



**Comparing Approaches to Identifying and Influencing
Social Networks**
A Workshop at the Center for Strategic & International Studies

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Executive Summary

On May 5, 2011, the Center for Strategic and International Studies hosted a workshop attended by approximately forty experts in various disciplines and subject areas. Each was involved in work that in some way touched upon the understanding or utilization of social networks. By design this group represented a range of theorists and practitioners spanning defense and security, urban development, law enforcement, social movements, disease prevention, grassroots activism, and health care. It included representatives from governmental organizations, academia, and the private sector.

The day's discussion had three core objectives:

- To generate discussion among communities that address similar issues relating to social networks from different perspectives;
- To provide a forum for sharing information about understanding social networks, as well as practices to influence, leverage, or counter them; and
- To develop a network of expertise in support of future interactions.

The workshop was held on a non-attribution basis, so the discussion below summarizes themes without reference to specific participants. The day was organized around three broad questions:

1. Which approaches or models have various communities found most useful in analyzing networks?
2. Which approaches or models have planners found most useful in developing strategies to affect network behaviors?
3. Which network features are common across problem sets, and what does this imply for strategies to counter or leverage networks?

In general, the discussion around the first question about methods of understanding networks revealed that many different communities, from those focused on remediating the influences of youth gangs to those interested in “crowd-sourcing” information sharing, rely on similar approaches to identifying the key nodes and relationships in social networks. These include soliciting that information directly from “participants” in the networks, but also virtually through social media. The group stressed the importance of seeking multiple perspectives on each network relationship, ideally from both direct and indirect sources, and of gaining insight into the communicative behaviors. One expert shared his experience in developing an incentive system to induce information-sharing. All acknowledged that despite the plethora of avenues of collecting information about social ties, the resulting maps have multiple limitations. These include problems of attribution and causality, accounting for temporal evolution, and appropriately characterizing qualitative differences among various types of network ties. The impact of these limitations is further magnified when the networks of interest are covert and information must be collected solely through indirect means.

The discussion on the second question on influencing the behavior of networks was dominated by questions about how viable external influence is at all, at least in a capacity yielding predictable outcomes within a scheduled timeframe. The importance of understanding – and then

leveraging – the incentive structures that maintain an actor’s network position was highlighted, to include the actor’s cultural and personal conceptions of identity. Other insights were offered to help sharpen our interpretation of network maps and inform intervention techniques. These include the research finding that ideology plays a limited role in driving network formation, while social expectations and encouragement are a forceful source of influence – details that can shape external strategies. Network strength was also flagged as a factor enabling or disabling the efficacy of intervention efforts, as was an appreciation for the degree of risk involved with various behaviors a network might seek to induce in its members.

The final discussion around commonalities revealed several shared factors across disparate problem sets. One was the fact that many popular networks are a source of emotional connection for their actors, and that network participants often derive personal meaning from them. Another observation was how second- or third-tiered actors frequently are more impressionable to outsider influence and thus invite more careful studying by analysts. Finally it was noted that while there are some common patterns and features across networks, network activities still occur around a specific topic. Network behaviors can be inextricably connected to the network subject matter.

Beyond these specific points, several themes recurred during the course of the day. One was a general note of precaution against overextending our expectations of what network analysis can yield. While everyone in attendance attested to the utility of network maps, the group agreed on the importance of ensuring network depictions are explicitly acknowledged as imperfect representations of a complex – and often poorly understood – set of dynamics.

The limitations discussed generally fell into two categories: (1) those posed by disadvantages outsiders have in trying to gain insider insight; and (2) those resulting from the limitations of network analysis itself. Overcoming the former shortcomings can, at least in some cases, be achieved with a more expansive and creative use of incentives to induce insiders to share network information. Failure to do so can result in an incomplete network map, or – when we make faulty assumptions – an inaccurate one, leading to misinformed analysis and ineffective strategies.

The second kind of challenge is less directly negotiable. The inability to gauge whether a network feature was formative in creating the network or a result of it, for example, stems from a more fundamental limit on reading causality and attribution from network maps. Similarly, not knowing whether network behaviors are internally or externally driven derives from limits on reading motivation. The ideas discussed in response to these challenges generally entailed devising alternatives less heavily dependent on the network features that are not legible. Intervention techniques might focus on external or contextual surroundings rather than the network site itself, or the provision of connection opportunities aligned with a desired outcome. While several of the challenges were faced almost universally by participants, the diversity of their problem sets enabled cross-pollination between very disparate communities, sharing practices that might be transferred or translated.

Summary of Workshop Discussions

The day opened with a discussion revolving around network definition and purpose. In its early usage “networks” referenced transport through railways and canals, roots that remain instructive. At base, networks reflect connections, or the way people are interlinked, and the flows of communication that move through them. Network analysis relies on these maps for social orientation, seeking to understand the features that explain and determine interactions.

One participant cited organizational charts as a primitive form of network depiction, with lines representing the relationships between various people, depicted as nodes, mirroring an organization’s structure. The group agreed that these types of maps lend basic insight into how an organization functions, and the role individuals and their relationships play in channeling its activities and outcomes. Network depictions reveal something about a person’s worth by virtue of their relative location in the system; they capture human capital as social capital. That spatial placement can in turn reflect influence, so that an agent at the periphery is assumed to have the power of a peripheral actor. Additionally, network maps shed light on behavior patterns, such as reciprocity or exchange, and thus may enable us to predict future activity. It was noted early, and later expanded upon, that network depictions are by nature representational, that the lines and nodes are superimposed on relationships often more complex and nuanced than what can be captured. While offering entry into social dynamics, then, network analysis retains the limits of any analytic tool.

The conversation then shifted to the initial cartographic challenge: how does one identify and draw a network to begin with? One discussant likened the difficulty to that of demarcating an outline whose shape you don’t yet know, with the attendant risk of laying down false boundaries. She described her experience confronting this challenge when studying criminal behavior among youths and young adults. In the process of assessing the compositions of delinquent and at-risk youth social networks, her team discovered that ties did not always fall within neighborhood lines, and that pinpointing the structure of an individual’s network necessitated a broader approach. The example highlighted the pitfalls of assuming that a network falls only within certain geographic bounds or ethnic groups, potentially omitting what are more diverse and meaningful links. To minimize this risk, participants discussed the merits of collecting information “on the ground,” which can reveal non-traditional alliances and aid in setting boundaries that are appropriate for the analytic purpose at hand.

That said, the group acknowledged that seeking people’s takes on their own relationships also has limitations. These include the limited accuracy of self-analysis and/or the potential for “self-editing.” One discussant described responding to this challenge by seeking multiple perspectives on any single relationship (e.g., from others both within and without the network), as well as asking for quantitatively descriptive information, such as how frequently a pair calls one another. Another approach mentioned was relying on eliciting stories as a less aggressive form of inquiry, so that one might ask for self-narratives rather than direct responses to specific questions. The participant shared her experience that inviting people to tell their stories often results in greater

candor, and that entry into more sensitive topics is sometimes only granted if approached obliquely.

Some noted how these methods are less viable when seeking information from those with a motive to conceal their relationships or their strength. In these cases, the challenge becomes designing a system that incentivizes information sharing. One participant suggested creating a benefit that can only be used if actors identify their information source, which reveals connections post hoc, or if individuals offer referrals. Another participant added that agents' referral behaviors relay an additional layer of information, so that network boundaries can be inferred through respondents' chosen inclusions and exclusions. Self-reported information can also be augmented with external measures of connection.

One discussant shared a less common predicament: the task of formalizing a network based off of openly-available information. Experienced in creating and supporting patient- and doctor-based networks to improve health care delivery for Crohn's disease, he described the sensitivity issues sometimes involved in encouraging participation. While online discussion boards readily make apparent the community of interest, approaching someone about certain health problems, especially those with social stigmas, can still feel invasive, he noted, and introduces ethical considerations. Another participant suggested audience-specific online advertisements as a more discrete tactic. Generally, the example highlighted the challenges of harnessing available information to formalize a network, a reversal of the more traditional task of extracting information from networks already formed.

The group expanded upon its earlier conclusion that network frameworks, even once identified, are limited in their explanatory power. Discussants observed that while similarity is often a network feature, we have little insight into whether that similarity drives network formation or emerges as a result of it. Did actors form a network *because* of their pre-existing similarities, or did they influence one another into similarity *after* forming their ties? Research suggests that similarity plays a greater role in relationship maintenance than formation – i.e., that individuals may encounter many people but mostly choose to maintain connections with those with whom they are similar – although uncertainty remains. Two vastly different processes can create identical networks, and the route is not always obvious.

This noted difficulty relates to a more fundamental challenge: network depictions describe dynamic phenomena, while our images of them are frequently static. Though this artificiality constitutes a basic limitation of network analysis, one participant asserted that seeking continuous data over time could help to illuminate causal relationships more accurately than snapshot representations. Another participant remarked that analysts' narrow focus on network structure often assumes an unchanging system. If a goal of network analysis is to understand not just existing relationships but how agents act, then accounting for more dynamism could afford greater explanatory power, capturing actor behavior in a changing environment with multilayered simulations.

Another point raised was how critical context remains to interpreting networks. One participant shared that while the median number of Facebook friends is comparable across the UK and US (despite vastly different population sizes), it is double the median number in China, Japan, and Korea. He offered this anecdote as an example of the cultural variability in the meaning of a “relationship,” and went on to point out that when the weight or meaning of a connection differs, the way that network picture should be read also changes. A discussant added how this point only reinforced a more fundamental limitation of depictions of network structures, which generally fail to account for the kinds of interpersonal nuances that ultimately determine outcomes, such as who receives a promotion, for example, or what constitutes effective leadership.

Another participant asked whether it was shortsighted to exclude non-human nodes from network analysis, arguing that introverts often feel closer connections to ideas, places, or certain experiences than they do to people. More expansive representation might also recast the network dormancy that often precedes imminent bursts of activity as just a different form of activity. A terrorist who isolates himself from people to immerse himself in ideology prior to carrying out an attack, for example, might be better understood if network depictions accounted for more than people-based nodes.

As the conversation shifted to discussing approaches for how to affect network behaviors, one participant described the task of facilitating communication and cooperation among actors absent an *a priori* network. In these instances, the challenge is twofold: bootstrapping the network – or using existing resources towards its formation – and incentivizing participation in it. The nature of his work underscored how networks remain of secondary importance to the activity they facilitate rather than the principal concern, he asserted, and that a network is better conceived of as a “substrate” that merely underlies the behavior that is ultimately of interest. He also cautioned that while tracing events in hindsight can lend them an air of inevitability, we should not assume we could ever prospectively anticipate the same path with stimulation. Others agreed, noting the difficulty of predicting – let alone provoking – precise outcomes. Some expressed skepticism about our ability to create effective interventions at all, at least in the short-term timeframes preferable to policymakers.

One discussant noted how this challenge is compounded by the indeterminacy of what motivates people to act. He explained how his work on social movements revealed the malleability of people’s belief systems and found countless instances where actors’ ideological views were not necessarily aligned with the activities in which they ended up participating. Generally, too, research indicates that worldview plays a somewhat minor role in determining or constraining actions, and that it is one’s networks that filter which beliefs ultimately get acted upon. How one desires to be perceived by others within one’s network, for example, can exert a powerful tug – networks provide social instruction. To this end, the participant described social networks as a “womb” that shapes our behaviors, introducing the idea of networks as formative as well as descriptive.

Others described intervention opportunities as less limited, arguing that incentive structures offer some room for manipulation. One discussant suggested investigating the incentives that maintain an actor's network position and then creating alternative incentives to dislodge it. The example was given of the hole-digger who places IEDs (improvised explosive devices) in the ground, an occupation perhaps born more of financial need than ideological commitment. Offering monetary compensation in return for locating the IEDs could then potentially prove an effective form of intervention. Another participant noted, however, that the success of such an approach would also hinge on the digger's self-identity. If the digger was intrinsically opposed to being an informant then no amount of money would sway him, even if he were not especially committed to planting IEDs. The group drew from the example the notable caveats of outcome-driven attempts to influence networks, especially absent an understanding of how people self-identify.

The group engaged in a lengthy discussion of the relationship between the level of risk undertaken in a given activity, network strength, and intervention efficacy. Participants noted that networks engaged in behaviors that could involve the risk of life, for example, may be much less amenable to outside intervention, no matter how aggressive, compared to those where less is at stake. Network strength can also vary by network type. For example, affiliate networks – where people are connected through direct affiliations, such as common friends or hometown – often exhibit stronger ties than networks based on mutual interest or shared ideology. Furthermore, not all communication mediums are equal. A message delivered through e-mail usually generates more committed involvement than a tweet on Twitter, presumably because it is viewed as more personal. Most agreed that actors' degrees of commitment to a network conditioned how amenable the network might be to external influence.

One discussant offered an interpretation of network intervention as disruption. He presented a systems dynamics view of networks, which proposes that network activity tends to fall into equilibriums – much in the same way as other dynamic processes, such as metabolic systems – and that effecting change requires a disturbance of this balance. This model suggests that there is a limited window of time following any disruption that must be exploited in order to effect change, before actors react and adjust to a new equilibrium. Excessive wait could yield a return to normalization, he noted, precluding the opportunity for adjustment.

Overall, a theme recurring throughout this segment of the discussion was the distinction between influencing network behaviors directly and influencing the incentives and motivations that underlie them. One participant advised caution in thinking social movements can be directly affected, arguing that the best that exogenous forces can do is influence the interplay between the endogenous forces within the system.

In light of what most agreed is limited control, then, some participants averred that the most fruitful task may be creating opportunities for communication among people with shared aims and contexts. While we may not be able to induce the forming or structuring of ties, nor steer them towards a certain outcome, we can provide infrastructure that facilitates their development. Offering the tools necessary for relationships to emerge can prove critical, participants agreed, as

evidenced by the recent uprisings across North Africa and the Middle East. Robust network ties can also obviate the need for strong centralization, one participant added, enabling movements to thrive absent a leader. She drew a parallel between al Qaeda and the hacking group Anonymous, as both practice a form of crowdsourcing that relies on freelance participation.

As the conversation moved to the common features prevalent across disparate problem sets, one discussant stressed that – despite their parallels – networks remain topic-specific, and that network behaviors are often intricately and intimately connected to the issues that animate them. A robust understanding of a system requires an eye to its communing forces, and, to be effective, intervention techniques must account for these differences. Faulty assumptions about what is gathering actors, meanwhile, can lead to fruitless intervention attempts and wasted efforts.

Another discussant noted that a search for meaning or emotional connection forms the basic tug of many popular networks, such as religious or self-help groups. He observed how organizations like Alcoholics Anonymous advise that participants avoid familiar places or people, as it risks recreating contexts that trigger destructive behavior. To this end, spurring behavioral change in networks could require introducing a supplanting set of symbols and ideas to which participants can latch on, especially if the symbols are emotionally laden. Similar to the storytelling technique mentioned earlier in the day, this method posits that eliciting a direct outcome requires an indirect approach. It also hints at the potential futility of attempting to halt network activity through shutdown, as highlighted by Hosni Mubarak’s failure during the Egyptian protests. Facilitating the formation of competing networks may prove more effective than directly contesting a network of concern.

One participant flagged the common pitfall of giving primary attention to the most highly valued or prominent individuals in a network. He argued that focusing on second- or third-tiered actors can hold more promise for two reasons: (1) those inhabiting lower rungs today may assume higher positions tomorrow, and (2) those distanced from the locus of power may remain more impressionable to persuasion or dissuasion. Expanding one’s frame of interest this way might ultimately yield greater network sway. Agreeing, another discussant also underscored the importance of seeking “boundary spanners,” or those individuals who act as conduits between varying class structures, regions, or ethnicities, or across multiple networks. The presence or absence of these actors often proves critical, as they determine a network’s reach. The participant linked the failure of Iran’s Green Revolution in 2009 to its remaining a student-based effort that failed to gain traction with labor unions or the military. The lack of boundary-spanning agents limits the potential for cascading impact, diminishing the likelihood that a message will translate or spread.

The closing discussion focused on various strategies for effecting change, such as seeking to alter a network’s structure or the behavior of the network itself. The group discussed the merits of attempting to induce behavioral changes by cutting ties within a network or targeting the behavior of nodes around the subject of interest. One participant noted how the significance of network behaviors can be altered by changes in the context in which that behavior transpires. He

gave the example of how the significance of the anti-war movement surrounding Iraq dissipated following President Obama's election. While the protests against the war continue, their public relevance has been diluted by external events.

Ultimately, the workshop reinforced the powerful range of insights that network analysis provides, but also its persistent and nontrivial limitations. How best to portray networks, and how – and whether – network behaviors can be influenced, countered, or even leveraged remain open questions. Meanwhile, where opportunities do exist, methods that focus on the surrounding context or that operate obliquely may prove more successful than direct approaches. While network analysis could benefit from an understanding of networks as substrates secondary to the phenomena of interest, policy choices still determine the context in which those substrates exist. As the past few months only underscore, restricting or facilitating network communications can prove decisive on a momentous scale. CSIS looks forward to supporting efforts to further advance our collective understanding of networks and their meaning as the landscape continues to further evolve.