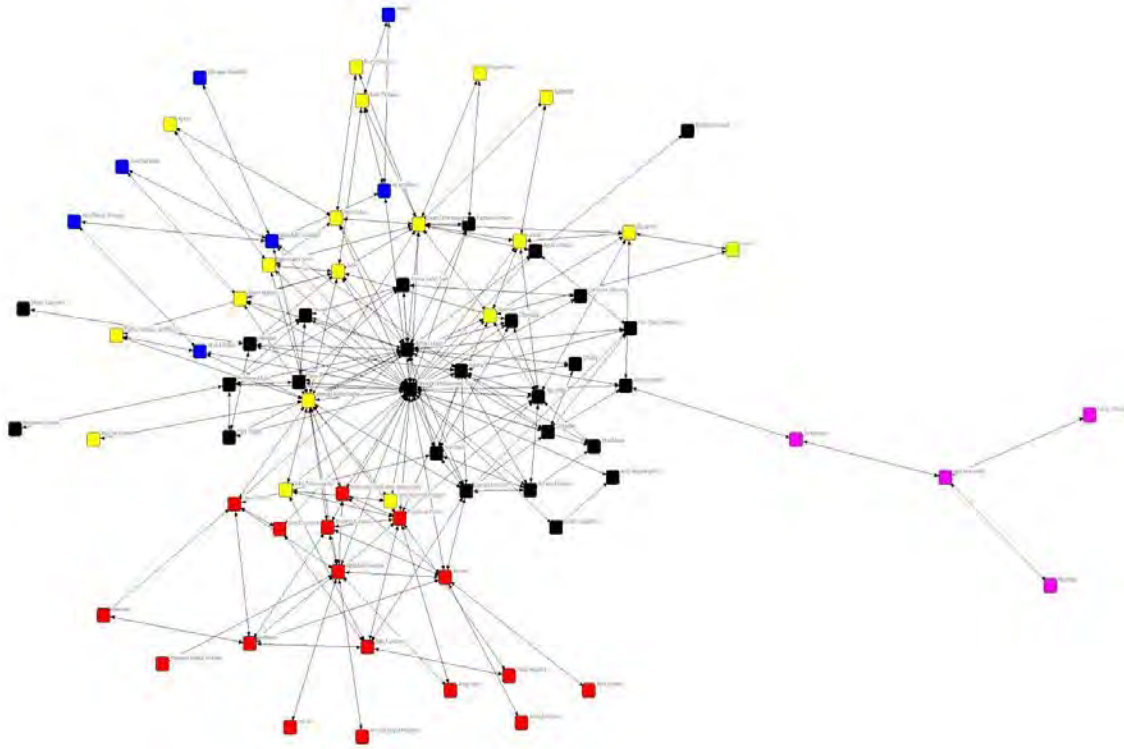
Figure 14.   Subgroups

Now it is more evident where the borders are between the subgroups within the network. This map allows the analyst to investigate why the subgroups exist, what their functions are, and start identifying vulnerabilities and susceptibilities for further examination in the next section of the TAA process. Knowing where natural borders are in a network helps determine where to use intelligence collection methods, and as mentioned earlier, SNA is not the only method for analyzing a TA, but it is a mechanism to highlight important aspects of a network to apply other techniques.

Next, the analyst must understand whether the network is hierarchical or heterarchical. This determines if there are a few actors that wield power and influence (hierarchical) or if it is more distributed (heterarchical). Understanding the structure of the network informs the MISO analyst as to what the conditions are that cause the network to behave in the manner it does. For example, if a network is highly decentralized that could indicate there is excessive external pressure on the network that causes actors to disperse rather than stay tightly connected. On the other hand, if the

network is highly centralized it may indicate significant external pressure is forcing the leadership to tightly control information flow. Figure 15 shows the Noordin Top communications network with larger node sizes indicating who wields the power as measured by degree centrality. The network has a centralization score of 47%, which indicates that it is relatively centralized compared to other covert or terrorist networks.[6] The importance relative to the SPO is that it can be assumed that the core members highlighted in yellow control much of the communication between the members. However, the analyst must consider other measures, or at least not jump to conclusions that removing two or three central actors will decapitate the network.
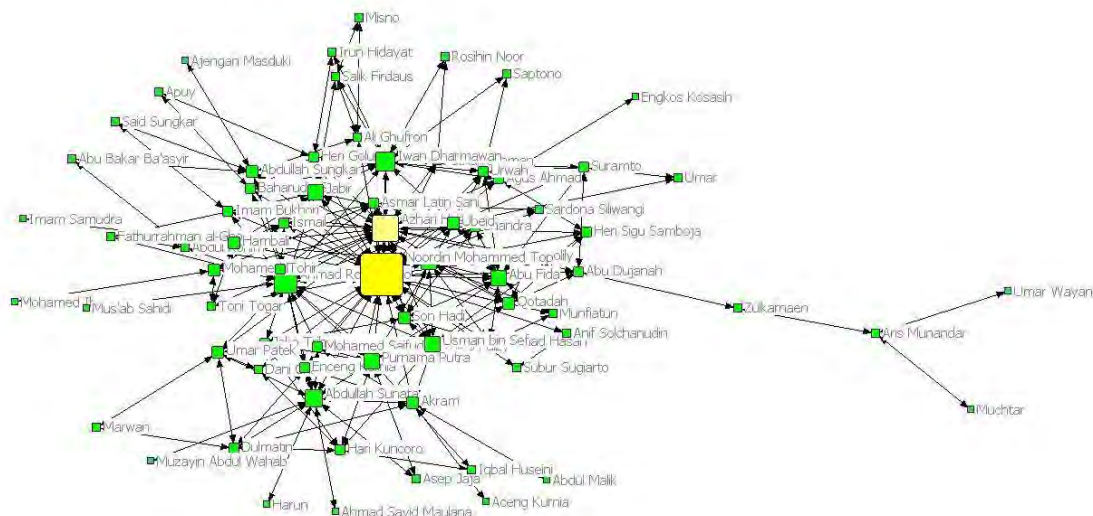
Figure 15.   Degree centrality

While information gained from defectors can provide a part of the overall behavior of the network; however, it can also cause the network to become more centralized to protect itself. The downfall of this tactic is that it makes kinetic targeting easier from the counter-insurgent or counter-terrorist standpoint. From a non-kinetic standpoint, looking at betweenness centralization amongst the actors aids in

[6] The range of centralization scores for covert networks are generally seen between 5% and 55% according to a presentation titled "Covert network data: A typology of effects, processes, practices and structures" given by Kathryn Oliver, Gemma Edwards, Nick Crossley, Johan Koskinen, and Martin Everett at the 2014 INSNA Sunbelt XXXIV Conference in St. Petersburg, Florida, February 19. This would suggest that most terrorist networks will have a lower centralization score than Noordin Top's network.

understanding conduits of information flow. An actor with a high betweenness centrality indicates that he was a significant broker for information between the subgroups. Pragmatically, it provides several non-kinetic options such as seeding disinformation to the periphery of the network or simply listening to Noordin Top's communications to gain a better understanding of the network.

The importance of the communications network is to show how looking at a network from only one perspective fails to give a complete picture. Therefore, it is important to build multiple layers of each network based on different relations. Even if the primary TA is centered on the communication network, each of the other layers provides additional insight and must be analyzed accordingly.

E. VULNERABILITIES AND SUSCEPTIBILITIES

Identifying the TA vulnerabilities and susceptibilities relative to the desired behavior is the next step (PSYOP Target Audience Analysis Handbook, pp. 10–12). Utilizing SNA outputs analysts can identify exploitable network characteristics and determine the likelihood the TA will be receptive. As Roberts and Everton (2011) discuss, it is vital that operations do not rely on any single characteristic, or vulnerability, rather an understanding of the network from a layered perspective is crucial for developing strategies for disruption. Additionally, the PSYOP Target Audience Analysis Handbook recommends being mindful of only looking at demographics, or attributes, of a TA since a demographic range may not be indicative of the layered relations among the actors.

One approach for identifying vulnerabilities is drawing on Borgatti's key player algorithms (2006). As noted above the Key Player Problem-Positive (KPP-Pos) attempts to determine the ideal set of actors for diffusing information through the network. It identifies the subset of actors within the network that are best positioned to diffuse information (or other resources) most quickly through the network. Likewise, analyzing the conditions make it is possible to understand whether or not the TA is susceptible to the influence technique based on network constraints or other social, environmental, economic, or political factors. If the TA is not susceptible to influence, then a similar

algorithm KPP-Neg identifies the ideal set of actors whose removal from the network provide optimal network fragmentation. Figure 16 is the result of the KPP-Pos for the communication network. Using the four actors, depicted with the large squares, as targets can increase the likelihood that information will diffuse throughout the entire network. Through trial and error, the analyst can determine the optimal number of actors that are capable of diffusing information through 100% of the network. In this case, the top three actors are capable of diffusing the information throughout the entire network, but four are shown to illustrate how different actors can be used based on their accessibility for MISO.
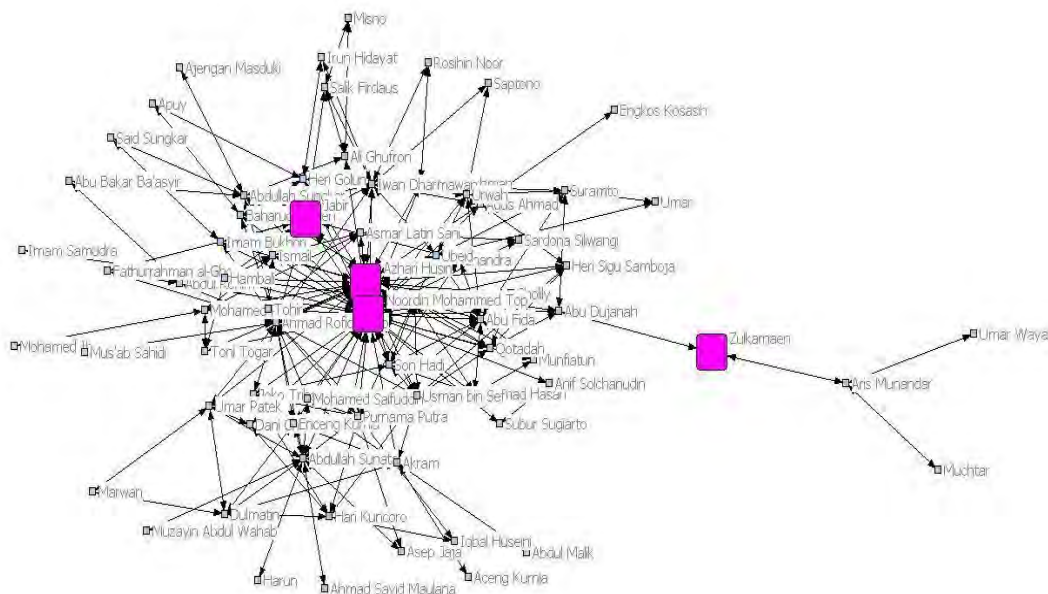
Figure 16.   KPP-Pos

Since MISO extends beyond information diffusion, it is also important from a vulnerability perspective to recommend who should be kinetically targeted to best disrupt the network's operations. Combining both KPP measures allows for more comprehensive strategies that include both kinetic and non-kinetic techniques. As with both KPPs, the analyst can choose how many actors to analyze; four were chosen here for illustrative purposes although different combinations should be used to determine the best fit. For instance removing the top four actors fragments the network by 36.4%, whereas

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removing the top five fragments the network by 49.9%. Figure 17 shows the results of KPP-Neg identifying the top four actors that should be removed.
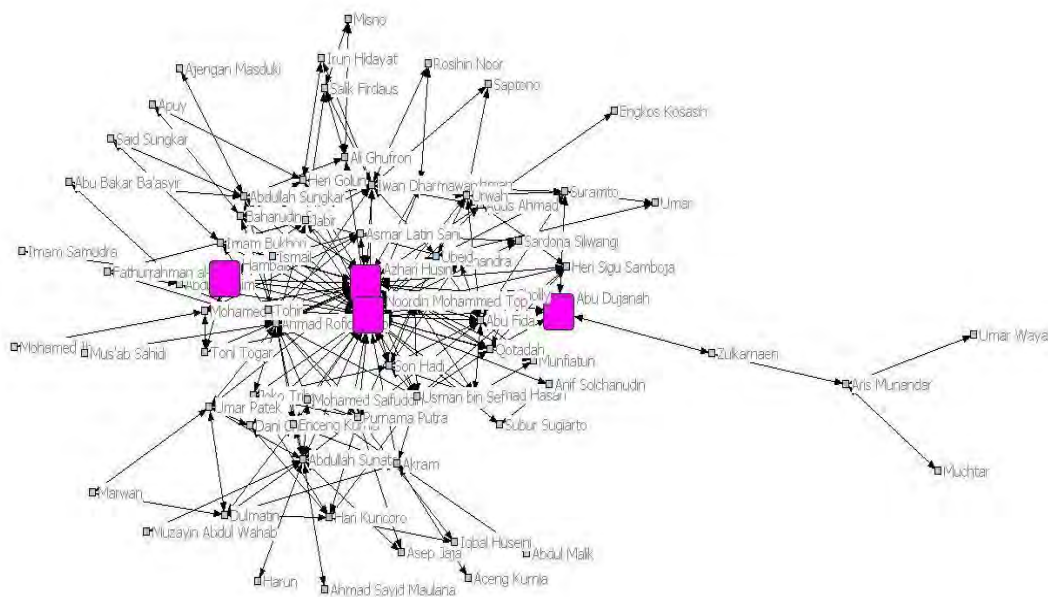
Figure 17.   KPP-Neg

The combination of these methods along with a thorough qualitative understanding of the network can provide analysts with the ability to identify network vulnerabilities from different focal points. Borgatti's key player algorithms are not the only metrics available to analysts for identifying network vulnerabilities, but they are a useful tool to pinpoint where to apply influence and social movement theory techniques to achieve the SPO. Nevertheless, like all of the algorithms discussed in this capstone, they help frame the objectives and the TA in terms of where resources need to be applied against the network for effective results.

F.   ACCESSIBILITY

Accessibility is defined as the availability of the TA for targeting by MISO (PSYOP Target Audience Analysis Handbook, p. 13). This is better illustrated by how the TA receives information, what forms of media are credible to the TA, or what forms of communication are most practical. A portion of this analysis is already determined

through the use of KPP-Pos, but other sources include social media, face-to-face communication, news outlets, community centers, religious leaders, etc. SNA provides the analyst with a methodological approach that begins with a vulnerable and susceptible actor and then analyzing the TA source of information; this is considered looking at the network from the inside out. Once the appropriate communications mediums are identified, the analyst is able to assess and rank the communication means by preferential priority according to the TA.

G. ARGUMENTS AND PSYACTS

Arguments and recommended actions is the portion of the TAA that combines the "art of influence" with the science of SNA. SNA consists of methodologies that help identify and explain behavior, visualize the TA according to relational and attribute data, and provide an understanding of potential vulnerabilities and susceptibilities related to the stated objective. The actions recommended rely heavily on understanding the various organizational, cultural, and psychological characteristics that can be influenced using other academic theories such as social movement theory or influence theory. Wilson (2013) captures the essence of the recommended actions by summing up the entire TAA process by stating "in order to prevent, shape, and win future conflicts our forces must embrace the challenge of understanding and influencing the human domain." During this phase of the process, including the principles of SMT and influence theory provide mechanisms to apply against the vulnerable locations in the network identified earlier.

H. ASSESSMENT CRITERIA

The final stage of the TAA process concerns assessment criteria and measures of effectiveness (MOE). Although this subject justifies a separate field of research it is important to highlight where SNA assists with the task. Much of the difficulty is concerned with whether or not the TA received the influence message, kinetic or non-kinetic, and subsequently behaved in a manner congruent with the objective (Sammons, 2004). Given that the analyst will rarely have full knowledge of what the TA believes, or why or why not a behavior occurred, SNA helps narrow the focus of intelligence collection to specific points within the network. Through continuously updating the

network and the associated dates and time provide a temporal view of relationships that allow for change detection. Detecting behavior change in the network is possible by knowing when a message or action was conducted and how the resulting network structure has changed. To determine whether or not the change in network typography was a result of the influence technique requires further information ascertained from the TA in the forms of surveys, interrogation reports, and public statements by the TA.

The combination of TAA, SNA, influence theory, and social movement theory, provides the PSYOP analyst with the ability to grasp the complexities of a TA across several layers of social and environmental domains. Although, a complete understanding of any TA is unlikely, the ability to achieve the desired objectives is possible when multiple analytical methods are collated.

I.   CONCLUSION

There are countless options for an analyst to visualize and analyze a target audience using the methods conveyed here. Although not shown, if geo-location data and event times are included incorporating geo-spatial and change detection methods can provide further insight on the network. Even without advanced methods, the TA can be adequately defined and understood. One important aspect to remember is that the analysis is never complete and assumptions must be made to progress through the analysis. When new information on the TA is gained it must be appropriately updated and the measures recalculated. Moreover, TAA is informed by SNA and provides a better understanding of how the network behaves and a deeper understanding of the TA then what is provided in doctrinal target audience analysis. Influence and social movement theory techniques are more likely to succeed when appropriate targets are identified and understood.

IV. CORENET: A WEB-BASED INTERFACE TO CONDUCT ADVANCED TARGET AUDIENCE ANALYSIS

Applying SNA, SMT, and influence methodologies to enhance TAA can be accomplished using a multitude of software packages such as UCINET, ORA, Pajek, or Gephi. All of these packages are robust and provide a significant amount of analytical capability. However, they require a lengthy education and training process, require the program to be downloaded on the user's computer, and currently lack the ability to collaborate in near-real time. To overcome these challenges a high-fidelity prototype, COREnet, was developed to provide a simple interface that incorporates SNA with the TAA process. COREnet is a web-based application that allows for multiple analysts to work on a project in near-real time and requires only a basic understanding of TAA and SNA.

Web interface design principles (Scott, Neil, 2009) were used to develop COREnet to ensure the application nomenclature matches what a trained analyst will understand. Given the complexities of SNA, SMT, and influence theory it is important to minimize new terminology that can cause an analyst to spend unnecessary time and effort learning a new lexicon. The minimalist design removes functions that are rarely or ever used to ensure that the entire application consists of only those requirements that are needed for analysts to complete their tasks. If a more detailed analysis of the data is needed, they can export the data to packages such as ORA or UCINET.

Go to http://www.npscorelab.com/studios/COREnet/1.0/?project=example to begin using COREnet and provide the requested information as shown in Figure 18. Each field must be completed to proceed to the main page or an error message will result. The information on the login page gives a unique identifier to each project to be retrieved at a later time.

Analyst Last Name	
Analyst First Name	
Rank	
Analyst Unit	
Psychological Obj	
Supporting Psyc Obj	
Initial Target Audience	

Submit

Figure 18.   Login page

The COREnet main page is shown in Figure 19. The left hand side of the page is an accordion design that lists the seven steps of the TAAW, network statistics, and the ability to upload referenced documents and websites for later use. The right hand side of the screen is the SNA application that allows analysts to visualize and analyze a network's structure. Additionally, the radio buttons in the upper left hand portion of the SNA application provides a mechanism to resize individual nodes (i.e., actors) relative to various SNA measures.
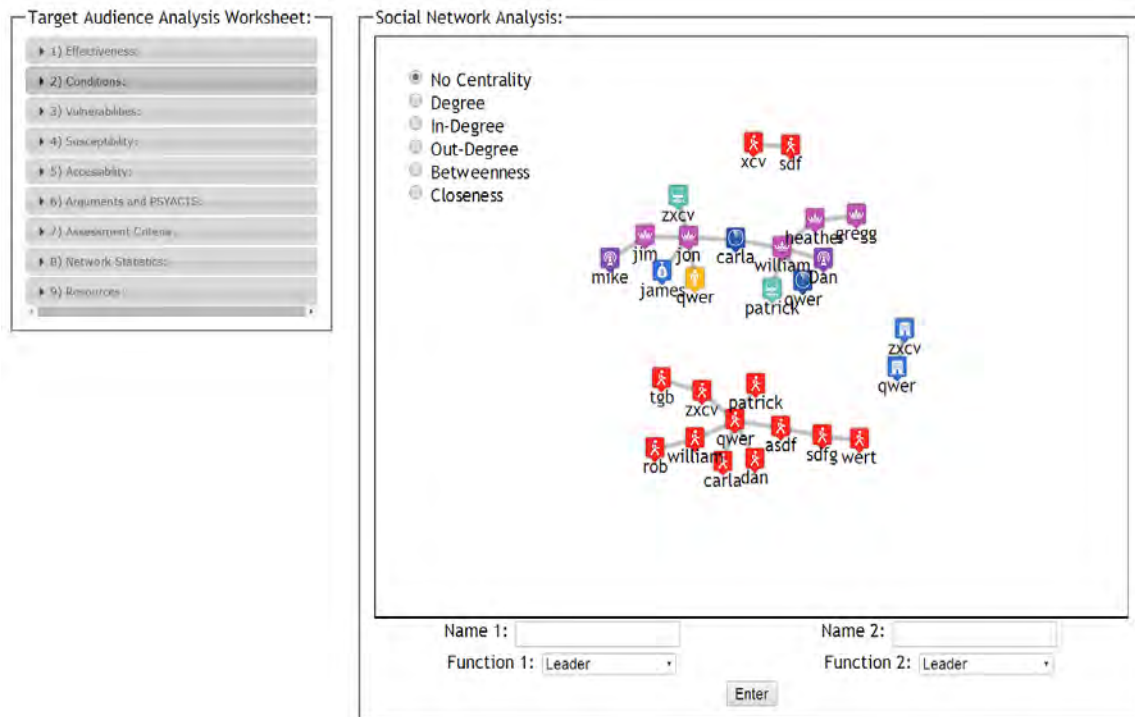
Figure 19.   COREnet main page

To assist with the doctrinal terms and definitions, the analyst can place the cursor over the main concepts in the TAAW to have a definition appear on the screen as shown in Figure 20. This feature was created to assist analysts with quickly identifying what each field requires and help promote a common lexicon that ensures analysts are not confusing terms and concepts.
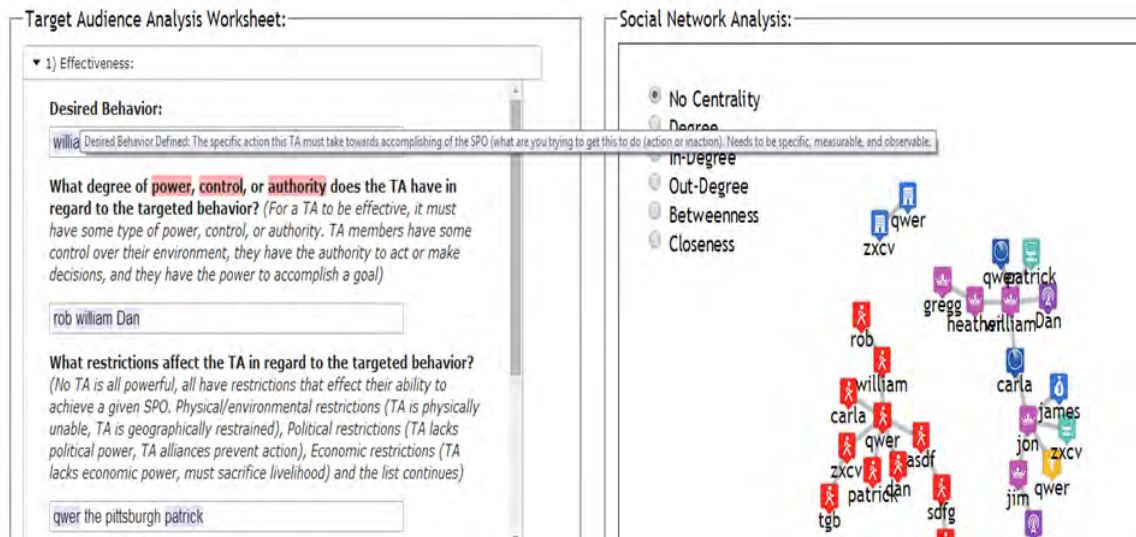
Figure 20.   Popup to provide additional doctrinal information

Another unique feature is that the SNA application is linked to the TAAW. For instance, the sociogram on the right consists of a visualization of various actors and their role (i.e., leader, deputy, financier, propagandist, intelligence officer, technology officer, terrorist, passive supporter, person). As actors in the sociogram are listed within the TAAW the names of the actors are highlighted in light blue. Placing the cursor over the name of the actor in the TAAW causes all the other actors in the sociogram to dim and the highlighted actor remains in bold as shown in Figure 21. This helps the analyst understand where the actor lies in the network structure, and adds an additional function to visually analyze the structure of the network.

Figure 21.   Dim-out function

Another aspect that illustrates the link between the TAAW and SNA application is shown in the Network Statistics tab where various SNA metrics are automatically generated, including degree, betweenness, closeness, and eigenvector centrality. Additionally, when a radio button is checked within the SNA application, the sizes of the nodes change to reflect higher scores. In the event an analyst is unsure of what the metrics mean they are provided with visual tool that "takes the math out of the analysis." For example, Figure 22 shows the degree centrality scores for the network in tab eight and expands the names of the high scoring nodes in the sociogram to reflect the scores.

Figure 22.   Network statistics

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Other COREnet utilities include the ability to store resources for later use and collaboration. Within tab nine, the user can upload documents or save web addresses used in the analysis to reference later. Also, the user does not have to periodically save what is created on the website as it is automatically saved with each keystroke.

Figure 23.   Uploading resources

A.   ANALYZING A TARGET AUDIENCE USING CORENET

To begin, analysts need to determine what Psychological Objective (PO), Supporting Psychological Objective (SPO), and initial target audiences (TA) they will analyze. For this example, the following objectives and TA are drawn from the Noordin Top terrorist network. This particular network was chosen because it has over 23 networks to analyze and provides a substantial amount of attributes identified through numerous student projects (Roberts & Everton, 2011, pp. 1–32).

- PO: Increase defections within the Noordin Top terrorist network.

- SPO: TA provides information to local authorities on Noordin network operations.

- Initial TA: Low income (poor) laborers who are parents residing in Central Java, Indonesia.

Objectives and the initial TA are normally provided within the authority documents that dictate the use of MISO. Furthermore, TAA is conducted both during and after mission analysis. This is important because mission analysis provides context to the problem and the approach the commander or policy makers intend to use. However, this example assumes that this has already occurred and the focus is on the TAA process.

The first step is to determine what the TA is and how it is connected. This is done using the codebook found in Appendix A and visualizing the actors in the SNA app. For the example used in this chapter, the analysis drew on Crises Group International's 2009 report on the Noordin Top terrorist network (Asia Report, 2006, N114; Asia Report, 2009, N95) in order to identify all the actors in Noordin's network. Once identified, analysts will determine whom they are connected to and enter the relationship into the SNA application. The intent is to identify as many relevant actors and relationships as possible early in the TAA process, but as analysts gain a better understanding of the TA, actors will be added and/or removed from the network. Figure 24 is a sample of the actors who have operational ties with one another. The purpose of this is to get an initial understanding of the TA, and as more information is gathered, it is important to have a visual depiction to understand the network's complexities. Once an initial understanding of the network is visualized the following sections discussing the nine tabs on the left side of the application.
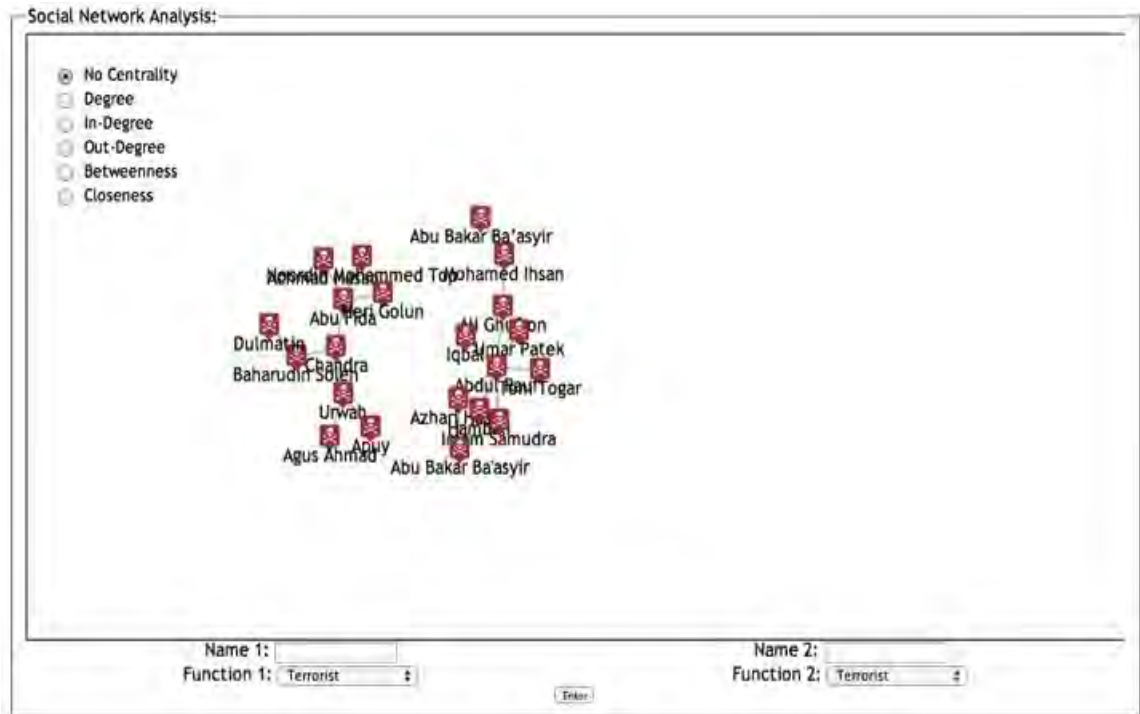
Figure 24.   Initial visualization of the Noordin Top operations network

1.   Effectiveness

Effectiveness is the portion of TAA where the TA is analyzed to determine if the desired behavior, and subsequently the PO and SPO, is achievable. This includes stating the desired behavior, determining whether the TA has the power or authority to perform the desired behavior, what restrictions may prevent the performance of the desired behavior, and a qualitative judgment on how effective the TA will be at achieving the SPO.

Much of this analysis is derived from gaining and comparing as much information as possible on the TA. The information is reflected in the analysis of both the SNA app and the effectiveness portion of the TAAW. For instance, initial desired behavior concerning the Noordin Top network is shown in Figure 25, but as the rest of the analysis is completed the desired behavior may need to be amended.

Desired Behavior:

The TA will report illegal, criminal, and/or suspicious activities to local key communicators (Tribal Elders, Law Enforcement, Military, Civic Leadership, and/or Political Party Leadership). Illegal, criminal, and suspicious activities include any type of criminal behavior, extremism, black market activity, illegal crop cultivation, drug dealing, harassment and/or intimidation.

Figure 25.   Initial desired behavior

2.   Conditions

This portion of the analysis considers the behavior the TA is currently exhibiting rather than what behavior is desired. To determine the existing behavior, consider the qualitative aspects of the resources used and compare that to the sociogram using the Girvan-Newman algorithm and other SNA metrics. The combination of the qualitative analysis with the quantitative visualization begins to illuminate a story about the TA. In the case of the Noordin Top network, it is easy to determine key leaders and influencers, but the additional information on how the relationships are formed, what experiences the individuals had, who was imprisoned, where they went to school, and other attributes make the sociogram a tapestry of information. With this knowledge of the TA, the analyst can now define the current behavior and examine why that behavior exists.

With the current behavior defined and a more complete understanding of the TA, the next step is to determine the causes of the current behavior. First, examine what the network is doing as a whole and what macro level conditions facilitate the current behavior. This can include anthropological studies of the region, economic disparities, grievances towards the government, or any other relevant viewpoints. The context of the behavior is as important as the sociogram that visualizes the relations. Capture these causes and include them in tab two of the TAAW as seen in Figure 26. For a more detailed explanation on how to define causes, refer to the *Psychological Operations Target Audience Analysis Handbook*, or FM 3-05.302 (Psychological Operations Tactics Techniques and Procedures).

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Figure 26.   Conditions

The remainder of the conditions section concerns the effects of the current behavior. Determine what positive rewards or consequences the TA receives for their behavior, how the TA is punished, any secondary consequences, or how the TA affects other groups. This process can be tedious, but the behaviors of the various actors provide a better understanding of the overall effects. For instance, when the Noordin Top network bombed a hotel in Bali they were positively rewarded by media attention and recruits. The negative consequences were arrests and a significant increase in Indonesian military and their counter-terrorist operations against the network.

3.   Vulnerabilities

Vulnerabilities are those characteristics of the TA that exhibit inject points to alter behavior. For instance, in Figure 27 a sample of the Noordin Top network shows that Iqbal is a broker between two subgroups. This information is useful because it highlights that within the network, Iqbal may be in a position that can facilitate or restrict information flow, but his removal can cause the network to become disconnected and less

functional. Furthermore, the use of KPP-Pos and KPP-Neg illustrate how information flows throughout the network and who is important relative to information diffusion and network cohesion respectively.

By analyzing the network visually, the analyst is able to identify those actors who are important to the overall function of the network. Once identified, the motives, demographics, psychographics, and other pertinent attributes about the actors are determined. After these aspects of the TA are identified the analyst then determines the vulnerable points of the network.

Figure 27.   Identifying network vulnerabilities

4.   Susceptibility

Susceptibilities are factors to which the TA are likely to respond, and are completed in tab four (not shown). These include the positive rewards the TA gains from exhibiting the desired behavior, what perceived risks keep the TA from exhibiting the desired behavior, and how consistent is the desired behavior with the TAs' belief structure. The purpose is to identify inconsistencies within the reward and belief structure

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that can be exploited to achieve the desired behavior. Once identified, the analyst suggests initial recommendations on how to exploit those vulnerabilities and susceptibilities. At this point in the analysis, it is important to frequently revisit the previous sections of the TAAW to ensure that the recommendations are congruent with the previous conclusions. If inconsistencies do exist then it is important to rectify those differences before proceeding.

5.   Accessibility

Accessibility, tab five, is used to determine not only the availability of the TA for targeting, but also the most viable means to communicate with the TA. This can be through social media, radio broadcasts, face-to-face communication, third party sources, etc. Each media platform is rated for its viability to reach the intended TA. For instance, if an analyst determines that face-to-face interaction is the most effective means for message dissemination, the SNA application can provide a visualization of the actors in a position to diffuse the message throughout the network.

6.   Arguments/PSYACTs

The "MISO argument" is a framework to guide the development and approach used to persuade the TA to behave in the intended manner. Within this section analysts are responsible for providing guidance and recommendations for developing the overall series. Through their analysis, the MISO argument and psychological actions (PSYACTS) are developed.

A MISO argument is developed in four steps: articulate a main argument, identify any necessary supporting arguments, determine what type of appeal will be useful to present the main argument, and determine what persuasion techniques have the greatest possibility for success (FM 3-305.301, 2007, pp. 2–24).

The main argument is the reason why the TA should engage in a particular behavior. It links the desired behavior to one or more vulnerabilities identified and provides the reason for engaging in desired action. When supporting arguments are presented appropriately and effectively the TA should concur with the main argument.

Supporting arguments are used to make the main argument stronger. When there are significant obstacles/barriers that need to be overcome, supporting arguments provide the factual evidence to shape the TA's behavior through "intermediate" objectives. These arguments address the TA's causes and effects and seek to exploit a TA's vulnerabilities and susceptibilities. Through the use of supporting arguments a TA's acceptance of the main argument increases.

The appeal is the overall approach utilized to present the main argument. As discussed in Chapter II, applying SMT and influence theory is necessary when developing a series of messages and actions to influence the TA. The analyst must understand what drives the TA to behave in a particular manner to have any success in influencing them. By analyzing the TA's conditions and vulnerabilities analysts select particular tones to use in order to gain and maintain a TA's interest throughout the presentation of the argument.

Determining what techniques to utilize when presenting information to a given TA requires a thorough understanding of the TA and its behavior. Techniques are established based on the current conditions affecting the TA. The presentation of information is not limited to one technique and can alter based on the type of information being presented.

PSYACTs include any action or activity that is used primarily for its psychological impact. During the TAA process analysts recommend potential PSYACTs based upon the specific vulnerabilities identified. These are used to modify a TA's conditions, exploit vulnerabilities, build rapport or even add or remove some aspect of the TA's environment that impacts behavior. By utilizing COREnet, analysts can visualize the TA and monitor changes within the network as PSYACTs are conducted to determine what actions or activity are producing changes within the network.

7. Assessment Criteria

Tab seven concerns how to assess the change in the TA's behavior after the recommendations are implemented. During mission analysis, initial assessment criteria are created as a broad measurement of achieving the intended behavior. At the end of the

TAA process, refined assessment criteria is developed that seeks specific, measurable and observable evidence regarding the SPO. Developing refined assessment criteria accurately requires reviewing the current and desired behavior definitions according to the analysis. Through TAA it is determined whether the desired behavior is achievable and how the behavior will be measured or assessed. If the SPO is increasing a behavior, then the refined assessment criteria will center on the TA's desired behavior definition; however, if the objective is to decrease a behavior, the criteria will center around the TA's current behavior definition (PSYOP Target Audience Analysis Handbook, p. 19). In the case of Noordin Top network the refined assessment criteria could resemble something similar to that seen below.

Desired behavior – The TA will report illegal, criminal and/or suspicious activity to local key communicators (Tribal elders, Law Enforcement, Military, Civic Leaders, and/or Political Party Leadership). Illegal, criminal, suspicious activities include any type of criminal behavior, extremism, black market activity, drug dealing, harassment and/or intimidation.

Current behavior – Crime is rampant and criminals operate openly among the poor populace in rural areas. Currently the TA is not reporting illegal activities to local authorities due to fears of reprisal or being ostracized by their community unless there is something monetary to gain. Many of the TA benefit from illegal actions or have family and friends directly or indirectly involved in the activities that cause the TA to tolerate illegal activities.

Initial assessment criteria – How many tips/reports were made in the last two weeks?

Refined assessment criteria – How many reports to key communicators were made last month in the central Java area, with what medium (in person, phone, text), and how many turned out to be credible/actionable intelligence?

8. **Network Statistics**

This provides many of the basic SNA used throughout the TAA process. It includes degree, betweenness, closeness, and eigenvector centrality. It also identifies the top five actors determined from the KPP algorithms to either use to disseminate information throughout the network, or to remove to best fragment the network. The measures are updated immediately when actors are added or removed from the SNA application.

9. **Resources**

Uploading resources in Tab nine is simple. If a digital document (e.g. PDF or Word document) is used as a reference all that is needed is to click on the "Choose File" button and select the document. After the document is selected, click the "Upload" button and the document will be uploaded to database and displayed at the bottom of the Tab. If a specific website needs to be saved for later use the process is the same. Either type or paste the web address in the box next to "URL" and click upload. The URL will then be uploaded to the database and displayed at the bottom of the Tab with the other saved resources.

B. **CONCLUSION**

Conducting target audience analysis is a process that requires constant refinement. The information garnered on a TA will be received in segments throughout an operation, and it is the task of the analyst to structure and analyze the data in a way that can inform operational strategies. COREnet is a tool that assists analysts with visualizing the structure of the network and applying SNA methods and theories to inform the TAA process. Although every effort is made to incorporate social science methods into analyzing a TA, analysts must still make decisions and recommendations based on their best judgment.

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IV. CONCLUSION

A. SUMMARY

This capstone has explained how SNA, SMT, and influence theory can be used to improve TAA. Additionally, open source technologies provide a venue to apply SNA to the TAAW in a manner that enhances existing doctrine. Moreover, the methods described are intended to augment, not replace, the necessary research needed for understanding the human domain within TAA process. The combination of SNA, SMT, and influence theory enriches the analyst's ability to not only create a powerful method to visualize, measure, and understand the TA, but to assist in crafting effective strategies.

The demonstration of COREnet, specifically concerning the Noordin Top TAAW, illustrates how a web-based interface can be developed and implemented to seamlessly integrate SNA into existing doctrine. COREnet is a high-fidelity prototype and requires further development before it can be integrated in the operational force. Although the final version of COREnet will likely be different from the existing prototype, the concept of visualizing and understanding complex social networks will remain.

B. CAPABILITY RECOMMENDATIONS TO THE FORCE REGARDING METHODS, TOOLS AND TECHNOLOGIES

SNA, SMT, and influence theory are complex fields of study that require both education and training. Educating soldiers on the academic theories and training them how to apply the theories in an operational context is a long-term endeavor. Even though impending fiscal restraints limit the ability to expand training and education beyond the status quo this is an investment worth considering. Future operations require precision methods to locate, target, and influence foreign TAs, and to be effective MISO must accomplish the operations rapidly and effectively. Therefore, it is recommended that the MISOC develop dedicated PSYOP soldiers who are trained and educated in basic SNA methods and capable of teaching the methods throughout the force. Trained SNA analysts can prove to be a vital tool throughout the entire MISO process.

Analysts who understand and use SNA methods gain a much deeper understanding of a TA by exploring the layers of relationships and attributes inherent within the network. This increased understanding enables analysts to advise commanders on specific gaps in information and make recommendations for further intelligence collection requirements that would best support achieving the SPO.

It is also recommended that USSOCOM maintain a centralized server specifically for MISO mission data. In particular, COREnet requires a server and database architecture that enables global access to the qualitative, quantitative, and visual analysis. COREnet is specifically designed to provide near-real-time collaboration for TAA, and to do so requires that tactical level operators can communicate complex analysis to commanders throughout USSOCOM and the TSOCs. The recommendation for USSOCOM to maintain the server addresses the potential resource limitations the MISOC and USASOC may possess for maintaining the server and at the same time, streamlines the access channels for the GCCs and TSOCs to access the analysis.

C. RECOMMENDED FUTURE RESEARCH

This research identified a few areas that, if addressed, could increase the effectiveness of MISO operations. Although the list is not exhaustive, it does provide a framework to continue enhancing the TAA process and operationalizing COREnet.

1. Advanced SNA methods that include geospatial analysis and longitudinal change in TAs should be incorporated into the TAA process. Including this capability directly addresses the difficulty to measure the effectiveness of MISO, and provides a venue to amend messaging to achieve the SPO.

2. MISO doctrine should be amended to include SNA, SMT, and influence theory where appropriate. Other social science fields that would be useful include anthropology, psychology, political science, geography, visual analytics, and communication science; these fields should also be included into the doctrine to address the complexities of MISO.

3. There must be educational opportunities for PSYOP forces focused specifically within the social science realm. MISO is a complex profession and requires a force that is trained and educated in areas beyond conventional military operations. As technology, social science methods, and research advance, PSYOP soldiers must possess the academic

fundamentals to adjust training and operations to incorporate those advancements. The importance of correctly identifying and understanding the motivations, properties, and structures of social interaction is essential for any military operation from the pre-conflict through redeployment phases.

4. The field of MISO should identify and develop SNA software that addresses the gaps identified within the MISO process. While this capstone introduced COREnet as a high-fidelity prototype, it would be beneficial to further develop a similar application that comprehensively addresses the gaps in the analytical process. The final product should be simple and easy to train all levels of PSYOP soldiers to use. A "government off the shelf" SNA software application designed specifically to strengthen the reliability and validity of the TAAW requires further examination into the strengths, weaknesses, and overall cost benefits of the application and it should be measured against commercial SNA software tools.

D. CONCLUDING REMARKS

Budget constraints, reduction in force structure, and the increase of precision targeting instead of large scale combat will force all aspects of the DOD to optimize operations. Subsequently, it is essential for the PSYOP branch to investigate innovative ways remain relevant in the complex environments of the 21st century. Technology will increase the speed of communication among adversaries, but it will also increase the ability of the DOD to capture relevant relational information. PSYOP must stay abreast of emerging technology and new analytical methods to offensively exploit the vulnerabilities of an adversary before the adversary exploits our own. This requires methods to visualize large amounts of data, quickly parse through the visualizations to find vulnerabilities and susceptibilities, and ultimately formulate influence operations that keep the commanders one step ahead of the adversary.

While a complete understanding of a TA is unlikely, enhanced TAA in combination with SNA, SMT, and influence theory produces a more valid end product that combines qualitative and quantitative research. Effective TAA requires not only understanding why the relationship exists between given actors or networks, but also requires knowing how to influence and manipulate those relationships. Through combining these methodologies the analyst can examine a TA across several layers of

social and environmental domains to draw valid conclusions on how to achieve the influence objective.

The incorporation of SNA methodologies into the TAA process represents one additional method for analysts to utilize that provides a more in-depth understanding of the TA. Using the network approach for analyzing a TA may not always be the dominant choice during mission planning and execution, but the methodology illustrated throughout this capstone is easily transferrable to other academic disciplines. The academic theory used to help with analysis and planning is less important than ensuring that the TA is understood to the greatest extent possible. However, the authors recommend that whichever discipline is chosen that it includes both qualitative and quantitative analysis. The fact still remains that no technological tool can replace the necessity for analysts to have a great understanding of the human domain within the target audience analysis process, but technology can greatly assist in the journey.

APPENDIX. A. NOORDIN TOP'S NETWORK DATA

These data were drawn from "Terrorism in Indonesia: Noordin's Networks," a publication of the International Crisis Group (Asia Report #114, 5 May 2006). Defense Analysis students structured and analyzed the data in the course "Tracking and Disrupting Dark Networks" under the direction of Professor Nancy Roberts, professor at the Naval Postgraduate School, and updated by Dr. Sean Everton, co-director of the CORE Lab

1. TERRORIST/INSURGENT ORGANIZATIONS

Definition Terrorist/Insurgent Organization:

A terrorist/insurgent organization is defined as an administrative and functional system, whose primary common goal is the operational conduct of terrorist/ insurgent activities, consisting of willingly affiliated claimant members. Factions and offshoots will be considered separate from their parent organization.

List of Terrorist/Insurgent Organizations:

1. Abu Bakar Battalion (AMIN)

2. Al-Qaeda (AQ)

3. Darul Islam (DI)

4. Islamic Defenders Front (FPI)

5. Jemaah Islamiyah (JI)

6. KOMPAK

7. Kumpulan Mujahidin Malaysia (KMM)

8. Majelis Mujahidin Indonesia

9. Mantiqi I (JI)

10. Mantiqi II (JI)

11. Mantiqi III (JI)

12.   Mujahidin Kayamanya

13.   Ring Banten (DI)

14.   Tanzim Qoidatul Jihad (AQ)

15.   STAIN Group

Two-mode network 79 X 15

2.   EDUCATIONAL RELATIONS

Definition of Educational Relations:

Educational relations are defined as schools where individuals received formal education.

List of Schools:

1.   Adelaide University

2.   al-Husein – *pesantren* (Islamic boarding school) in Indramayu, West Java

3.   al-Muttaqien

4.   Sukabumi

5.   Bogor Agricultural University

6.   Brawijaya University in Malang

7.   Darusysyahada – *pesantren* (Islamic boarding school) in Boyolali

8.   Gontor

9.   Indramayu

10.   Jepara

11.   Luqmanul Hakeim – *pesantren* (Islamic boarding school) in Johor, Malaysia

12.   Pondok Ngruki/al-Mukmin – *pesantren* (Islamic boarding school) in Ngruki, Central Java

13.   Reading University, UK

14.   Universitas an-Nur/ Mahad Aly – *pesantren* (Islamic boarding school) in Solo

15.   University of Technology, Malaysia

        Two-mode network 79 X 15

3.   COMMUNICATION RELATIONS

Definition of Internal Communication:

Internal communication is defined as the relaying of messages between individuals and/or groups inside the network through some sort of medium.

One-mode matrix, 79 x 79

4.   MEDIUM FOR EXTERNAL COMMUNICATION:

Definition of Medium for External Communication:

Medium for external communication is defined as the various means utilized to relay information between the terrorists and those outside the network.

List of Mediums:

1.   Computer-based messages—such as website (www.anshar.net), network cafes, and email.

2.   Print media—such as the KOMPAK magazine

3.   Codes and passwords—to send material from prison.

4.   Videos—for bomb making and training to recruit outside members.

5.   Undefined—any other, undefined, yet referenced type of communication between actors

Two-mode matrix, 79 x 5

5.   KINSHIP RELATIONS

Definition of Kinship:

Kinship is defined as a family connection based on marriage. Kinship includes current marriages and past marriages due to divorces and/or deaths.

One-mode matrix, 79x79

6. TRAINING RELATIONS

Definition of Training Relations:

Participation in any specifically designated activity that teaches the knowledge, skills, and competencies of terrorism. Training does not include participation in a terrorist sponsored act or mujahedeen activity in places such as Afghanistan, Bosnia, Chechnya, or Iraq unless the individuals' presence was to participate in a specifically designated training camp or base in one of these areas.

List of Training Locations:

1. Post-Bali Mil Refresh Training
2. Jan 04 Bomb Making
3. Jun 04 Bomb Making
4. 03 Rois Training
5. May 04 Training
6. 99 Mindanao Training
7. Australian Embassy Religious Training
8. 01-02 Ujunj Kulon Training
9. 03 Mindanao Training
10. Oct 99 Waimurat, Buru Training
11. Jul 04 West Ceram
12. Azhari Apprenticeship
13. Solo course
14. Training for Bali II in "Selera" restaurant

Two-mode matrix, 79x14

7.   RECRUITING RELATIONS

Recruiting Relations Defined:

Contact between two individuals for the purpose of enlisting new members for terror-related activities. Recruiting relations are only relevant where the attempt to enlist members has been successful. Failed recruiting attempts are not included.

One-mode matrix, 79 x 79

8.   8a. BUSINESS RELATIONS

Definition of Business Relations:

Business relations are profit and non-profit organizations that employ people.

Types of Businesses:

1.   Shock Repair Shop-- the automobile shop that repaired shock absorbers

2.   CV Courier Business—business that specializes in transfer of information and products

3.   Indonesian Muslim Workers Union

4.   Tobacco Business—firm that grows tobacco

5.   Small Trading Business—exchange of goods

6.   Used Cloth Business—the collection and sale of used cloth for industrial purposes

7.   Clothing Business—making and selling clothing

Two-mode matrix, 79 x 7

8.   8b. BUSINESS RELATIONS

Definition of Business Relations:

Business relations are profit and non-profit organizations that employ people.

Types of Business and or Finance Operation:

1.   Clothing Business—making and selling clothing

2.   CV Courier Business—business that specializes in transfer of information and products

3.   Durassalam Foundation

4.   Indonesian Muslim Workers Union

5.   Shock Repair Shop-- the automobile shop that repaired shock absorbers.

6.   Small Trading Business—exchange of goods

7.   Tobacco Business—firm that grows tobacco

8.   Used Cloth Business—the collection and sale of used cloth for industrial purposes

Two-mode matrix, 79 x 8

9.   FINANCING RELATIONS

Definition of Financing Relations:

Financial relations are defined as the provision of funds (legal and illegal) to support, sustain, and conduct operations for the terror network.

Types of Funding:

1.   Money transfer from unknown source—in the form of cash or gold.

2.   Crime—defined as illegal activities to raise funds, e.g., robberies.

3.   Donations—*Infaq* and other collections of money.

4.   Sales—the creation of a product as a mechanism to generate funds, e.g., the production of Videos or CDs.

5.   Business—profit-based organization that uses some of its profits to support terror-related activities.

Two-mode matrix, 79 x 5

10.   OPERATIONAL RELATIONS

Operational relations are defined as terrorists who are directly involved with the bombings, either at the scene e.g., a suicide bomber, commander or as a direct support to

those at the scene e.g., driver or lookout. Matrix does not include communications, logistics, or organizational ties that were related to the operations. This file has been updated to reflect Koschade article on Bali I bombing.

List of Operations:

1.   Australian Embassy Bombings

2.   Bali Bombing I

3.   Bali Bombing II

4.   Marriott Bombings

Two-mode matrix 79 x 4

11.   FRIENDSHIP RELATIONS

Definition of Friendship Relations:

Friendship relations are defined as close attachments through affection or esteem between two people. Friendship ties are not defined as meetings and/ or school ties.

One-mode matrix, 79x79

12.   RELIGIOUS TIES

Definition of Religious Relations:

Religious relations are defined as association with a mosque. We will not include Islamic schools, even though we assume that the schools have mosques. Not using the schools prevents duplication of effort with the team constructing the school ties. We listed the Mosques by the town in which it is located. If there was more than one in a city, we added a numerical identifier plus the name of nearest location.

List of Mosques:

1.   Surabaya Mosque I (al – Ikhsan Mosque)

2.   Surabaya Mosque II (Airlangga University)

3.   Kediri Mosque

4.   Banten Mosque

5.   Cipayung Mosque

6.   Solo Mosque (an – Nur Campus)

Two-mode matrix, 79 x 6

13.   LOGISTICAL RELATIONS

Definition of Logistical Relations:

Logistical relations are defined to mean a Key Place within the archipelago where logistical activity occurred. Logistical activity is defined as providing "safe houses" for meeting/hiding, providing material support in terms of explosives, providing weaponry, or facilitating transportation of personnel or equipment.

List of Places Where Logistical Support Given:

1.   Kuta

2.   Boyolali

3.   Kartosura

4.   Pekalongan

5.   Semarang

6.   Solo

7.   Surakarta

8.   Ungaran

9.   Blitar

10.   Malang

11.   Mojoagung

12.   Mojokerto

13.   Pasuruan

14.   Surabaya

15. Ambon

16. Buru

17. Poso

18. Bukittinggi

19. Bengkulu

20. Dumai

21. Pekanbaru

22. Medan

23. Anyer

24. Jakarta

25. Bandung

26. Cianjur

27. Indramayu

28. Palabuhanratu

29. Tawau

30. Sekudai

31. Cotabato

32. Datu Piang

33. Zamboanga

34. Yogyakarta

35. Wonosobo

Two-mode matrix, 79 x 35

14. LOGISTICAL FUNCTIONS

Definition of Logistic Functions:

Logistical functions are defined as the support for terrorist operations by providing materials, weapons, transportation and safe houses.

List of Logistic Functions:

1.   Safe houses

2.   Weapons

3.   Transportation

4.   Material

Two-mode matrix, 79 x 4

15.   ATTRIBUTES

Education Level:

Education level is defined as highest degree attained, level taught at, studied, participated in, or attended.

0.   Unknown

1.   Elementary Education

2.   Pesantren (Luqmanul Hakiem, Ngruki, al-Husein, Indramayu, Jemaah Islamiyah)

3.   State High School

4.   Some University (University an-Nur, Univeristi Teknologi Malaysia, Adelaide University, Bogor Agricultural Univ.)

5.   BA/BS Designation

6.   Some Graduate

7.   Masters

8.   PhD (Reading University)

Contact with People outside Indonesia:

Contact with people outside Indonesia is defined as contact with people in different countries outside Indonesia

Coding Scheme:

1.   Unknown

2.   Afghanistan

3.   Australia

4.   Malaysia

5.   Pakistan

6.   Philippines

7.   Singapore

8.   Thailand

9.   United Kingdom

10.   Afghanistan & Malaysia

11.   Afghanistan & Pakistan

12.   Afghanistan & Philippines

13.   Afghanistan, Malaysia, & Philippines

14.   Australia & Malaysia

15.   Philippines & Malaysia

Military Training:

Military training is defined as the country where a terrorist received military training and attained veteran status in fighting in known insurgent/conventional wars:

1.   Unknown

2.   Afghanistan

3.   Australia

4.   Indonesia

5.   Malaysia

6.   Philippines

7.   Singapore

8.   Afghanistan & Indonesia

9.   Afghanistan & Philippines

10.   Indonesia & Malaysia

11.   Indonesia & Philippines

Nationality of terrorists:

Nationality of terrorists is defined as country of birth, citizenship, or residence:

Coding Scheme:

1.   Afghanistan

2.   Australia

3.   Indonesia

4.   Malaysia

5.   Philippines

6.   Singapore

Current Status per ICG Article:

Current status per ICG article is defined as the physical condition of the terrorist.

Coding Scale:

0.   dead

1.   alive

2.   jail

Role:

Role is defined as the role a terrorist assumes in the terror network

Coding Scheme:

0.   no info / unclear

1.   strategist: high level planner of a terror network

2.   bomb maker: individual who constructs bombs

3.   bomber/fighter: individual who participates in bombing attacks or who is described as a fighter

4.   trainer/instructor: individual who trains or instructs new members of a terror network

5.   suicide bomber: individual who plans to or already has performed a suicide attack

6.   recon and surveillance – engaged in the surveillance and recon of targets

7.   recruiter – engaged in identifying and recruiting new members (to include bombers)

8.   courier /go-between – used in communications between members

9.   propagandist – developed information campaigns

10.   facilitator – assisted in the operation of the network (especially with materials and finances)

11.   religious leader – provided religious training and support

12.   commander/ tactical leader – in charge of operations at the local/tactical level

Logistics Function:

Logistics function is defined as the provision of safe houses, weapons, transportation, and material to the operational network.

Coding scheme for the attribute:

1.   Providing a safe house

2.   Providing weapons

3.   Providing transportation

4.   Providing material

5.   Providing weapons, transportation, material

6.   Providing weapons, material

7.   Providing transportation, material

8.   Providing safe house and transportation

9.   Providing safe house, transportation, material

10.   Providing safe house, weapons, material

Effectiveness:

Effectiveness is defined as the effectiveness of the terrorist with regards to Noordin's network.

Coding Scale:

1.   Dead

2.   Free but on the run

3.   Free but compromised

4.   Free and active

5.   Jail

6.   Flipped (now a good guy)

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