

# Trust and Communication in Cross-Border Counterterrorism Networks

by

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To Steve and MTC

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## LIST OF ABBREVIATIONS

**9/11** September 11, 2001

**ABM** agent-based modeling

**ANES** American National Election Studies

**ANOVA** Analysis of Variance

**CBP** U.S. Customs and Border Protection Agency

**CBSA** Canada Border Services Agency

**CDC** U.S. Centers for Disease Control and Prevention

**CIA** U.S. Central Intelligence Agency

**CN** Canadian National Railway Company

**CVECO** Chemical Valley Emergency Coordinating Organization, Sarnia

**DHS** U.S. Department of Homeland Security

**DNI** U.S. Director of National Intelligence

**EMS** Emergency Medical Services

**FBI** U.S. Federal Bureau of Investigation

**GSS** General Social Survey

**ICE** U.S. Immigration and Customs Enforcement Agency

**ICS** Incident Command System

**IRB** University of Michigan Institutional Review Board

**LRN** Laboratory Response Network

**MDCH** Michigan Department of Community Health

**MDOT** Michigan Department of Transportation  
**NIMS** National Incident Management System  
**NVS** National Veterinary Stockpile  
**OHS** U.S. Office of Homeland Security  
**OPP** Ontario Provincial Police  
**PHEP** Public Health and Emergency Preparedness  
**RCMP** Royal Canadian Mounted Police, Canada  
**RDS** Respondent-Driven Sampling  
**RESA** St. Clair County Regional Educational Service Agency  
**SCC** St. Clair County, Michigan  
**SNS** Strategic National Stockpile  
**SERESA** South East Regional Emergency Services Authority, Michigan  
**TOPOFF** Top Official  
**USCG** U.S. Coast Guard  
**USPS** U.S. Postal Service



# ABSTRACT

Trust and Communication in Cross-Border Counterterrorism Networks

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The effective implementation of national homeland security strategies is particularly challenging at the international border, where local actors are the front line of defense, and where security professionals face complex obstacles to cooperation for shared security goals. Despite their importance, these local actors are often overlooked in policy planning and scholarly analyses. As a result, political scientists and public policy scholars are at a loss to explain why some security communities are more effective than others when critical emergencies test the limits of carefully laid plans.

I argue that the development of interpersonal trust in a networked setting can explain this variation in observed outcomes. Dyadic-level trust is a form of social capital that allows actors from diverse bureaucracies to overcome substantial legal and organizational barriers in the face of limited resources and potentially large threats.

In the homeland security context, individuals often function under tremendous pressure and in high-stress situations. Under such conditions, the setting for the development of trust begins as a result of interactions that give professionals the opportunity to get to know other in formal and informal non-emergency settings.

However, while formal institutions such as mandated exercises and meetings provide an important opportunity to meet, they are not sufficient for trust development. Instead, repeated interactions set the stage for the formation of trust relationships as individuals have the opportunity to demonstrate their competence under pressure and share important and relevant information. Depending on the situation, interpersonal trust can act as a complement or a substitute for institutional requirements, laws and procedures.

My dissertation seeks to explain how interpersonal trust develops at the individual and community levels in the high-stakes environment of domestic counterterrorism. My research utilizes social network surveys complemented by qualitative interviews with a difficult-to-reach population to map networks of homeland security professionals and explain how trust develops in one international border security community. A more complete understanding of how interpersonal trust relationships interact with institutional mandates is important for policymakers seeking the most effective use of homeland security resources, and I conclude practical policy recommendations for facilitating trust in other homeland security settings.

# CHAPTER I

## Introduction

Information procedures should provide incentives for sharing, to restore a better balance between security and shared knowledge.

9/11 Commission Report, p. 417.

The really big puzzle in the social sciences is why cooperation levels vary so much and why specific configurations of situational conditions increase or decrease cooperation. This question is important not only for our scientific understanding but also for the design of institutions to facilitate individuals' achieving higher levels of productive outcomes in social-dilemma situations.

Ostrom 2003, p. 39.

### 1.1 Motivation

On September 11, 2001 (9/11), the border between the United States and Canada almost completely shut down.

The immediate economic toll was tremendous (Makinen, 2002). While the majority of domestic economic impacts were clustered in New York City, the international U.S.–Canada border was strongly affected as well. In an environment of extreme fear

and uncertainty, travelers, vehicles, and workers were all halted for inspections and questioning which could take up to nine hours (Edmonson, 2001). Assembly plants of major auto manufacturers located near the border, such as DaimlerChrysler, having spent years perfecting profitable just-in-time inventory processes to exploit the unique advantages of each nation, ground to a halt as critical parts failed to arrive and workers from both the U.S. and Canada were sent home (The Canadian Press, 2001). The day after the attacks, Ford closed every single one of its plants in the U.S. and Canada (Associated Press, 2001).

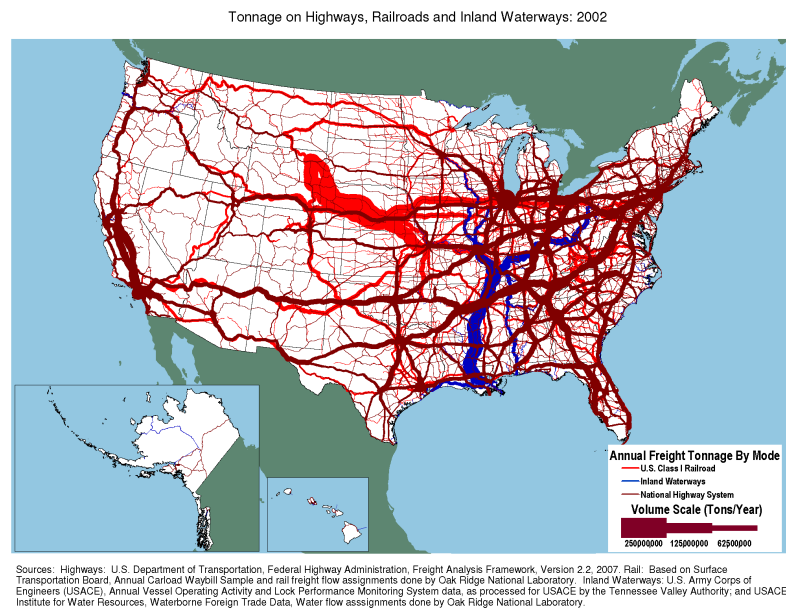


Figure 1.1: Annual Freight Tonnage through the U.S.-Canada Border in 2002.

Beyond just the auto industry, the economic effects of this closure were felt throughout the U.S. and Canada, across multiple manufacturing sectors. As Figure 1.1 graphically displays, Michigan has long been the nation's primary gateway for international trade with Canada, carrying 27 percent of all land-based international trade in North America. In 2001, the Ambassador Bridge connecting Detroit to Windsor, Ontario, was the busiest commercial crossing in the U.S., with traffic of approximately 12,000 trucks per day. The Blue Water Bridge, connecting Port

Huron, Michigan and Sarnia, Ontario, was the busiest entry point for hazardous, radioactive, and flammable materials between the two nations (McDaniel, Groden and Friedland, 2005). This border continues to be the location of one of the most important and largest bilateral trading partnerships in the world, with \$1.5 billion of trade every single day (DHS, 2012*b*) and a major security breach would have tremendous economic impacts in North America and worldwide.

U.S.–Canada border security is a major source of concern for counter-terrorism analysts. Due to a long history of being, or being perceived as “the longest undefended border in the world,” (Andreas, 2003) the events of 9/11 brought the vulnerabilities of this border into focus. Both governments are acutely concerned about human smuggling, illegal immigration, and the movement of drugs and weapons across the border, in addition to the potential of a direct terrorist attack (Whitaker, 2004). In 2012, U.S. Department of Homeland Security (DHS) released the first comprehensive approach to this border in the *Northern Border Strategy (NBS)* (DHS, 2012*b*). In this document, DHS identified their key goals as:

- Deterring and preventing terrorism and smuggling, trafficking, and illegal immigration
- Safeguarding and encouraging the efficient flow of lawful trade, travel, and immigration
- Ensuring community resiliency before, during, and after terrorist attacks and other disasters. (DHS, 2012*b*, p. 1)

Although there are many global and domestic threats that are key components of the U.S. homeland security mission, due to its geographic proximity and direct trade dependence, the U.S.–Canada border is one of the most critical.

While the challenges of this border – in terms of first response, communications, and planning – are fundamentally local, the effects of border threats are enormous,

potentially impacting the large economies of the U.S. and Canada, with ripple effects around the world. As important as the actions and mandates of the principals at the top of any national hierarchy are, they must rely on their agents at the state and local level for day-to-day terrorism prevention and response. As Clarke and Chenoweth (2006, p. 95) note, “Regardless of the national character of homeland security policy, the reality is that all terrorism is local. Ultimately so are all security initiatives. Paradoxically, the greater the national security threats, the more important the local role in the United States.” These local actors and their actions are understudied in the political science literature, and research on them can provide microfoundational insights into the mechanisms underlying assumptions of models used to study the policy responses to terrorism.

The United States federal government has invested considerable resources, both domestically and abroad, to ensure greater levels of internal security. One of the most prominent flaws highlighted by the *9/11 Commission Report* (2004) was the failure of communication between officials of different counterterrorism agencies. U.S. Federal Bureau of Investigation (FBI) agents, U.S. Central Intelligence Agency (CIA) analysts, local police officers and others all had pieces of the puzzle that could have potentially prevented these devastating attacks, but none had the full information necessary to act. 9/11 therefore precipitated the development of hundreds of new laws, ushering in a new era of primarily top-down federal bureaucracy which sought to formalize the process of networking and information sharing, particularly within the law enforcement and intelligence communities.

New bureaucratic agencies, such as the DHS and the position of U.S. Director of National Intelligence (DNI) were created in response, tasked with driving the process of increased sharing of information and actionable intelligence between agencies and individual actors. The creation of the DHS represented one of the largest reorganizations of federal bureaucracy in United States history. According to Kettl (2003,

p. 259), “Analysts have called the new department the biggest federal government restructuring since the creation of the Department of Defense in 1947. In fact, it is the most complicated restructuring in U.S. history.” While approximately \$200 billion has been spent to strengthen internal security structures, by 2008, over \$850 billion was spent to reduce or eliminate terrorist networks overseas through military operations in Afghanistan and Iraq (Feller, 2008).

Roberts (2007) indicates that the U.S. federal government’s immediate reaction to the terrorist attacks of 9/11 was to issue a raft of dramatic new mandates to the states, without seeking their expertise or providing sufficient funding. According to Eisinger (2006, p. 538),

Although cities immediately began to develop their own security plans on an ad hoc basis and assign law enforcement personnel to guard vulnerable infrastructure, Congress did not provide any federal funds to defray these outlays until March 2003, a year and a half after the attacks, nor did the Homeland Security Council provide any guidance for local planning or strategies to begin taking on new homeland security responsibilities.

A lack of communication and trust between levels of government developed immediately and persisted for years. At the local level, the newly-formed U.S. Office of Homeland Security (OHS) introduced the National Strategy for Homeland Security, a national plan intended to clarify the roles of multiple levels of government in combating the terrorist threat.

Figure 1.2 shows the incident command structure of National Incident Management System (NIMS) (DHS, 2008), the primary framework developed by the U.S. for integrating responses to incidents at all levels (Buck, Trainor and Aguirre, 2006). NIMS is an extension of Incident Command System (ICS), an emergency management system and set of protocols, training, and accepted language designed to be understood by a variety of actors working together under acutely difficult circum-

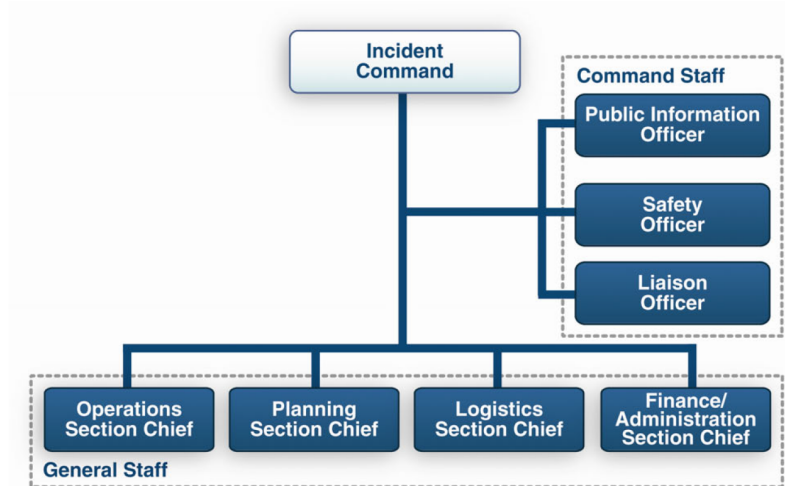


Figure 1.2: NIMS Incident Command System: Command Staff and General Staff. (DHS, 2008)

stances, such as disaster response, and, as of 2005, was a condition for the receipt of homeland security grant funding (Jensen, 2008). As DHS describes it:

ICS is a widely applicable management system designed to enable effective, efficient incident management by integrating a combination of facilities, equipment, personnel, procedures, and communications operating within a common organizational structure. (DHS, 2008, p. 45)

Figure 1.2 shows the general hierarchy and allocation of roles in the midst of an incident, but does not prescribe the agency representatives that fill each role – these are dependent on local circumstances and the nature of the incident.

Yet even strong federal reorganization and funding-conditional mandates do not guarantee information sharing. While new legislation and DHS regulations have required certain types of communication, such as the requirements of the NIMS, these procedures are generally only needed and followed once an emergency is already underway, and individuals are in the middle of a high-stress critical situation. Despite such rules for communications and information sharing across domains, pre-existing structures of trusted professional networks can lead to imperfect implementation of



these rules. At a January 2008 conference of Homeland Security professionals in New York City, participants in one session expressed extreme frustration with the state of communication among homeland security officials. As one participant in the New York conference stated, “You can really only talk to people in an emergency if you were able to swap business cards at the golf course in the past” (personal communication, 2008). Taking this statement on its face, one challenge for policymaker principals in the counterterrorism domain seems to be to find ways to strengthen regular communication among agents across multiple bureaucracies and with external stakeholders.

But mandated exercises, inter-organizational meetings and other formal institutions are not sufficient for the development of trust. Now, the new homeland security mission encompasses many more entities, from hospitals to private sector holders of critical infrastructure. This provides fresh impetus for understanding the workings of entities at the sub-federal level because, as Caruson and MacManus (2006, p. 523) point out, “Local governments must manage the vast majority of critical duties associated with emergency preparedness while first-responder groups – emergency personnel, firefighters, law enforcement, and local health care workers – provide the first line of defense in the event of a terrorist attack.” Professionals in sub-federal agencies are acutely aware of this burden.

Recent political science research on counterterrorism and homeland security has focused on the allocation of defensive resources against terrorist threats (Powell 2007*a*; Powell 2007*b*; Bueno de Mesquita 2007), public support for homeland security measures (Hetherington and Suhay 2011; Healy and Malhotra 2009), the effect of city governance on homeland security outcomes (Chenoweth and Clarke, 2010), and homeland security as a federalism problem (Scavo, Kearney and Kilroy Jr., 2007). Given the dramatic changes that have occurred and continue to occur in laws and society after 9/11, this is an area that seems likely to be a more important part of future

academic discourse. In other words, it is an empirical domain that social scientists are just beginning to understand, but is unlikely to become irrelevant.

### 1.1.1 The Policy Problem

How does interpersonal trust develop in the high-stakes environment of domestic counterterrorism? Large-scale quantitative analyses of observational data have provided numerous useful insights into the political dynamics of terrorism and counterterrorism. But, at the end of the day, most defensive antiterrorism and much offensive counterterrorism happens at the local level. The *9/11 Commission Report* (2004), in the best-known example, notes how hijacker Ziad Jarrah was pulled over by local police in Maryland for a speeding violation on September 9, 2001. The very first responders at the Twin Towers in New York were local police and firefighters. The Millennium Plot was foiled in 1999 by an attentive border guard. My research seeks to answer the question of why we observe greater levels of cooperation in some counterterrorism communities than others. This matters because, as Joyal (2012, p. 6) notes, “Trust is an indispensable quality that is difficult to bureaucratically engineer. Thus, if the law enforcement community is truly to collaborate in the shared goal of homeland security, the impact of interpersonal relationships cannot be discounted.” I study these local agents directly in order to understand the effect of interpersonal trust on network cohesiveness across and between organizations, particularly in settings with large legal and bureaucratic barriers to cooperation. I argue that interpersonal trust within social networks is an important and measurable intervening variable that is not captured by existing bureaucratic politics models.

My analysis is therefore at the level of *actors* in diverse bureaucracies who must cooperate for a shared outcome. I seek to explain how trust forms in different network conditions, such as those externally imposed by occupation, legal constraints, or cultural norms. Interpersonal trust has both dyadic and network effects that magnify

the efforts of any one individual, be they principal or agent. In an especially complex system such as an international border community, with multiple overlapping and competing jurisdictions and interests, agents face legal, procedural, and geographic barriers that impede formal cooperation, often leaving informal cooperation as the only alternative to failure in the face of potential threats.

In this setting, network trust is best thought of as a conceptual model:

$$T_n = \gamma_0 + \underbrace{\gamma_1 T_e}_{\text{Ego}} + \underbrace{\gamma_2 F_a}_{\text{Culture}} + \underbrace{\gamma_3 P_a}_{\text{Institutions}} + \underbrace{\gamma_4 \Psi_a}_{\text{Network}} + \underbrace{\varepsilon}_{\text{Stochastic Variation}} \quad (1.1)$$

where  $T_n$  indicates overall levels of trust within the network and is a function of  $T_e$ , individual levels of “trustingness” (at the *ego*-level, see Yamagishi, Kikuchi and Kosugi 1999),  $F_a$  is a set of measurements of familiarity (culture),  $P_a$  considers professional status (institutions), and  $\Psi_a$  captures a set of assessments about each *alter*<sup>1</sup> named in the survey.

The link between enhanced communication and effectiveness is well-studied in the organizational studies literature. Across multiple settings, including security contexts in the U.S. and other countries, researchers have found that coordinated inter-agency communication (Wang and Kuo, 2014), facilitating connections between agencies with different missions (Kelman, Hong and Turbitt, 2013), and reducing hierarchical structures (Thatcher, 2004) result in measurably more effective outcomes in crisis response. In contrast, failures in communication were shown to have exacerbated the disasters of Hurricane Katrina (Farazmand, 2009) and the Deepwater Horizon Oil Spill (Birkland and DeYoung, 2011), as well as tornadoes (McEntire, 2002), wildfires (Weick, 1993), and earthquakes (Comfort, 1994).

Despite the important role of institutions such as NIMS, interpersonal trust cannot be legislated or mandated, but can be facilitated or hindered by both policy prescriptions and individual actions. Beyond the mandates of grant funding in the

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<sup>1</sup>A given individual named by a respondent in the survey described in Chapter IV.

U.S. (which require the exercise and use of the NIMS structure under simulated emergency conditions), further interactions can facilitate the formation of trust relationships through demonstrated competence in real-world situation and information sharing. This research suggests that better understanding the needs of sub-federal actors can have policy implications that can potentially displace the need for difficult legal modifications at the national and international levels.

My research draws from the interdisciplinary social science literature on trust (Subsection 2.1) and the political science literature of bureaucratic politics (Subsection 2.2). The trust literature explicitly incorporates the role of norms in organizations and communities, but rarely examines how communities with different norms interact with each other in order to achieve a shared goal. The bureaucratic politics literature examines systems such as those inhabited by the homeland security agents under study, but has done very little empirical research on the role of trust as a norm moderating other identified influences within a bureaucracy.

Using new survey data supplemented by extensive qualitative interviews with a rarely studied and difficult-to-access population, my dissertation examines interpersonal trust formation among bureaucratic agents in the defender networks of two countries in an international counterterrorism community. It seeks to describe the structure of these homeland security communities and explain how agents form trusting relationships and perceive trust of others in the community. In studying the unique bureaucratic structure of international homeland security communities, it provides a novel empirical contribution to the political science literature on bureaucratic politics and a theoretical contribution to the larger social science literature on trust, bridging the two by focusing on the overlap of shared social norms.

As noted in Equation (1.1), I argue that the formation of network trust, as an aggregate measure of the trust within multiple dyads, is a function of a number of covariates, including professional function and standing, length of relationship, and

ego-level predisposition to trust. Although trust cannot be forced on agents through legal mandates, principals can implement certain practices to facilitate trust formation and the desired output of improved inter-agency cooperation in cross-border counterterrorism defender networks.

## 1.2 Why Homeland Security?

Focusing this study on homeland security provides both a limitation and an opportunity. This research is inevitably limited in the ways it can connect with prior political science scholarship on the homeland security aspect of counterterrorism. What has been published to date has focused on limited areas of this complex field, in many cases what was ascertained through analysis of observational data which is almost exclusively available at the federal level (see, for example, Prante and Bohara 2008; Mueller and Stewart 2011*b*; Mueller 2010; Chenoweth and Clarke 2010).

While the contribution of federal funding to state governments is a very expensive and important component of homeland security, it is far from complete. Caruson and MacManus (2006, p. 523) make the point that, “Many post-9/11 analyses emphasized federal-state relations rather than federal-local or state-local relations in spite of the critical role that local governments were expected to play in homeland security policy.” I am only aware of one cross-sectional dataset (Mayer, 2009) that analyzes homeland security expenditures at the sub-federal level, or homeland security funding which is not due to federal pass-through funds but rather from local and state general fund budgets (and therefore a closer reflection of the policy trade-offs made at the state level). Despite major changes in funding, local officials remain the front line of counterterrorism within the boundaries of the U.S., inevitably in the area of mitigation and to some extent in the area of prevention.

As an opportunity, collecting data at the local level can provide greater insights into the mechanisms driving outcomes observed using federal data. For example,

Chenoweth and Clarke (2010, p. 9) utilize statistical tests on federal grant-level data to conclude that,

[B]etter performance appears more likely to the extent that these efforts create governance arrangements and nested institutions with well-established partnerships and formal rules, compared with loosely structured relationships of more autonomous units.

This is a directly testable proposition, and my dissertation contributes evidence about the presence and effect of such partnerships and rules in a homeland security community, and how these “nested institutions” can hinder or facilitate cooperation in a challenging setting.

### **1.3 Generalizability beyond Homeland Security**

Homeland security is a valid empirical domain for studying the mechanisms of trust, because it involves actors who must both maintain vigilance against potential terrorist threats and cooperate closely in crisis conditions. Studying homeland security actors helps political scientists understand the “black box” of decisionmaking in a security context, providing greater insights into the psychological mechanisms at play that are generalizable to other security contexts, such as national security decisionmaking.

Just like politicians who get their start locally and move onto higher levels of responsibility through their careers, a number of actors in the local homeland security context have either come from national level security decisionmaking contexts, or will end up there. It is not unreasonable to believe that some of the mechanisms for developing trust in a security context at the local level are also observed at the national level, making this work a potentially useful empirical contribution to theories that seek to explain decisionmaking as part of international strategic interaction.

According to Fry-Pierce and Lenze (2011, p. 2),

In foreign policy and by extension, homeland security, bureaucratic politics is often described as a one-dimensional battle for power at the executive level whereby “[o]ne may, at best, respect the crafty gamesmanship of certain players, but underneath there is a fundamental unease with the idea of bureaucrats operating in self-consciously political ways.”

Trust and communication are elements that come into play when describing such “political” behaviors, and bureaucratic structure is one possible factor affecting information-sharing and organizational efficacy through interpersonal trust. My dissertation provides microfoundational research to help shed light into the actual mechanisms and processes at work in ways that prior research has only done to a limited extent.

This dissertation proceeds as follows. Chapter II provides an overview of the interdisciplinary literature on trust and the political science literature on bureaucratic politics. The trust literature is especially important for understanding the sources of interpersonal trust in a bi-national, multi-organizational setting encompassing multiple bureaucracies. Chapter III describes the theoretical model of trust suggested by the literature, and how it might be observed in a social network setting. I present my hypotheses and explain how and why I elected to study this topic through survey-based social network analysis instead of potential alternative approaches. Chapter IV describes the survey instrument and procedure in more detail and presents the new data. I describe the characteristics of those individuals within the network, as well as those outside the network. I review descriptive statistics for each question in the dataset and test the hypotheses. In Chapter V, I share the qualitative interviews with selected individuals in the survey study area. These interviews provide context for findings from the survey data, and the subjects explain their own perception of the issues of trust development, communication and effectiveness hinted at by the survey. Finally, in Chapter VI, I review the findings, discuss limitations of this research, and

suggest next steps both in terms of future scholarly research on homeland security bureaucratic actors, and practical policy suggestions for the actors themselves.



## CHAPTER II

# State of the Literature and Theoretical Implications

To situate my argument that interpersonal trust relationships in the homeland security context arise from repeated dyadic interactions incorporating the factors of ego, culture, and institutions, my research draws from the interdisciplinary social science literature on trust (Section 2.1) and the political science literature of bureaucratic politics (Section 2.2). The bureaucratic politics literature examines systems such as those inhabited by the homeland security agents under study, but has done very little empirical research on the role of trust as a norm moderating other identified influences within a bureaucracy. The trust literature explicitly incorporates the role of norms in organizations and communities, but rarely examines how communities with different norms interact with each other in order to achieve a shared goal.

This dissertation does not focus on major parts of the current terrorism literature – specifically terrorist mobilization, recruitment, organization, motivation, and other related issues. While important, such issues are not central to the defensive actors under study here. To put it bluntly – in this setting, it doesn't matter *why* terrorists want to attack, only that they might do so, along some continuum of risk. This is consistent with the “all-hazards” approach to homeland security and emergency management that seeks to prepare responders for a multitude of potential threats,

both strategic and non-strategic (Brooks, Bodeau and Fedorowicz, 2012).

## 2.1 Trust

From an academic standpoint, this research contributes to study of trust in two ways. First, it contributes useful evidence to the debate over which approach – institutional rational choice or social psychology – better explains the development of trust in a group that is rarely studied and has important public policy implications. Second, the literature on trust incorporates norms in organizations and communities, but less frequently discusses how these groups, communities or organizations establish norms with each other. This is important because it is recognized that sub-group cooperation is often needed to solve complex problems, a point emphasized by Ostrom (2003, p. 60) when she stated, “The endogenous process would be to break up the organization into smaller local associations in which face-to-face communication about common problems within the smaller unit would be possible.”

Trust is not a necessary condition for cooperation to occur. According to rational actor theories, cooperation can occur through the selfish motivations of individuals. Yet, as the opening quotation from Elinor Ostrom indicates, trust can facilitate cooperative outcomes in complex social situations. Mulder et al. (2006) differentiate between internal and external motivations to cooperate, pointing out that outcomes based on external motivations may not be reflective of trust at all, and may even indicate distrust. One puzzle is how to disentangle which mechanism is at work in a given social context.

A major challenge for effective communication in defender networks has been the development of trust between different types of bureaucratic actors. For example, organizational distrust may exist between different law enforcement agencies, but also between law enforcement as a whole and non-law enforcement actors, such as hospitals, which have fundamentally different missions. Yet trust can be a contributing

factor to achieving the benefits of cooperative outcomes. Dupont (2006, p. 178) provides a useful and concrete illustration of how trust operates to solve collective action problems in the security community he studied:

One intangible manifestation of these emergent properties is the trust and reciprocity that are instrumental in achieving collective outcomes: take for example the case of a subway station located within a university campus where frequent political demonstrations spill over on the crowded streets in its vicinity. When good relationships exist between the campus police, subway security and the municipal force, coordinated responses to equipment theft, vandalism and potential disruptions to public order deliver positive impacts that cannot be broken down according the measurable contribution of each partner. The trust that binds them together (and can be generated by a range of processes) is also a significant factor that is rarely taken into account.

Although interpersonal trust is not always essential for achieving cooperation or collective action, it is an important catalyst in a wide range of policymaking contexts (Cook, Hardin and Levi, 2005). In a review of experimental work on trust, Ostrom (2003, p. 34) finds that “Building trust appears to be a key link in the communication-cooperation connection.” It is therefore important to begin with an overview of the literature on trust.

## **Exclusions**

Much of the most important work on trust in political science has been done on the role of trust in institutions.<sup>1</sup> The longitudinal decline in measures of trust noted by Putnam (2000) are correlated with declining trust in government, politicians,

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<sup>1</sup>See Levi and Stoker 2000 for an overview of the development of this line of research; also Citrin and Muste 1999.

and government institutions (Hetherington, 1998). Because my research is focused only on people inside of bureaucracies, and not their relationship to the public at large, I instead draw from the literature on interpersonal trust, which uses different constructs.

### **2.1.1 Models of Trust in International Security**

In political science, trust in an international security context has been studied largely in the abstract, at a high level of decision making. In the rational choice tradition, Kydd (2000) and Maoz and Felsenthal (1987), for example, combine formal models of trust with illustrative case studies. In these cases, the predictions made by these well-developed models are empirically supported by a limited number of descriptive cases. The use of descriptive case studies in this fashion suffers from potentially serious selection bias (King, Keohane and Verba 1994; Geddes 1990) and therefore can be problematic as a standard of evidence for assessing the theories posited. McGillivray and Smith (2003) develop a comprehensive formal model of trust without any empirical component at all.

Fearon and Laitin (1996) explore the consequences of trust through a formally modeled social matching game. They argue that the most desirable equilibrium, from the perspective of promoting social cooperation across groups, is one where individuals cooperate with each other, except when their opponent is being publicly punished by their own group. While their work examined interethnic cooperation, the concepts are also applicable to the homeland security context, where, instead of ethnic loyalties, individuals are grouped by different types of affiliations – professional (police or firefighters), national (U.S. or Canada), level of government (local or national), and sector (public or private), for example Ostrom (2003, p. 33) notes that laboratory experimental work on trust reinforces this claim, stating that, “...many mutually reinforcing processes are invoked when communication is allowed. Unless mutual

trust in the promises that are exchanged were to increase, however, expectations of the behavior of others would not change.” Taken together, these findings hint that one of the mechanisms that facilitates cooperation is the presence of an institution that effects communication of in-group public punishment.

As noted earlier, while such a public sanctioning system may increase cooperation, it may not necessarily increase trust. Mulder et al. (2006, p. 148), in a series of laboratory experiments, find evidence for this and argue that, “. . . a sanctioning system can decrease trust that others are internally motivated to cooperate. Our reasoning for this is that a sanctioning system could serve as a message of distrust towards group members.”

### **2.1.2 Institutional Approches to Trust**

In the view of scholars such as Ostrom (1998), institutions, with monitoring and enforcement rules to detect and punish defectors, play an important role in the development of trust in this context. She incorporates the major concepts of interpersonal trust, generalized trust, and horizontal social networks to describe communities where trust is an issue. Ostrom, Gardner and Walker (1994) speak specifically to the role of social networks from the perspective of personal communications, focusing on whether people communicate by participating in voluntary associations. Scholars have found differing expectations for the role of enforcement in building trust and cooperation, leading to a problem of confusing causation. As Leach and Sabatier (2005, p. 493) note,

If institutions can be viewed as both a precursor to trust and a societal response to distrust, then institutions and trust might correlate either positively or negatively in a cross-sectional study. A positive correlation would indicate that the rational-choice mechanism dominates. A negative correlation would indicate that the social capital mechanism is stronger.

### **2.1.3 Social Psychological Approches to Trust**

From the perspective of social psychology, Leach and Sabatier (2005)'s Advocacy Coalition Framework, in which professionals negotiate with others from a set of beliefs unique to each actor, seeks to distinguish between "deep core beliefs" and "policy core beliefs" suggesting that the latter is more important for actors trying to negotiate policy. In this view, individuals must rely on heuristic shortcuts to assess the trustworthiness of others. Assuming that personal beliefs, rather than rational decisions, are the main factor driving trust (or the lack thereof) between individuals, Leach and Sabatier posit that trust develops when other individuals come to believe, either with the help of a mediator or some other process, that the "core beliefs" of other line up with their own. Leach and Sabatier find strong support for the importance of belief in fairness and legitimacy of the process in developing trust, suggesting that, "One strategy for pursuing such an integrated framework is to further define the scope of the two underlying models. . . For example, scholars could seek to identify the range of political situations where rationality dominates human behavior, and those that call forth the psyche" (Leach and Sabatier, 2005, p. 500). I argue that communications among members of a cross-border counterterrorism community fall into the latter category.

### **2.1.4 Empirical Validation of Trust Models**

Empirical validation for formal models of trust in political science has come from several methods. Scholars working in the social psychology and behavioral economics traditions utilize primarily experimental settings testing the assumptions of formal game theoretic models.<sup>2</sup> Parks, Henager and Scamahorn (1996) use lab experiments to approximate how trust models from international relations may operate in a very limited context. While such laboratory experiments with undergraduate subjects are

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<sup>2</sup>See, for example, Arce, Croson and .Eckel 2011; Glaeser et al. 2000.

more likely to be inferentially valid evidence for the theories posited, they suffer from the well-known problem of generalizability to other populations. While this may be less of a problem in psychology, where individuals are assumed to share a number of psychological constructs and decision making processes over various situations, the problem of generalizability becomes more acute in political science, which in certain domains is explicitly interested in the behavior of political actors, or individuals acting with a specific political motivation within the bounds of political institutions.

Survey research has also been used in the political science literature to provide empirical evidence of theories of trust, most notably in the the General Social Survey (GSS) and World Values Survey. In the security context, Brewer et al. (2004) use survey data to assess how individual's perceptions how their nation interacts with of other nations helps shape U.S. foreign policy decisions. Hetherington and Suhay (2011) and Green et al. (2011) use experimental survey methodology to understand how individual attitudes toward civil liberties and authority have changed since 9/11, while work by Merolla and Zechmeister (2009) use experimental survey methods to find evidence of the effect of terrorist threats on U.S. voting behavior. While these surveys have the benefit of generally covering larger populations and therefore having greater external validity, their reliance on self-reports of levels of trust can limit their effectiveness in measuring actual trust behaviors.

In other social science fields, large-scale surveys ask respondents to make self-assessments of trust with questions such as “Do you trust other people?” which may differ from actual trust behaviors, particularly in real world settings. In the social network literature, Constant, Sproull and Kiesler (1996) found that network colleagues who were “weak ties” (Granovetter, 1973) provided better information if they had access to better resources. This study was also important because it examined the role of “diversity” in the value of information in response to requests, finding that diversity may be valuable when the network consists of individuals with

a wide variety of levels of experience. This concept is particularly important to the study of counterterrorism communities, which now include an unprecedented variety of actors, from law enforcement officers to hospital administrators.

Leach and Sabatier (2005) incorporate models of trust from both the theories of institutional rational choice and social psychology to examine the development of trust among policy elites using surveys of distinct stakeholder communities. Trust, in their definition, comes from iterated interactions where an actor keeps her word, noting that, “Trust ought to be correlated with the length, depth, and recency of past collaboration” (Leach and Sabatier, 2005, p. 492).

This research seeks to extend this mode of inquiry by using such surveys as starting point for understanding trust and collaboration in a different kind of community – a counterterrorism community – where interpersonal trust may be formed differently due to professional constraints and the unique pressures of facing a potential strategic terrorist adversary.

## **2.2 Bureaucratic Politics**

The political science research agenda of bureaucratic politics, with its emphasis on unpacking the “black box” of group processes, provides the most useful theoretical lens for examining these questions. Specifically, the literatures on organizational culture (Monten and Bennett, 2010) and “politics from below” (Brower and Abolafia, 1997) provide testable conjectures about how norms such as trust can influence processes within and between bureaucracies for which policymaker principals seek to control outputs.

This dissertation contributes to the study of bureaucratic politics in three ways. First, it addresses the tension between rational choice models and social psychology models of bureaucratic process by explicitly including psychological variables. Second, it builds on the literature of organizational culture (Monten and Bennett, 2010), by



providing empirical evidence for the existence and effects of a specific type of norm – trust – in a novel setting. Third, it provides stronger evidence for the phenomenon of “politics from below” (Brower and Abolafia, 1997), which examines in detail how low-level bureaucrats exercise power in ways that appear only as “friction” in models of higher-level decisionmaking.

## **Exclusions**

At the outset, it is important to note what is not included in this research. Bureaucratic politics literature deals with the development of policy at the legislative and rulemaking level first, and the implementation level second. Analysis of the legislation and presidential directives which created the DHS comes from, for example, May, Jochim and Sapotichne (2011) and Inamete (2006). As this research was carried out at the local level, the legislative and rulemaking components of the bureaucratic process, including those that influence the rules with which the participants are expected to comply, were not studied. Instead, local implementation is the focus.

Interest groups, their roles and influence, are also a major focus for bureaucratic politics scholars. Interest groups usually have the greatest stake in bureaucracies during the creation phase, and ongoing stakes in modifying the actions of the bureaucracy to fit their preferred outcomes (Yackee, 2006). While interest groups in the field of homeland security are legion and important, they do not directly affect the bureaucracy at the level I am studying it, and therefore are not included in this analysis.

Instead, this research seeks to explain how trust between actors inter-organizational forms in different network conditions when working in a complex environment of multiple public and private bureaucracies at the local, international level.

### 2.2.1 Bureaucratic Politics – Rational Choice Models

Rational choice approaches (Bendor and Moe, 1985; Hammond, 1986) provide one important analytical framework for addressing the questions of bureaucratic politics. In the domain of bureaucratic control or delegation, a number of rational choice models illustrate important concepts of strategic bureaucratic behavior which are relevant to international homeland security communities. Building on Huber, Shipan and Pfahler (2001)'s comparative theory of legislative delegation to bureaucrats, which incorporates concepts of political context, professional capacity, bargaining costs and non-statutory control opportunities to explain how legislative principals can encourage resistant agent bureaucracies to carry out desired policy, this research takes a comparative approach to the question of trust between bureaucracies by examining two homeland security communities where many factors are the same, but certain cultural and insitutional factors differ.

I also utilize Gailmard and Patty (2007)'s "slackers" and "zealots" model of intrinsic motivation of individual bureaucrats, which captures, although formally, the connection between individual norms, time spent working in a particular organization and the development of relevant expertise, which is operationalized as an independent variable in the survey component of the research. Tenure of this sort, in turn, is linked to norms in the literature on trust. Huber and McCarty (2004)'s model of bureaucratic capacity, particularly related to the threat of punishment for certain agents, is also applicable to the setting being studied.

Although there may be some ability for centralized policymaker principals to exercise control over the federal agents in the homeland security community, there is less ability to control local agents, and essentially no control over agents from other countries and the private sector. Fostering interpersonal trust, from the ground up, is one way for principal policymakers interested in effective communications at international border regions to achieve their preferred policy objectives.

### **2.2.2 Rational Choice and Social Psychology Models of Bureaucracy**

The rational choice approach to bureaucratic politics is not without its critics. Moe (1995), for example, suggests that the economic assumptions underlying rational choice-driven theories are inappropriate due to unique characteristics of public bureaucracies. He notes that public bureaucracy is the closest analog to the firm, but differs due to the involuntary nature of bureaucratic structures, two-tiered political firms, political uncertainty, and political compromise, leading to no gains from trade. To explain why the organization of public bureaucracy is tied to politics, he suggests explicitly including interests groups and bureaucrats along with politicians as competing actors in a bureaucratic politics model:

Public bureaucracy is a product of American democracy with foundations wholly different from those presumed by economists. Political institutions shape the incentives and opportunities of those who exercise public authority . . . It is a theory unavoidably about separation of powers, legislators and presidents, professionals, civil service, sub governments, and a range of topics familiar to political scientists but completely foreign to economic theorists. (Moe, 1995, p. 148)

Incorporating organizational culture and ego-level “bottom up” concepts as independent variables in this research can bridge some of the gaps identified here between rational choice and social psychology models.

### **2.2.3 Bureaucratic Politics – Allison (1971) and Inter-Bureaucratic Competition**

In contrast to the rational choice approach, the major components of Allison’s (1971) bureaucratic politics model of foreign policy crisis decision making (also known as his Model III) include an emphasis on individual human decision making as an

explanation for observed policy behavior, the influence of individuals on each other within a given institutional structure, and the role of persuasive political leadership. In this model, decision makers are limited by the inertia of the bureaucracy. Those in charge of various state responsibilities make predictable arguments based on their present position, and policy “outcomes” are the result of negotiations among these leaders. A later revision of the original theory (Allison and Zelikow, 1999) extends the model to account for an individual’s bureaucratic loyalties and well as level of responsibility. Other bureaucratic politics scholars (see, for example, Jones, Hesterly and Borgatti 1997) have usefully included additional variables, to account for the varied interpersonal dynamics that may occur in different topic areas.

Extending Allison’s 1971 analysis of inter-bureaucratic competition, Drezner (2000) analyzes the role of organizational culture and norms by comparing “missionary agencies” and “embedded agencies” along the dimensions of faithfulness to their original mission and long-term durability. Drezner’s argument for conceptualizing bureaucracies as strategic actors themselves, using organizational culture for self-preservation is relevant to the study of cross-border counterterrorism networks because it accounts for how norms and trust may be shared across organizations, and even across international borders.

For example, at an August, 2011 meeting of homeland security representatives from the Port Huron-Sarnia region (Michigan-Ontario), the fire Chief of Sarnia, Robert Eick, gave me a copy of an interagency memorandum of understanding dating from 1998 between his department and the city of Port Huron, allowing firefighters from both communities to quickly cross the international border and help their co-professionals on the other side. One explanation for this observed voluntary cooperative behavior is the shared sense of professional duty among firefighters regardless of location, that may help to overcome collective action problems of adequate fire protection for two relatively small communities. This specific case will be discussed

in more detail in Chapter V.

Ting (2003) develops a formal model to explain why redundant bureaucratic structures are deliberately placed to ensure policy implementation. Ting's work is relevant to the homeland security communities being studied as his first game theoretic model (Ting, 2003, p. 282) accounts for the presence of multiple agents with jurisdiction over a preferred outcome or policy task where a number of the redundant agents are outside of the control of the principal. As Ting notes,

Redundant structures tend to help most when the set of agents available for a task are relatively 'unfriendly,' or disinclined to choose policies that  $P$  would like. Here the collective action problems are not serious enough to hurt aggregate policy production, which is increasing in  $n$ . But if  $P$  has access to a friendly agent, then adding agents will tend not to help performance. (Ting, 2003, p. 287)

According to his proof, structurally, the presence of bureaucratic actors theoretically representing the principal's wishes, i.e. DHS officials, will make the overall outcomes *worse* in the presence of agents, such as Canadians and owners of private infrastructure, with no interest in the principal's wishes. DHS has a role for "Protective Security Advisors," who act as liaisons to local communities in this fashion

The models of Allison (1971), Drezner (2000), and Ting (2003) are important for advancing theories of inter-bureaucratic cooperation and competition on the federal level, between federal agencies. But this is not the only level where bureaucracies are expected to cooperate to achieve a shared outcome. The local level is a particularly important location to study these dynamics, particularly in the domain of counterterrorism, and has been insufficiently studied to date (Caruson and MacManus, 2006). Cooperation between bureaucracies can be expected to vary based on factors other than federal bureaucratic affiliation, including institutional factors such as national affiliation, cultural factors such as professional affinity, and network factors such as

interpersonal trust. Current theories about inter-bureaucratic cooperation and competition are therefore incompletely generalizable without studying communities where the variables used to develop the theories may differ.

#### **2.2.4 Organizational Culture – Effects of the Norm of Trust**

In purposeful contrast to Allison’s “where you stand depends on where you sit” model of bureaucratic bargaining, Monten and Bennett (2010) argue for an alternative model of “organizational culture” that accounts for the presence of norms in a bureaucracy, stating: “The organizational culture model centers on shared understandings within the organization about what it does, how it does it and the values and human relationships that tie together these ends and means.” These norms can come from professional identification, mission, or interactions of individual agents with personal convictions. This dissertation addresses this gap in the literature by empirically examining organizational cultures before a catastrophic emergency, in a context where a high-stakes crisis, such as a terrorist attack, could happen.

#### **2.2.5 “Politics from Below”**

Looking specifically at such “bottom up” political dynamics, Brower and Abolafia (1997) extend Allison’s logic to the bureaucracy of a state-level agency, focusing particularly on how low-level employees include status hierarchy in their decisions and preferences. Defining “politics from below” as “action or intentional inaction that defies, opposes, or sidesteps the rules, roles, or routines of the organization,” (Brower and Abolafia, 1997, p. 308) they find support for such actors using strategies to bypass formal institutional mechanisms that are intended to constrain and direct their work, particularly at their level of responsibility. They focus their ethnographic study on examining how individuals with a strong individual sense of morals or ethics can undermine bureaucratic goals by undermining or thwarting bureaucratic directions

from the top with which they do not agree.

This suggests that ego-level cultural factors such as professional affiliation may further trust between individuals of different bureaucracies, while also hampering cooperation with individuals across functional professional areas. Brower and Abolafia, p. 305 find that, “because of their relatively less powerful hierarchical positions, lower participants engage in political activities that are primarily about the pursuit of identity rather than specific organizational outcomes.” In keeping with the focus of this part of the bureaucratic politics literature, I include as agents in my study traditional bureaucrats – high-level appointees or careerists – along with individuals in the field – such as front line police officers – who are exclusively civil servants. In case of an emergency, each of these agents has a role that may or may not be disproportionate to their professional status, and I did not wish to set limits on the subjects of study which the participants do not themselves see as important. The RDS or snowball sampling methodology of defining the boundaries of the network is part of this approach, as well, and is described in more detail in Chapter III.

Sabatier (1986) examines the analysis of “bottom up” approaches to bureaucratic decision making with some skepticism, but concludes that, “The bottom-up approach is more appropriate in situations where (i) there is no dominant piece of legislation but rather large numbers of actors without power dependency, or where (2) one is primarily interested in the dynamics of different local situations” (Sabatier, 1986, p. 30). Both of these situations are applicable to the international border region that is the focus of this dissertation.

By systematically collecting information on participants on a homeland security community at multiple levels, this research is important in testing for the effects of this kind of behavior in a situation of multiple bureaucracies. Furthermore, it will strengthen the evidence beyond ethnographic studies, such as Brower and Abolafia (1997).

### 2.2.6 Contributions to Bureaucratic Politics Literature

As Drezner (2000, p. 734) notes,

The bureaucratic politics approach has focused exclusively on crisis decision making in security bureaucracies at the expense of longitudinal analyses of ‘routine’ foreign policy, which is odd since this is the policy category that bureaucratic politics should matter most. . . Expanding the range of cases can help to broaden the explanatory power of bureaucratic politics in foreign policy.

Jones (2010) indicates a number of ways in which bureaucratic politics research can move forward, stating,

There is an active and potentially rich contemporary research agenda associated with the bureaucratic or governmental politics approach to foreign policy analysis. . . These lines of inquiry are likely to include: attempts to respond to the criticisms associated with Model III with particular attention to making it a more genuine social scientific and analytically useful framework; and efforts to examine and broaden the cross-national, decision maker, and issue area applicability of the model.

The proposed research can contribute to both of these needs. First, generating and releasing new data, amenable to multiple forms of quantitative analysis, can help other scholars apply more rigorous scientific tests of components of the research agenda. Second, expanding bureaucratic politics research into a new type of security community, with international components, can help to assess the generalizability of the model outside of the limited scope of U.S. foreign policy making.



## **2.3 Conclusion: Interpersonal Trust and Bureaucratic Constraints**

Extant political science literature on bureaucratic politics which relies on rational choice arguments cannot explain policy failures which are attributable to variations in human decisionmaking within an organizational context. At the same time, social psychology models discount the role of institutions such as NIMS, which are the backbone of emergency response, and function in an acute emergency when individuals do not have the ability to deviate substantially from their roles. A more complete understanding of how interpersonal trust forms in different network conditions can strengthen scholarly understanding of both literatures and help homeland security policymakers reliant on local actors find solutions to difficult cooperation problems at the front line of emergency response.

## CHAPTER III

### Hypotheses, Procedures and Methodology

My main argument is that, for individuals who work in the homeland security context and function under tremendous pressure and frequently in high-stress critical situations, the first step in the development of interpersonal trust comes as a result of interactions that give professionals the opportunity to get to know other in non-emergency settings. Because such meetings are not sufficient for the development of trust, repeated interactions are necessary for individuals to prove professional competence and share important and relevant information. From these extended interactions, interpersonal trust can act as a complement or a substitute for formal institutional requirements under certain conditions.

Equation 1.1 in Chapter I describes a basic conceptual model of the components of trust within a network based on ego attributes, as well as cultural, institutional, and network factors. In this chapter, I expand on that model, specifically the effect of culture and institutions on the formation of trust within and between subgroups. I argue that, in repeated interactions, culture and institutions can facilitate cognitive biases within groups, potentially exerting a negative influence on the development of dyadic interpersonal trust relationships throughout the network.

### 3.1 Model

#### Model: Trust Among Strangers and Friends

First, consider social networks on a continuum based on familiarity of network actors. At one end are networks of total strangers  $S$ , sharing information through prices in the perfectly competitive markets of neoclassical economic theory. At the other end are social networks of actors who know each other very well  $T$ , such as spouses, family, and friends.

According to Axelrod (1984) and others, cooperation emerges from the *shadow of the future*, or the idea that actors will meet again (the discount parameter in rational actor models). In this way, the perfect market of strangers is more like a one-shot game, and cooperation and coordination would not be expected. This produces a linear increase in the total value  $\Gamma_S$  of information in the network as the number of actors  $n$  increases.

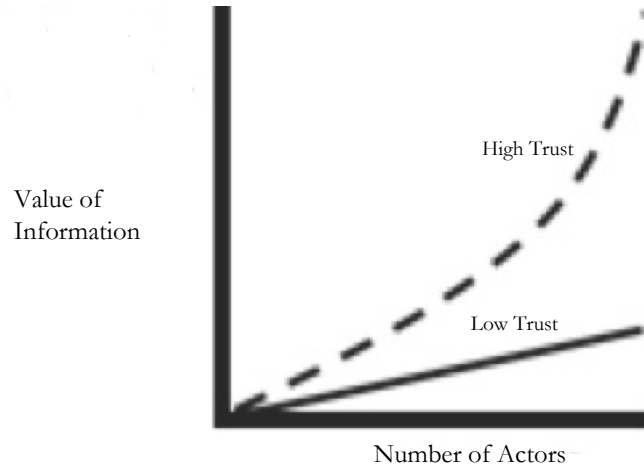


Figure 3.1: Information Value in Two Networks

$$\text{Stranger Network} : \Gamma_S = \sum_{i=1}^{\infty} n(\gamma_i) \quad (3.1)$$

$$\text{TrustedNetwork} : \Gamma_T = \tau \sum_{i=1}^{\infty} (\gamma_i - \mu_i)^n \quad (3.2)$$

A trusted network has not only greater connections between at least two actors, but also more opportunity for detection and punishment of cheating, valued as  $\tau_T$ . It also, however, suffers from the potential of Sunstein (2007)'s proposed cognitive biases  $\sum_{i=1}^n \lambda_i$ , which vary among individuals, may be related to group membership, and increase with the size of the network. The curve representing value of information  $\Gamma_T$  as a function of network size is convex for the trusted network, increasing, but not necessarily rapidly, as the number of trusted actors grows. Figure 3.1 graphically depicts this hypothetical relationship between information and network size.

Interpersonal trust can therefore be defined as  $\psi_{i,j}$ , or how much  $i$  trusts  $j$ , and network trust as  $\Psi = \sum_{i=1}^m \sum_{j=1}^n \psi_i \psi_j \forall i, j$ . In the network of strangers described above, therefore, with no connections between any pair of  $i, j$ ,  $\Psi = 0$ . In the trusted network,  $\Psi > 0$  as long as there is some level of trust between any two  $i, j$ . The greater amount of trust between dyads and between members of different dyads, the greater the value of  $\Psi$ .

$\psi_{i,j}$  is operationalized as the mean of the value of self-reported levels of trust between two individuals. For example, if individual A reports a connection with individual B, and a value of 4 out of 7 on the Likert scale, and B reports a connection with individual A, and a value of 2 out of 7 on the Likert scale,  $\psi_{AB} = 3$ .

Relationships, however, are not always reported as reciprocal. If, for example, individual B does not report a connection with individual A, it would bias the resulting analysis if the value was reported as 2 (i.e., an assumption of 0 trust from B to A). Graphically, these results can be reported as undirected ties, however, statistically, they may either be dropped or adjusted for.

## 3.2 Hypotheses

### 3.2.0.1 Hypotheses

A high value of  $\Psi$  could therefore represent a situation where there is substantial in-group cohesion, measured by high levels of in-group trust, but very little cross-group cohesion. In this description, this is represented as the total value of the cognitive biases inherent to each group,  $\Lambda$ . The literature indicates that high levels of  $\Lambda$  could be problematic, particularly as groups are required to coordinate to achieve a preferred outcome. This leads to my first hypothesis:

**H1** : Individuals will have greater levels of trust with other members of their in-group than members of other groups.

While this hypothesis may seem tautological on its face, the complexity of potential groups, especially in an inter-organizational and international setting (Kapucu et al., 2010), makes it useful to consider when reviewing the data of this study. In this context, “in-group” could have multiple meanings. It could refer, for example, to all U.S. respondents or all Canadian respondents, all firefighters or all law enforcement. Alternatively, it could refer to all local employees or all federal employees. The analysis presented in Chapter IV accounts for each of these different ways of describing members of the communities studied. Furthermore, the challenges of working in a security situation under threat force professionals in organizations to learn from each other (Brower et al., 2009), which may create different “in-groups” and “out-groups” such as those who are constrained by legal institutions and those with more freedom to collaborate.

Because of this, it is necessary to account for the level of trust between groups. One solution may be to assign a weight to the value of each reciprocated  $\psi_{i,j}$  that is higher if  $i$  and  $j$  have different group memberships. The sum of these values  $\Psi_{weighted}$  can then be compared to the unweighted sum, or the situation  $\Psi_{unweighted}$  in which

all individuals are hypothetically part of the same in-group. The difference  $\Psi_{weighted}$  -  $\Psi_{unweighted}$  is therefore the value of cooperation across groups,  $\Psi_{coop}$ .

I expect a negative correlation between  $\Lambda$  and  $\Psi_{coop}$ . If each group has strong cognitive biases, as represented by in-group cohesion or professional norms, we would expect to see lower levels of cross-group cooperation. This leads to my second hypothesis:

**H2** : Greater levels of trust within in-groups is correlated with lower levels of trust between groups.

It is difficult to develop trust in situations, such as cross-border counterterrorism networks, where there is the constant presence of a threat. It is possible, however, that the members of the network do not see the threat as coming from other actors, but rather from an external source. This is certainly true for weather disasters, which are out of the control of any of the agents, and is likely true for terrorist threats as well. While the literature on in-groups and out-groups posits levels of distrust between groups, it is also possible that terrorists are seen as an “out” out-group, which may foster the development of trust among individuals who might otherwise only see their professional differences as the main factor determining group status.

### 3.3 Methodology: Survey-Based Social Network Analysis

Sinclair (in Fowler et al. 2011) notes that, in many social network analysis studies carried out by political scientists, they fail to account for the “bowling alone” effect, wherein more political communication now occurs online than in real-world situations traditionally measured by social scientists. The problem, from her perspective, is problematic inferences made by sampling from large national datasets such as the American National Election Studies (ANES). I agree, and discuss the comparability on measures of trust between aggregate surveys and individual measures in this sec-

tion. As geography defines the boundary of these communities, it is appropriate to collect and utilize network variables in the analysis.

Social network analysis provides a uniquely useful set of tools for analyzing the role of trust in a cross-border counterterrorism community. To the best of my knowledge, international homeland security communities have not yet been studied in a network context. One of the few studies using network methods to study security communities at all is Dupont (2006). Therefore, it is difficult to make predictions about the structure and shape of the network based on prior observations. Nonetheless, social networks exhibit a number of well-known properties that may also be expected to arise in this network as well. Similarly, bureaucratic politics models make implicit assumptions about the structure of the networks of individual actors and the transmission of information within those networks.

For example, rational choice delegation models, such as Huber, Shipan and Pfahler (2001) assume a direct flow of information from principals to agents, who, at the implementation level, may have no connections to the principals at all. A number of interesting questions can arise from this: Does the average path length from the principal to the agent correlate with implementation effectiveness? Do greater levels of eigenvector centrality between the principal and her agent(s) correlate with a higher probability of the principal achieving her preferred outcomes? To take another example, the model of Ting (2003) on redundant bureaucratic structures, does this assume a scale-free network model, which is more robust to node failure (agents hostile to the principal)?

As O'Toole, Jr. (2010, p. 11) argues, "The conventional political science literature on control has it that political overseers seek to direct administrative agents, and research tries to show shifts by agents or their outputs when principals change or initiate new policy. But if the agents are typically multiple, the principal-agent model is mis-specified from the outset." Political science scholarship on the role of trust in

policy networks of individuals in multiple bureaucracies cooperating for a shared outcome (in this case, estuary policy) can be found in Berardo (2009) and Berardo and Scholz (2010). Both studies find support for greater trust in denser networks and but also for those with a few highly centralized network hubs.

Most social networks are assumed to be scale-free, but evidence is not conclusive. Bearman, Moody and Stovel (2004), for example, use social network methodology in an epidemiological setting to study the diffusion of STDs through a network of sexually active adolescents. They find that this social network is in fact a spanning tree,<sup>1</sup> and illustrate that traditional models of disease diffusion are reliant on an assumption of random mixing of nodes that is not compatible with real-world behavior that transmits diseases. Mis-specifying these networks by assuming a certain kind of structure has the potential to overestimate the potential effects of communications mandates such as NIMS, particularly when there are an excess number of structural holes, lack of bridges, or excessive cliques. In other words, the reason for observed policy failure may not be captured in existing models that do not account for the social structure in which agents make their decisions.

In an experimental study of diffusion of health behaviors in an online network, Centola (2010) also finds unexpected results when the structure of the network is artificially varied. He found that networks with high degrees of clustering – as might be expected with a homeland security community with distinct organizational cultures – spread behavior both more quickly and more diffusely.

In studying communication within a network, I am also extending the methodology of McCubbins, Paturi and Weller (2009), who included network measures in laboratory experiments to study the ability of a group to solve a dynamic coordination problem, specifically a graph coloring problem. Under various forms of network structure, they find that greater average degree in a network is associated with greater

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<sup>1</sup>“... a long chain of interconnections that stretches across a population, like rural phone wires running from a long trunk line to individual houses” (Bearman, Moody and Stovel, 2004, p. 51).



coordination and speed in solving problems in both symmetric and asymmetric coordination game settings. Specifically, they find greater coordination in groups with network structures in which individuals have a very local set of connections (the “0-chord cycle network”), those with two distinct groups and a few connections between them (the “barbell network”), and highly interconnected groups (“the cylinder network”). They conclude that,

... our results suggest that increasing the density of the network, *ceteris paribus*, can improve coordination. In particular, when coordination is difficult because of asymmetric incentives, these results suggest that building connections between actors can facilitate coordination. For instance, in settings where policy coordination is desirable, the results indicate that it may be useful to develop institutions that create more connections between various actors. (McCubbins, Paturi and Weller, 2009, p. 916)

Notably, McCubbins, Paturi and Weller (2009) found no significant effects for network structure on group coordination behavior for strongly hierarchical networks – in their experiment, those with a few “leaders” who are connected to many individuals. In the policy problem of homeland security, however, this is exactly the kind of structure that is expected for law enforcement and other agencies. This suggests that these sub-components of the networks themselves may be a hindrance to greater cooperation and trust.

### **3.4 Methodology: RDS**

Rothenberg (1995) describes this sampling method: “The snowball procedure is defined as one that enlarges an original node sample by joining adjacent nodes” (Rothenberg, 1995, p. 105). This method of snowball sampling as applied to social networks within bureaucratic structures was first used by Hull and Hjern (1982) to

study small firm cooperation in Germany. They began with a representative sample of 20 to 30 percent of the firms they wished to study, and followed up with those firms and the firms named as contacts. They then gathered the information needed for their study through semi-structured oral interviews and surveys administered by mail. Their goal was to understand “firms’ subjective perceptions of how much or little they benefited from each of their contacts” (Hull and Hjern, 1982, p. 190). They then connected this information to available observational data to link observable output in the trends they were interested in.

Chen and Chen (2008) tested for the representativeness of snowball sampling on 14,400 simulated data sets and found that,

... snowball sampling performs better than simple random sampling in estimating the magnitude of social inter-correlations, but the advantage of snowball sampling over simple random sampling reduces in networks characterized with the scale-free power-law distribution for the number of connections of each member. (Chen and Chen, 2008, p. 2)

Nonetheless, they find that snowball sampling is superior to simple random sampling for social networks because it is less likely to produce a downward bias in estimates of the magnitude of ties. Despite its utility for social network analysis, snowball sampling and RDS suffer from the same statistical flaws as any nonrandom sampling method.

### **3.4.1 Criticisms of the Snowball Sampling Method**

Rothenberg (1995) warns that the use of snowball sampling may require different assumptions than those frequently made in statistical analysis, which are based on probability samples. He notes that,

The population reached in a study is an unknown subset of some larger group, but not a sample in the usual statistical sense. It may have intrinsic

coherence, but it cannot be used to estimate the size of a larger group without invoking other techniques (e.g. capture-recapture methods, or demonstration by multiple means that the potential for further members is exhausted). (Rothenberg, 1995, p. 107)

Similarly, Kwak et al. (2006) note that snowball sampling has a bias towards “hub nodes,” or subjects who are already highly connected. Kossinets (2006, p. 249) points out that, “Omission of actors may lead to significant changes in network statistics.” This is especially true in small networks, where exclusion of particular nodes can have severe consequences for common network statistics such as average network degree. Conversely, omission of actors is less of a problem for analysis of larger networks, unless the nodes are not missing at random.

In the case of the proposed research, it is a significant concern that certain members of the network may not wish to be contacted or participate, and in particular that this self-exclusion may be systematic. An example in the counterterrorism network context is individuals who are working undercover, for agencies that do not wish to be identified, or conducting work which may not necessarily be legal (consider, for example, the domestic wiretapping case.) This problem may be exacerbated in the international context where, despite their close alliance, individuals identified with different nations may not wish to reveal certain information across borders. Kossinets (2006) identifies the separate statistical inference problems from such a situation as boundary specification problems, survey non-response, and, to a lesser degree, respondent inaccuracy.

This is a potentially serious problem, as the boundaries of the network are not known, even to the participants themselves, however, I utilized several procedural fixes in the data collection stage which minimized the need for later statistical adjustments, as well as a number of additional analytical corrections that were made after the data collection procedure had occurred. Missing data in networks with unknown bounds

and members actively trying to conceal their participation is an empirical problem that has been considered before, specifically in the analysis of terrorist networks (see, for example, Clauset, Moore and Newman 2008).

### 3.4.2 Corrections – Design Stage

Kossinets (2006) suggests one correction to the boundary specification problem, noting,

An approach advocated by Laumann et al. (1983) is to focus on measurable interactions. The network boundary is then defined by recording who is interacting with whom in a certain context . . . It requires an operational specification of the interaction setting or context, and then including all actors who interact within this context. (Kossinets, 2006, p. 249)

In the survey, this was handled by clearly specifying the domain of interest – homeland security in the U.S. and public safety in Canada – when asking individuals to name their contacts. This is important to specify because almost all actors have multiple roles, and the homeland security role is often a small part of a larger set of responsibilities. For example, the routine operations of law enforcement – patrol, arrests, and court appearances, for example – take up the majority of their time, but I was interested only in connections that they considered in the homeland security context. See Appendix C for the exact wording of this limiter in the survey.

Another proposed correction involves handling of nonreciprocal ties. Accounting for situations where one person names a contact, but the contact in turn does not respond to the survey can provide an approximation of some of the missing data in the network. Non-responsive individuals were assigned different weights based on whether they were identified by one or more other individuals in the network survey. See Subsection 4.1.1.1 in Chapter IV for the analysis of this type of missing data in the survey.

Finally, Kossinets (2006) identifies the potential problem of “fixed-choice” designs, where individuals are asked to name a fixed number of contacts. I minimized this effect by giving individuals the opportunity to name fifteen contacts. As discussed in Chapter IV, most respondents provided the maximum number of contacts in the name generation task.

RDS sampling has been successfully used by researchers from economics and sociology who study diffusion in social network analyses. The main reason for using snowball sampling is best described by Hjern and Hull (1982, p. 109), who point out that, “The methodological imperative for describing a policy system is to identify the decisionmakers who populate it, in order that its goals, environments and resources become determinate.” As my research seeks to understand how actors work together in a networked setting, it is appropriate in the first phase to use sampling methods such as this which are actor-driven, instead of being based on limits set by the researcher.

## **3.5 Methods Justification**

In order to assess the appropriateness of using the methods of social network analysis to study questions of trust and bureaucratic politics in a cross-border counterterrorism community, it is important to consider other potential approaches and their drawbacks.

### **3.5.1 Alternative Methodological Approaches**

One option is to use this research to falsify predictions made by bureaucratic models posited by the political science literature and trust models from the interdisciplinary social science literature. According to Schrodtt (2010, p. 12), “. . . scientific inquiry, while accepting the *principle* of falsification, only rarely proceeds using strict falsification norms. Instead, the general tendency is to do extensive exploratory work

and substitute paradigms only when a superior alternative is available.” This sort of analysis could either lend support to existing theories or undermine them, and given the importance of homeland security now and in the future, it is important to carry out rigorous data collection now. The proposed research provides a completely new dataset on a novel community, incorporating network characteristics which could be of potential use not only to political scientists, but sociologists and policy analysts.

Another approach to testing models is to conduct a computer simulation such as agent-based modeling (ABM). These models require a set of pre-specified rules in order to operate, where each agent within the computerized system interacts with all others in an iterative fashion until patterns can be observed. The benefit of such simulations is that the rules can be programmed based on observed behavior from any number of methodologies, including qualitative methods and experiments. They also allow for observation of the historical process of agent interaction over long periods of time. As Macal and North (2010, p. 151) summarize, “Agent-based modeling offers a way to model social systems that are composed of agents who interact with and influence each other, learn from their experiences, and adapt their behaviours so they are better suited to their environment.” On the other hand, such simulations can potentially suffer from some of the same flaws inherent in the models themselves, specifically, being sensitive to assumptions made for computational operability and initial conditions. With respect to network situations, they can be as sensitive to systematically missing nodes as any other form of analysis, such that if the missing nodes and their behavior are not programmed into the system, their influence will not be known. Nonetheless, agent-based modelling could be a useful future complement to the sampling and network survey approach I utilize in this study by allowing for the modeling of different types of missing nodes. As will be discussed further in the next section, nodes may be missing because they wish to remain hidden or because they are doing something potentially illegal, and these variations in behaviors may

have differential impacts on the other actors in the network. It is also possible to model the effect of each of the types of missing nodes by varying the number of visible connections they possess. Finally, ABM can be used to vary the structure of the networks in which known actors interact, providing policy insights into which network structures might optimally produce desired communication outcomes.

Laboratory experiments are another possible avenue for the falsification of models. While producing the gold standard of causal information for experimental manipulations, such experiments are necessarily very limited in scope and generalizability. Nonetheless, McDermott (2002, p. 341) points out their benefits when she states that

Experiments also offer clear advantages over other methods in particular areas of investigation, such as the validation of theories developed by formal modeling, or in further theory testing and refinement. Experiments offer useful insights in work that investigates the underlying process of a particular phenomenon as opposed to its outcome. Finally, invoking multiple methods, including experimentation, in investigating a phenomenon allows greater confidence in consensual results.

A laboratory experimental approach to the study of cross-border counterterrorism communities would require that professionals participate in behavioral economics experiments in a laboratory. Such an approach would be subject to a number of logistical problems, primarily related to coordinating the schedules of a sufficient number of busy professionals together in a laboratory setting. An additional problem arises when trying to include “higher status” professionals, such as the departmental directors or politicians. In practice, it is difficult to gain cooperation from such individuals to participate even in large-scale, government funded exercises, such that even table-top exercises occur only once every few years, such as the Top Official (TOPOFF) exercises conducted by the DHS.

Even with these limitations, the laboratory setting might be useful to test re-

relationships and interactions, either between individuals or in small groups, where professional status is acknowledged to be part of the experiment. For example, if a researcher were able to secure cooperation of a police department by offering to share results or add questions or aspects of the experiment which may serve an institutional goal, it may be feasible to conduct laboratory experiments on site. Two major limitations with this approach include: 1) Self-selection into cooperation by organizations which are more inclined to change or “outside the box” thinking may bias results and 2) It would likely only be feasible to test small networks or small sections of a larger defender network.

To understand the variables underlying my argument that the development of interpersonal trust begins as a result of initial interactions in formal and informal non-emergency settings, followed by repeated interactions that demonstrate reliability and the willingness to share information, the methodological tools of survey-based social network analysis provide the most effective instruments. They incorporate ego-level variables, but more importantly, are uniquely suited to analyzing the dyad-level variables of interpersonal trust. While trust is sometimes measured in large-scale social surveys such as the ANES, these surveys do not focus on the professional roles of respondents, and the sampling methodologies used do not permit the collection of network variables where respondents have the ability to identify other respondents as network connections. Despite the reliance on the sampling method of RDS, social network analysis provides valuable insights into the question of trust formation that cannot be captured through other methodologies.



## CHAPTER IV

### Data Analysis

The central question of this research is how ego, culture, and institutions interact in a networked setting across the multiple interactions – formal and information – necessary to form trusting relationships. The first step in understanding how interpersonal trust develops at the individual and community levels in the high-stakes networked environment of domestic counterterrorism is to map the networks of local homeland security actors in an international border community. As noted in Chapter III, this is no easy task in a location where the bounds of the network are largely unknown, even to the respondents themselves, and where certain actors in the network may remain hidden. Subsection 4.1 describes the process of collecting the quantitative network data that is the focus of the quantitative analysis.

Section 4.4 tests the two hypotheses of group membership and interpersonal trust. Specifically, I test for greater levels of trust within in-groups and whether that is connected to lower levels of trust between groups. The variation in the name generation questions used in the survey helps to understand trust formation by asking respondents to name their alters under a variety of conditions – from informal networking to crisis situations – and then assess those relationships. Indeed, the data shows that occupational clustering occurs more under certain conditions (in response to specific types of name generator questions) than others. The variation in alter assessments

is also informative – there is very little variation in assessments of credentials, and most people name others as having good credentials. Since cooperation based on credentials is the basis of formal policy structures such as NIMS, an exploration of those assessments with greater variation is potentially informative about the role of trust in a networked setting.

## 4.1 Data: Survey Development and Deployment

In January 2013, the first wave of surveys (*Wave 1*) was deployed in the primary study region (Port Huron-Sarnia) on both the U.S. and Canadian sides. The goal was to gather information about professional social networks, as well as to recruit new respondents who were not part of the initial wave of surveys (*Wave 2*). In this way, much of the community was mapped – not just by their individual characteristics, but by their relationships with each other. Beyond simply asking for a connection, the surveys sought to understand the strength of the relationship by asking questions about past shared work experiences, and perceptions of the named individuals. The final  $n$  for the survey described here is 275.

### 4.1.1 Survey Procedure

The identification of respondents for the RDS procedure proceeded in two waves. In *Wave 1*, all individuals in who participated in a semi-structured qualitative interview<sup>1</sup> were included as potential respondents. In addition, the project sponsor, Mr. Jeff Friedland of the St. Clair County, Michigan (SCC) Office of Homeland Security and Emergency Management, provided a list of mailing labels that was partially generated from an internal list of invitees to an annual community-wide fundraiser called the “Emergency Services Breakfast.” I supplemented this list from a breakfast follow-up email Mr. Friedland sent to 104 people, including myself, where I could view the

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<sup>1</sup>See Chapter V for a more detailed description of the qualitative interview procedure.

email addresses of the other respondents. This is a large event with several hundred individuals from all sectors of the community, including the U.S. and Canada, local political and business leaders, law enforcement, fire and EMS at all levels.<sup>2</sup> Mr. Mark Wetering, Emergency Manager for Lambton County, Mr. Steve Bicum, Deputy Fire Chief, Coordinator of Training and Safety, St. Clair Township Fire Department, and Mr. Cal Gardner, Sarnia Emergency Management Coordinator, also provided names and addresses of contacts on the Canadian side. For *Wave 1*, all necessary information was provided by these individuals, including for each respondent their full name, organization, and mailing address.<sup>3</sup>

#### 4.1.1.1 Individuals Outside the Network

*Wave 2* included only individuals who had not been identified in the first set of provided contacts. Because the responses to *Wave 1* surveys were written by hand, it was more difficult to ascertain the names of the individuals identified. Sometimes, I knew the individual who was being referenced, and could easily locate the mailing address, as a colleague had been a *Wave 1* respondent. Other times, an alter would be identified as “Fire Captain,” for example, or an alter was named who was known to be outside of the study area, or a name was simply illegible. Table 4.1 provides the most frequently cited alters who were impossible to include in the network analysis, because there was no way of identifying who they were.

When a name was legible but unknown, in order to maintain confidentiality,<sup>4</sup> I

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<sup>2</sup>To provide a sense of the scope and scale of the breakfast event, one interview respondent, the executive director of a non-profit ambulance and EMS service in the U.S. stated, “In fact I’ll tell you even when Jeff [Friedland] brings the state folks in - he brings state homeland security folks in on a pretty regular basis – and they say that this event does not occur anywhere else in the state of Michigan. And what you will find at the meeting is you will find nearly every police, fire, EMS, township board, county official and hospital official from our county at this meeting. It’s the one time of the year in which everybody comes. We will have probably somewhere in the neighborhood of three to four hundred people there.” In 2013, I attended this breakfast as a guest.

<sup>3</sup>The figures in this section were produced with Stata 12.0. See Appendix E for the complete log file for this data.

<sup>4</sup>Because sharing information about other respondents by name would have been a violation of the terms of the IRB-approved informed consent document.

Name Provided	Frequency
Fire Officer	3
Incident Command	2
Police Sergeant	2
Fire Captain	1
Red Cross	1
Sarnia Police	1
Firefighter	1
Police	1

Table 4.1: Unidentifiable Names Provided by Network Respondents

did not seek information from the project sponsor, and instead sought out information through publicly accessible internet and library searches. I researched publicly available information on fire and police departments, accessed local newsletters that covered local municipal events, such as the *St. Clair Township Beacon* and the *Suncor Energy in Your Community* newsletter, accessed Michigan Department of Community Health (MDCH) and Michigan Department of Transportation (MDOT) statewide contact lists, and searched professional association websites for contact information. I searched as exhaustively as possible, but some individuals were not identifiable for the purposes of this survey.

There were 119 unique names (including nonspecific descriptors such as “Firefighter”) which were not included in the survey in either wave. Forty of the named individuals were outside of the study region. No contact or occupational information whatsoever was provided for twenty-eight individuals, making it impossible to locate them. Eighteen were agents with U.S. Customs and Border Protection Agency (CBP) or U.S. Immigration and Customs Enforcement Agency (ICE) for whom I could not locate any address information.

Because of the structure of the survey, however, it was not impossible to identify basic ego-level information about these individuals, even if their specific address could not be located for the purposes of a *Wave 2* follow-up survey. Figure 4.1 is a histogram showing the distribution of occupations for those outside the network, but within the

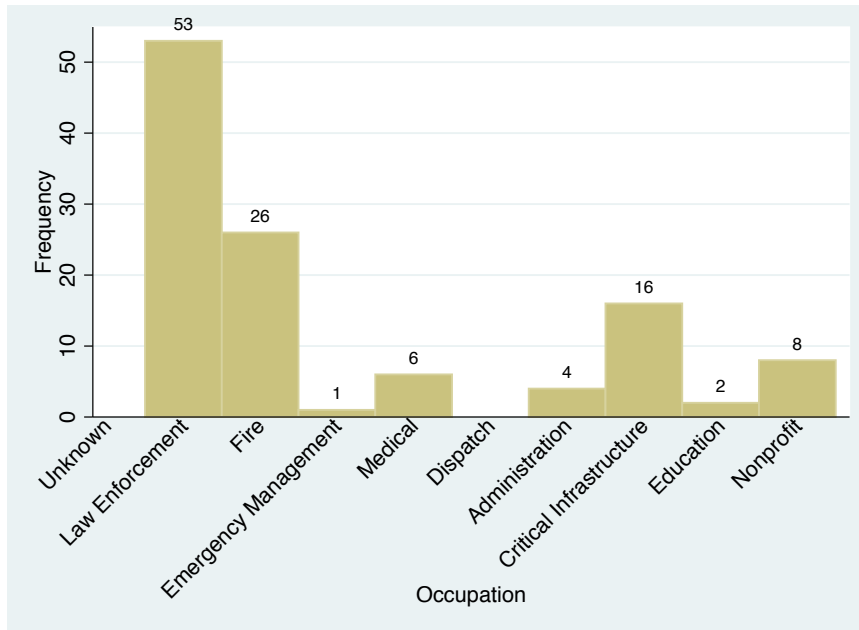


Figure 4.1: Occupations of those Outside the Network

study region of St. Clair County, Michigan and Lambton County, Ontario.<sup>5</sup> As noted earlier, more than a third of the law enforcement contacts who could not be located were with the U.S. federal government. Five additional *Law Enforcement* contacts were from FBI and U.S. Coast Guard (USCG), and four more were from Canada Border Services Agency (CBSA), the Canadian Coast Guard, or the Canadian military.

The next largest group of out-of-network alters were from the *Fire* services. In both the U.S. and Canada, many of the fire departments that protect small towns are staffed by volunteers. Although they are accredited for their profession, and part of the community, they were often difficult to identify, because they work only part-time. Individuals from *Critical Infrastructure*, in this case almost exclusively the petrochemical refiners in Canada, were similarly difficult to locate specific addresses for, as the private sector owners of such facilities publish little information online

<sup>5</sup>Although I did include in this count named alters who were affiliated with state or federal organizations with a responsibility for an area in the study region, but were not physically located there – for example, the FBI field office in Detroit, which has a large area of responsibility including Port Huron.

about their employees.

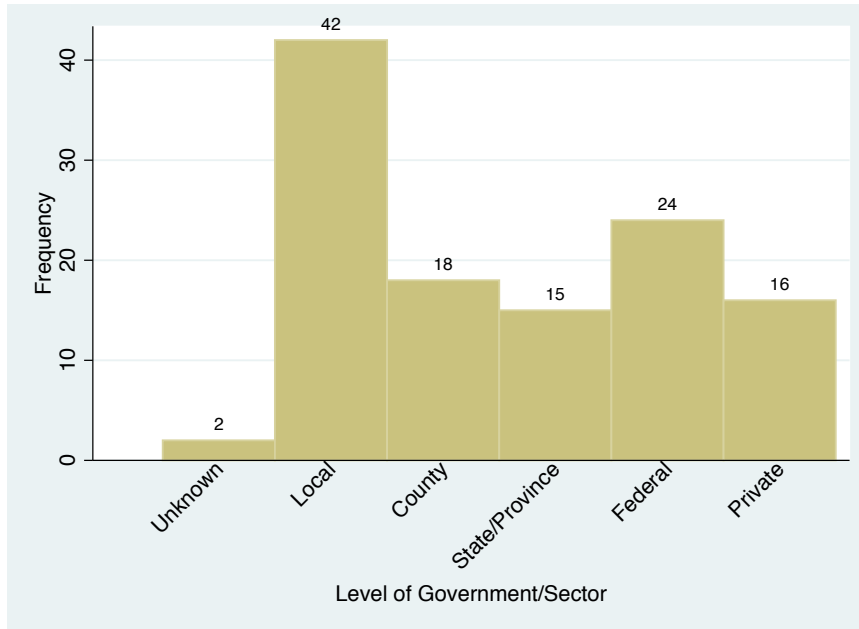


Figure 4.2: Sector/Level of Government of those Outside the Network

Figure 4.2 indicates the distribution of levels of government or sector for those outside the network reported here, but within the study region. The large number of *Local* alters is primarily driven by respondents from local fire and police departments. In many cases, I did know the address of the department in question, because another department member had already responded to the survey. I excluded many of these because of resource constraints, and because I wanted to diversify the respondents as much as possible. Due to the budget constraints I was operating under for this project, I had only printed 300 total surveys, including postage and all additional material. As the *Wave 2* surveys were being prepared, I started to receive requests for duplicate surveys from *Wave 1* respondents who had received a survey, but lost or misplaced it. I was becoming concerned that I would have no more surveys to send if I started to saturate departments that I had already retrieved information from. This was not an ideal situation, but I consciously tried in *Wave 2* to reach out to as many new organizations as possible, if I could locate the contact information.

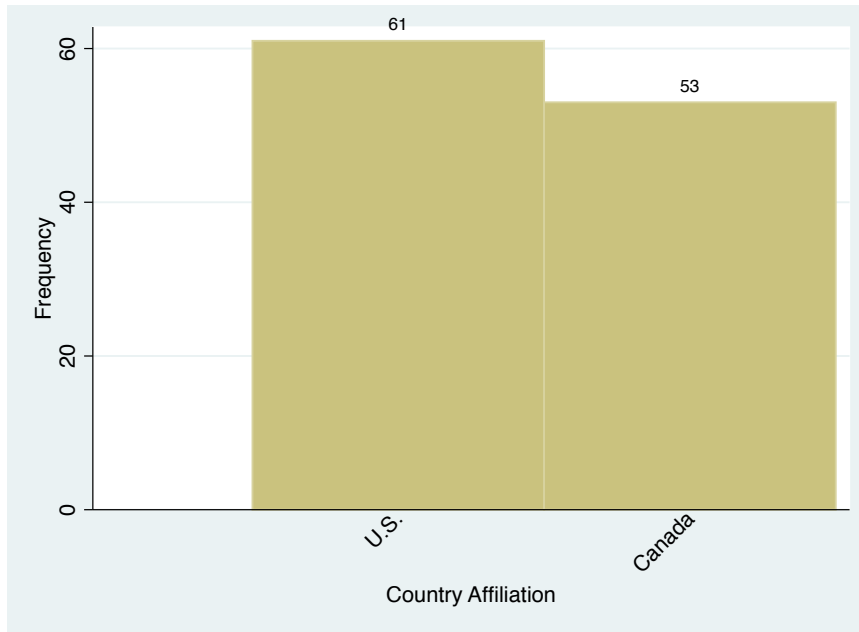


Figure 4.3: U.S. and Canadian Alters Outside the Network

Figure 4.3 shows that the distribution of those outside the network was about equal between U.S. and Canadian alters. There were slightly more U.S. than Canadian alters who could not be identified or were not selected for *Wave 2* surveys, but the division is evenly balanced.

Because I could not locate any additional ego-level information, those individuals who were not identifiable or otherwise not included in *Wave 2* surveys are coded in the data as “NA” and excluded from the analysis reported below. There were a total of 181 unique respondents identified in *Wave 1* and 94 unique respondents in *Wave 2*, for a total  $n$  of 275.

#### 4.1.1.2 Survey Procedure and Supporting Documentation

In both waves, potential respondents were given a pre-notification postcard by mail approximately a week before receiving the survey. The first batch of survey pre-notification postcards were mailed on January 19, 2013. This postcard had the logo of the project sponsor, the SCC Office of Homeland Security and Emergency

Management, an entity known to almost everyone in the professional community, along with a message from the Emergency Manager, Mr. Jeff Friedland, indicating his support for the project.<sup>6</sup>

The survey booklet, described in more detail in Subsection 4.1.2, was mailed with an IRB-approved statement of informed consent giving respondents the opportunity to opt out of the study.<sup>7</sup> Enclosed with the survey were two letters, written in plain language, from myself and Mr. Jeff Friedland, explaining the purpose of the research and directly asking potential respondents to help by completing the survey. I provided my email and phone number to answer any questions.<sup>8</sup> I also included my business card with each packet.

The survey, return envelope, and associated documents were mailed in a large and relatively heavy envelope. For Canadian respondents, this was mailed in bulk from a station in Windsor in order to reduce the substantial costs of international postage (from the U.S. to Canada). A pre-paid return envelope was included with every packet to minimize respondent burden. Due to limited resources and the bi-national nature of the survey, it was important at this stage to minimize costs while encouraging a minimally disruptive process for respondents to return their completed surveys. At the time of survey deployment, the cost of postage for Canada Post U.S.A. Letter-post service was (return postage for the survey) was \$2.37 per piece and U.S. Postal Service (USPS) First Class Mail postage was \$1.50 per piece. Future iterations of this study would likely benefit from the use of certified or tracked mail in both initial survey and response, as the findings of del Valle et al. (1997) suggest,

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<sup>6</sup>See Appendix D for the University of Michigan Institutional Review Board (IRB)-approved version of this postcard.

<sup>7</sup>As opposed to requiring respondents to sign an opt-in consent form, as originally requested by the IRB. I argued that the serious concern over response rate, given the sensitive questions being asked in the survey, would make a separate opt-in task excessively onerous for the respondents, who were in any case professional adults capable of understanding the language of the informed consent document and refusing to participate by simply ignoring the survey.

<sup>8</sup>Only one potential respondent, from *Wave 1*, called me directly, asked questions about the research, and explained that they would refuse to participate in the survey.



however, the limited budget available at this stage limited my ability to provide more sophisticated forms of survey deployment.

The cover of the survey featured a unique six digit number created by a manual stamping machine. This was the only unique identifier for the survey. In creating this system of identification, I hoped to give respondents a greater sense of anonymity in filling out the survey, which requested them to give the names and contact information of others. Respondents were notified in multiple ways that their name would not be known to others or publicly linked to the six digit number on the survey they filled out. While the procedure necessitated creating an electronic file linking names and unique codes, in accordance with the informed consent document, the identifying names were removed from this file once the survey was complete. Thus, the survey data reported here has been anonymized to protect the privacy of all respondents.

Those who did not return their survey in a timely fashion were sent two concurrent follow-up letters, from myself and Mr. Jeff Friedland, to encourage participation.<sup>9</sup>

#### **4.1.2 Survey Instrument**

The survey questionnaire itself consisted of an 18-page booklet (see Appendix C) modeled on one developed by sociologist Ronald Burt for an internal study of the human resources network of the Merrill Lynch corporation (Burt, 1996). The interactive booklet was structured to help respondents map their social networks through a series of prompts about professionals from other agencies in the community who they may have interacted with recently.

The survey contained three distinct components:

*Ego Characteristics:*<sup>10</sup>

1. A self-reported measure of “trustingness” from a 6-point validated Likert scale

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<sup>9</sup>See Appendix D for the IRB-approved letters.

<sup>10</sup>See Subsection 4.3.1.2 for more detailed information on these questions.

assessment developed by Yamagishi and Yamagishi (1994).<sup>11</sup>

2. Four questions about job experience, tenure, and level of responsibility.

*Name Generation:*<sup>12</sup>

1. Ten question prompts designed to generate the names of fifteen alters in the professional community, along with their contact information.
  - Who was the last person from a different agency with whom you went out to breakfast, lunch, coffee, or other drinks, one-on-one?
  - Name a few homeland security, public safety, and/or emergency management professional you meet regularly in a non-professional setting. For example, bumping into them at kids' sports games or at church. (*Up to three potential alters.*)
  - Think of an emergency situation that sticks out in your mind from the last few years that involved multiple agencies and countries – Who as the first person you looked for when you arrived on the scene?
  - Think of an emergency situation that sticks out in your mind from the last few years that involved multiple agencies and countries – Who was the first person who approached you when you arrived on the scene?
  - Think of an emergency situation that sticks out in your mind from the last few years that involved multiple agencies and countries – Who was the most important person there who helped you get your job done?
  - Think of an emergency situation that sticks out in your mind from the last few years that involved multiple agencies and countries – If applicable, who was the most important person from another country who helped you get your job done?

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<sup>11</sup>See Subsection 4.3.1.1 for more detail on this measure.

<sup>12</sup>Because individuals often think of others within their own organization, it was repeatedly emphasized that they name individuals “in organizations or agencies other than your own.”

- Now, think about day-to-day operations, not a specific emergency situation
  - Imagine you have an innovative new idea for the professional community, that is not ready for prime-time. Who would you discuss it with first?
- Now, think about day-to-day operations, not a specific emergency situation
  - From time to time, people seek out advice from someone in a different agency on homeland security, public safety, and/or emergency management-related matter. Who would you seek out for advice?
- Now, think about day-to-day operations, not a specific emergency situation
  - Think about a situation where someone from a different agency asked you for advice on a homeland security, public safety, and/or emergency management-related matter. Who asked you for advice?
- If you had to put together a task force including people not named already, who would be on it? (*Up to four potential alters.*)

*Alter Characteristics:*

1. Two questions assessing the length of relationship and frequency of contact for each alter.
2. Eight questions to determine if specific characterizations apply to each alter:
  - If you wanted information about an area of expertise other than your own, who would you talk to?
  - Who are the “go to” people for questions about homeland security, public safety, and/or emergency management in the region?
  - Who has a reputation for getting the job done?
  - Who has demonstrated proficiency in past incidents?
  - Good Credentials

- Reliable/Dependable
- Skilled/Competent
- Experienced

## 4.2 Survey Response

The overall survey response rate was 33.82 percent.<sup>13</sup> 292 unique surveys were mailed, seventeen of which were duplicates in *Wave 1*, which were sent on request when respondents reported misplacing or not receiving the original survey and requested another.<sup>14</sup> 93 unique surveys were completed and returned.

The response rate for *Wave 1* ( $n = 182$ ) was 38.12 percent and the response rate for *Wave 2* ( $n = 93$ ) was 25.53 percent. As noted earlier, *Wave 1* respondents were those identified by key members of the community in the U.S. and Canada who had already been interviewed on the record and agreed to provide contact information for relevant members of the community. *Wave 2* respondents were contacted because they were not identified in *Wave 1* and were only identified by *Wave 1* survey recipients. 23 Canadian respondents ( $n = 108$ ) returned surveys for a 21.3 percent response rate and 70 from the U.S. ( $n = 167$ ) responded, for a response rate of 41.92 percent.

Professional function was divided into ten categories: law enforcement, fire, emergency management, medical, dispatch, administration, critical infrastructure, education, nonprofit, and unknown. In the analysis, each respondent was assigned to only one professional category. For simplicity and tractability, it was necessary to group

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<sup>13</sup>This is below the average response rate for individuals in organizations identified by Baruch and Holtom (2008), but within their identified bounds. They found an average response rate of 52.7 percent,  $sd = 20.4$  across all media, and an average response rate of 44.7 percent,  $sd = 21.8$  for mail surveys, such as the one reported here. Their study did not evaluate the response rates of social networks surveys specifically.

<sup>14</sup>Not all of the duplicate surveys were returned. The  $n$  reported here represents the count of unique surveys without duplicates, so total  $n = 275$ .

several related functions into one category.

Coding decisions were not necessarily straightforward, however. While, for example, a local fire department chief is easily categorized as *Local* and *Fire*, it was more challenging to code individuals with unique or unusual positions. For example, one of my interviewees was a Special Agent with the Canadian National Railway Company (CN) Police. With a history of armed protection going back to the earliest days of private railroad ownership, the CN Police is a fully accredited and empowered law enforcement agency, with law enforcement powers granted by the governor of each state where CN owns property. In this case, I coded this individual as *Private* and *Critical Infrastructure* because the sector limits the individual's scope of work – CN Police does not have jurisdiction outside of CN property. This respondent's role as a representative of the *Critical Infrastructure* sector is more important to their position in the network than their role as a law enforcement officer.

The following non-exhaustive list provides a general overview of the specific functions and examples from the respondent set for each:

- *Law enforcement:* Ontario Provincial Police (OPP), Sarnia Police, Marysville Police, St. Clair County Sheriff, Michigan State Police, ICE, CBP, USCG, Royal Canadian Mounted Police, Canada (RCMP).
- *Fire:* Sarnia Fire Rescue, Marine City Fire Department, Point Edward Fire Department.
- *Emergency management:* Corporation of the County of Lambton Office of Emergency Management, St. Clair County Office of Homeland Security and Emergency Management.
- *Medical:* St. Clair County Health Department, Tri-Hospital EMS, St. Joseph Mercy Hospital, MDCH, Lambton County Community Health Services Department, County of Lambton Emergency Medical Service Department.

- *Dispatch*: St. Clair County Central Dispatch, Sarnia Police Service dispatch, Emergency Amateur Radio Services, South East Regional Emergency Services Authority, Michigan (SERESA).
- *Administration*: Petrolia Municipal Council, Mayor’s Office, City of Port Huron, St. Clair County Board of Commissioners.
- *Critical Infrastructure*: Blue Water Bridge Authority, CN Police, Ontario Ministry of Transportation, Imperial Oil, NOVA Chemicals.
- *Education*: St. Clair County Community College, St. Clair County Regional Educational Service Agency (RESA).
- *Nonprofit*: Salvation Army, Red Cross.
- *Unknown*.

Response rates for each professional category are reported in Table 4.2.

Occupational Category	Surveys Mailed	Surveys Received	Response Rate
Law Enforcement	90	33	36.67%
Fire	75	25	33.33%
Emergency Management	18	7	38.89%
Medical	27	8	29.63%
Dispatch	9	5	55.56%
Administration	27	2	7.41%
Critical Infrastructure	16	6	37.50%
Education	3	1	33.33%
Nonprofit	6	2	33.33%
Unknown	4	4	100%
Total	275	93	33.82%

Table 4.2: Response Rate by Professional Function

Respondents were also categorized by the level of government or sector that they worked for. Figure 4.4 is the visual equivalent of a cross tab showing the distribution of occupational functions by level of government or sector. *Local* was the broadest

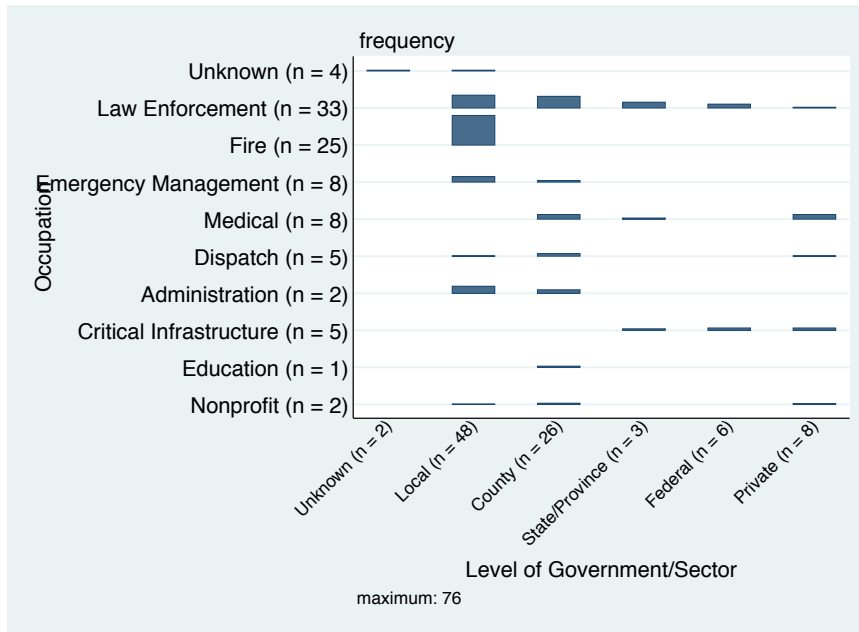


Figure 4.4: Occupation by Level of Government/Sector

categorization, including everything from Michigan or Ontario townships of just a few hundred people to the large metropolitan communities of Port Huron, Michigan, and Sarnia, Ontario. *County*, *State* and *Federal* categories were clearly delimited by the research question, and anyone affiliated with a government agency at each level was classified accordingly. Certain entities in the region, such as the Blue Water Bridge, are owned jointly by Canada and the U.S. On the Canadian side, the bridge is owned by a subsidiary of the Canadian federal government, while on the U.S. side, it is owned by the state of Michigan through the MDOT. In this case, respondents were classified as state or federal depending on their geographic location. The *Private* category largely overlaps with the previous category of *Critical Infrastructure*, but is restricted to private holders of critical infrastructure (petrochemical facilities, railroads) only.

- *Local*: Clay Township, Burtchville, Sarnia, Port Huron, Petrolia, Alvinston.
- *County*: St. Clair County, Lambton County.
- *State/Province*: Michigan, Ontario.

- *Federal*: U.S., Canada.
- *Private*: NOVA Chemicals, Imperial Oil, Sunoco, CN.
- *Unknown*.

Response rates for each level of government/sector are reported in Table 4.3. The largest number of surveys received was from the *Local* level, but the largest percentage was from the *County* level.

Level of Government/Sector	Surveys Mailed	Surveys Received	Response Rate
Local	144	48	33.33%
County	68	26	38.24%
State/Province	22	3	13.64%
Federal	16	6	37.50%
Private	23	8	34.78%
Unknown	2	2	100%
Total	275	93	33.82%

Table 4.3: Response Rate by Level of Government/Sector

## 4.3 Descriptive Statistics

### 4.3.1 Ego Characteristics

Other than the information captured by the general survey response rate, such as profession and location, the survey asked additional questions specific to the respondent (ego), without regard for their relationships with others (alters).

#### 4.3.1.1 Generalized Trust

The level of generalized trust at the ego level (i.e. the general trust or distrust of others) and tenure of personal and professional experience were hypothesized<sup>15</sup> to be

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<sup>15</sup>See Equation (1.1).



ego-level characteristics that may be expected to influence dyad- and network-level interpersonal relationships.

First, I measured generalized trust, what Yamagishi (2001) defines as the “*default expectation* of the trustworthiness of others.” This focuses on what level of trust individuals have in others in the absence of any evidence on way or the other. The General Trust Scale is a validated set of questions from Yamagishi and Yamagishi (1994) as follows:

1. Most people are basically honest.
2. Most people are trustworthy.
3. Most people are basically good and kind.
4. Most people are trustful of others.
5. I am trustful.
6. Most people will respond in kind when they are trusted by others

Each question is Likert scored from 1 to 5, corresponding to “Strongly Disagree,” “Disagree,” “Neutral,” “Agree,” and “Strongly Agree” and the overall score is divided by 6 for a final Generalized Trust Score. If, for example, a respondent were to answer “Strongly Disagree” to all six questions, they would receive a score of 1, while if they responded “Strongly Agree” to all questions, they would receive a score of 5.

These six items were found to have the highest factor loadings for predicting behavior in social situations where trust was required. Yamagishi (2001) used these survey questions to classify individuals into types – high-trusters and low-trusters – in order to assess their gullibility when dealing with others and finds that both types are able to accurately assess the intentions of others.

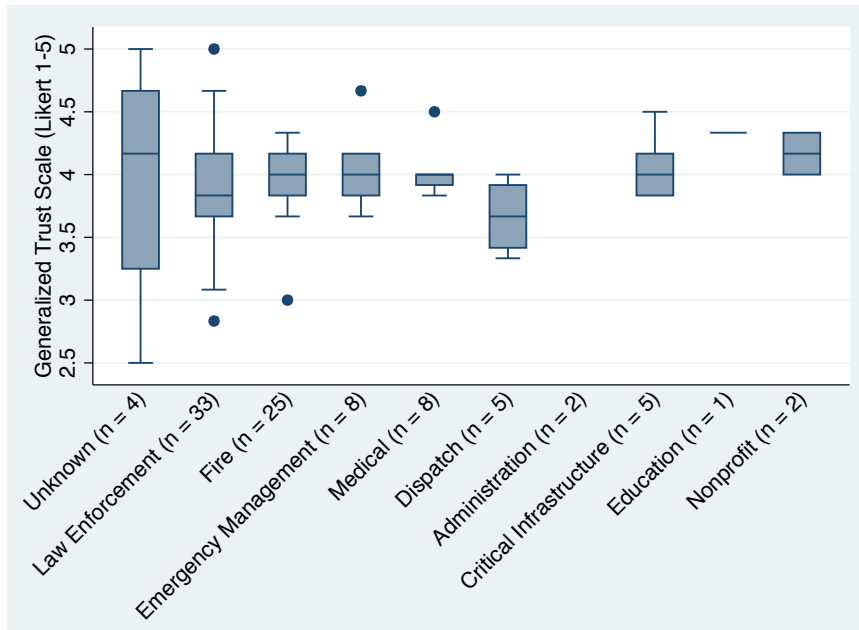


Figure 4.5: Ego Levels of Generalized Trust by Occupation

Similarly, I used the General Trust Scale to assess a basic level of generalized trust among respondents at the ego level. For all respondents, the mean Generalized Trust Score was 3.94 ( $sd = .46$ ) with a minimum score of 2.5 and a maximum score of 5.

Figure 4.5 uses box-and-whisker plots to indicate the median values of the aggregated General Trust Scale responses by occupation, along with the 25th and 75th percentiles, and outside values. Using a one-way Analysis of Variance (ANOVA), I compared the mean of each occupational group to the overall mean for this statistic. Despite their differences, none of the groups was statistically significantly different from the overall mean.

Figure 4.6 shows the median values of generalized trust by level of government or sector. Using a one-way ANOVA, I compared the mean of each occupational group to the overall mean for this statistic. The model reported a  $p$ -value of 0.02, indicating that there are statistically significant differences between individuals working in different sectors or levels of government. The most “trusting” were *Unknown* (unfortunately:  $\bar{x} = 4.67, sd = 0.47$ ) and *Federal* ( $\bar{x} = 4.25, sd = 0.43$ ), while the least trusting

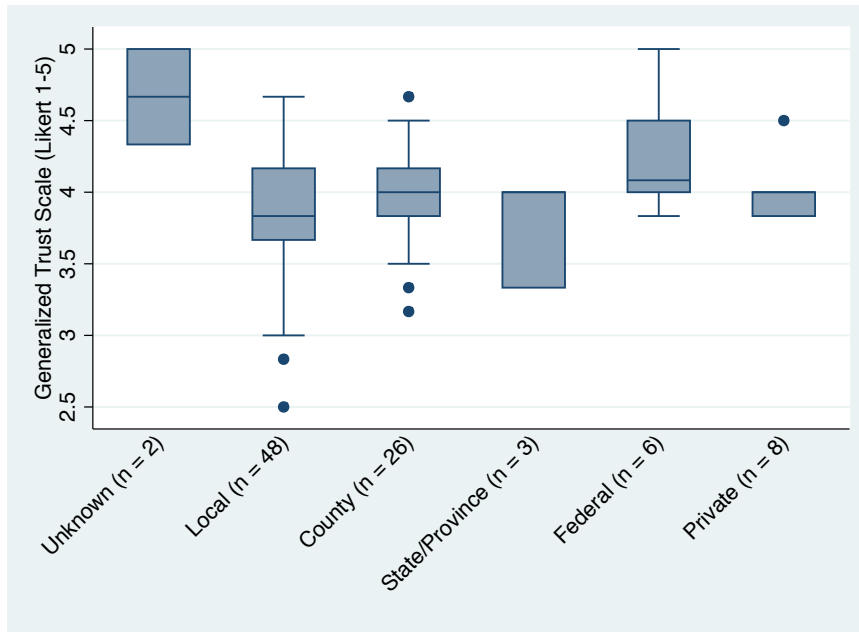


Figure 4.6: Ego Levels of Generalized Trust by Level of Government/Sector

were *State/Provincial* ( $\bar{x} = 3.77, sd = 0.39$ ) and *County* ( $\bar{x} = 3.97, sd = 0.37$ ).

Figure 4.7 indicates that there is a difference in ego-level general levels of trust between respondents in the U.S. and Canada. The mean score for U.S. respondents was 3.89 ( $se = .06$ ), while the mean score for Canadian respondents was 4.06 ( $se = .06$ ).

However, an independent two-tailed group means t-test, with an assumption of equal variances, produced a p-value of 0.11, and I cannot reject the null hypothesis (at the 95% confidence level) that the difference between those in the U.S. and those in Canada is not different from zero. Overall, along most ego-level categorizations, respondents tend to “Agree” with these generalized measures of trust.

#### 4.3.1.2 Professional and Community Tenure

I also hypothesized<sup>16</sup> that the amount of time in the professional community would be correlated with other measures, including ego-level measures of trust and network-

<sup>16</sup>See Section 3.2.0.1

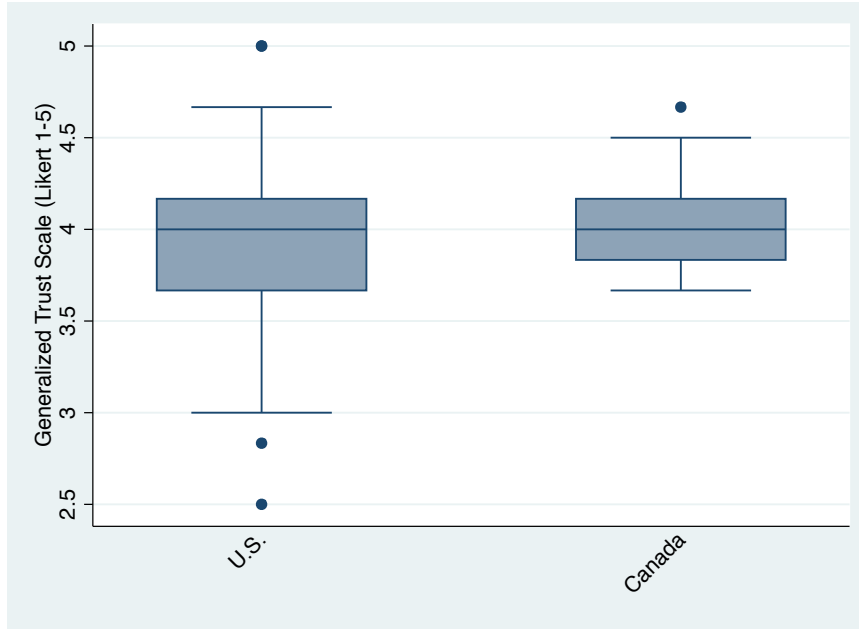


Figure 4.7: Ego Levels of Generalized Trust by National Affiliation

level measures of cohesion. I expected that more time working in the area would allow individuals greater opportunities to develop connections through networking and professional encounters. With an eye toward maintaining respondent anonymity, my survey contained four questions designed to assess the length of time a given respondent has been in the community, in the professional community, and their approximate level of responsibility.

The following survey questions are followed by the overall mean ( $\bar{x}$ ),  $sd$ , minimum, and maximum for each question:<sup>17</sup>

1. How long have you been in this job sector? (not necessarily in this job or at this level). ( $\bar{x} = 22.55, sd = 9.32, min = 5, max = 42$ )
2. How long have you been in this specific job? ( $\bar{x} = 9.22, sd = 8.41, min = .08, max = 42$ )
3. How long have you lived in this community (the St. Clair County/Lambton County region)? ( $\bar{x} = 36.56, sd = 17.43, min = 0, max = 62$ )

<sup>17</sup>The figures in the first three questions are reported in *years*, the fourth question is a *count*.

4. Approximately how many people work for you? (number of employees you supervise, number of people under you in your department or division, number of people who answer to you). ( $\bar{x} = 29.77, sd = 46.7, min = 0, max = 265$ )

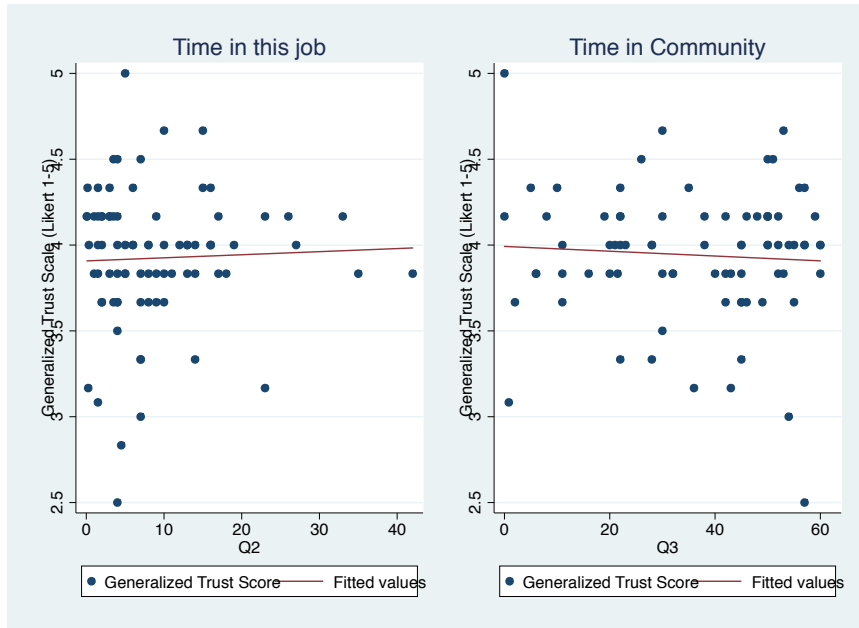


Figure 4.8: Ego Levels of Generalized Trust by Tenure in Occupation and Community

In a pairwise correlation analysis of each tenure question and the aggregated General Trust scores, there is a statistically significant<sup>18</sup> and positive correlation for each measure, with one exception. As Figure 4.8 indicates, there is a slight positive correlation between generalized trust and tenure in a specific job but a slight *negative* correlation between between generalized trust and tenure in the community. The median number of years for this measure is 42 years, indicating individuals who may have lived there for their entire lives. A closer analysis of the data reveals that the negative effect is limited only to those respondents above the median (42) – for those below the median, generalized trust is positively correlated with tenure in the community. It is unclear why individuals who have lived in the area for a very long time have lower levels of generalized trust: This could be a function of more exposure

<sup>18</sup>At the 95 percent confidence level.

to life's travails, or it could be indicative of inherent problems in the community itself. Unfortunately, these questions are beyond the limited scope of this project.

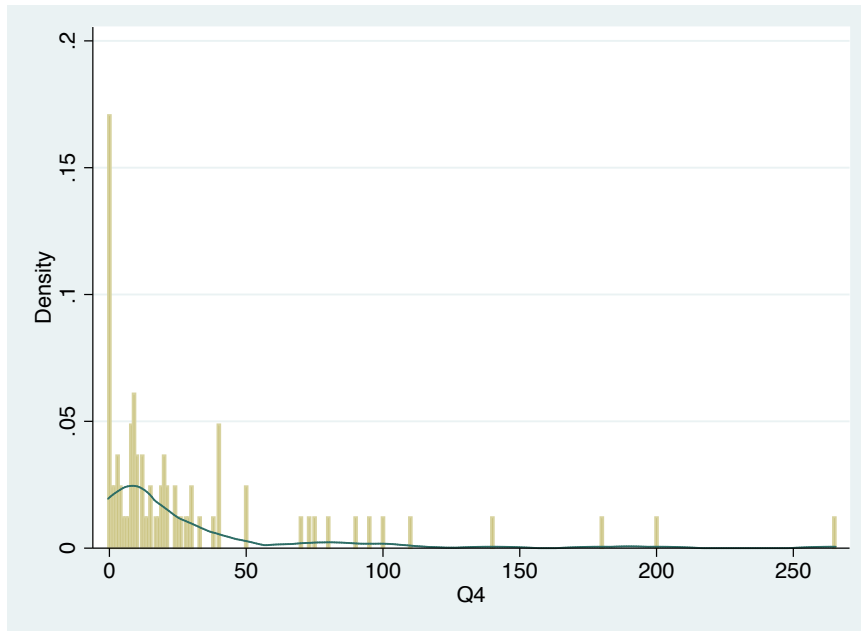


Figure 4.9: Distribution of Organizational Leadership

Figure 4.9 shows the distribution of the final question of how many individuals work for the respondent. Given the large number of respondents from the local level – including a large number of very small communities with small fire and police services – it is not surprising that most respondents have few employees working for them. Although this question was intended to be a proxy for the level of professional responsibility of a given individual, this confounding factor makes it less useful as an ego-level variable.

#### 4.3.2 Dyad-Level Characteristics

This section describes how the respondents (ego) perceived the individuals they named in aggregate, in other words, how did the respondent feel about the entire group of individuals they named as alters?<sup>19</sup> Two questions assessed the strength

<sup>19</sup>Including those who are not included in the network analysis of  $n = 275$ .

of the interpersonal relationship by asking how long each ego knew the alters they named, and how frequently they had worked together in the past year. Of the 71 non-missing responses for this measure, egos reported that they knew their all of their named alters (in aggregate) an average of 10.98 years ( $sd = 5.33, min = 2.82, max = 26$ ). In terms of frequency of professional connection, for all alters named, the 70 respondents with non-missing answers reported a mean total of 24.54 ( $sd = 30.99, min = 0, max = 173.33$ ).

In coding the assessment section of the survey, I counted 1 if the respondent indicated a particular alter with a check mark (as per the instructions in the survey), missing if the respondent provided no response to any alters in a given section, and 0 if the respondent did not provide a check mark for a given alter, in the presence of other responses on that section. While I really wanted to know for each alter, “Do you trust this person?” most interview respondents indicated quite strongly that they would never answer such a question. Therefore, the questions in this section are proxies for the ego-alter trust dynamic, and the alter assessment questions were set up to gradually become closer to the main questions of interest, without ever asking it directly.

Assessment of Alter	Non-Missing Observations	Mean	SD
Who Would You Talk To?	68	.6210	.2885
Who are the go to people?	68	.4758	.3020
A reputation for getting the job done?	68	.5757	.2709
Demonstrated proficiency?	68	.7073	.2762
Good Credentials	67	.8598	.1990
Reliable/Dependable	66	.8577	.2167
Skilled/Competent	67	.9061	.1797
Experienced	66	.8759	.1958

Table 4.4: Average Assessment of Alters (Non-Missing Values)

Respondents were generally positive about the alters they named. Table 4.4 shows the mean responses of non-missing observations for each of the alter assessment ques-

tions. The top half of the table is a series of four questions about the each named alter, and the bottom half is a series of questions asking for personal assessments of each alter. In response to the first question about alters, “If you wanted information about an area of expertise other than your own, who would you talk to?” more than 62% would talk to the alters they named. However, less than half of the named alters would be considered the the “go to” people for public safety and homeland security questions.<sup>20</sup> More than half of respondents (58%) responded affirmatively for their named alters for the question, “Who has a reputation for getting the job done?” But over 70% indicated that their named alters had “demonstrated proficiency.”<sup>21</sup> In the descriptive section (the bottom half of the table), respondents were most likely to describe the alters they had named as “Skilled/Competent” and least likely to describe them as being “Reliable/Dependable.”

#### **4.3.2.1 Assessments Under Differing Network Conditions**

Recall from Subsection 4.1.1.2 that ten questions were asked as part of the name generator task in order to develop a list of fifteen potential alters. While the goal of a name generator is to create a list of alters for assessment, it is often not fruitful to begin with questions such as, “Tell me the names of 15 people you know in the homeland security/public safety community.” Instead, I took the approach of asking individuals a series of prompts that would trigger their memory about specific individuals that they interact with as part of their professional network. These questions asked respondents to respond to different types of settings, which may have influenced the names provided. In this section, I review the responses for each question.

Figure 4.10 shows the percentage of responses to each of the name generation questions. This figure represents any time an alter was named, even if that alter was

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<sup>20</sup>The actual survey question was: “Who are the ‘go to’ people for questions about homeland security, public safety, and/or emergency management in the region?”

<sup>21</sup>“Who has demonstrated proficiency in past incidents?”



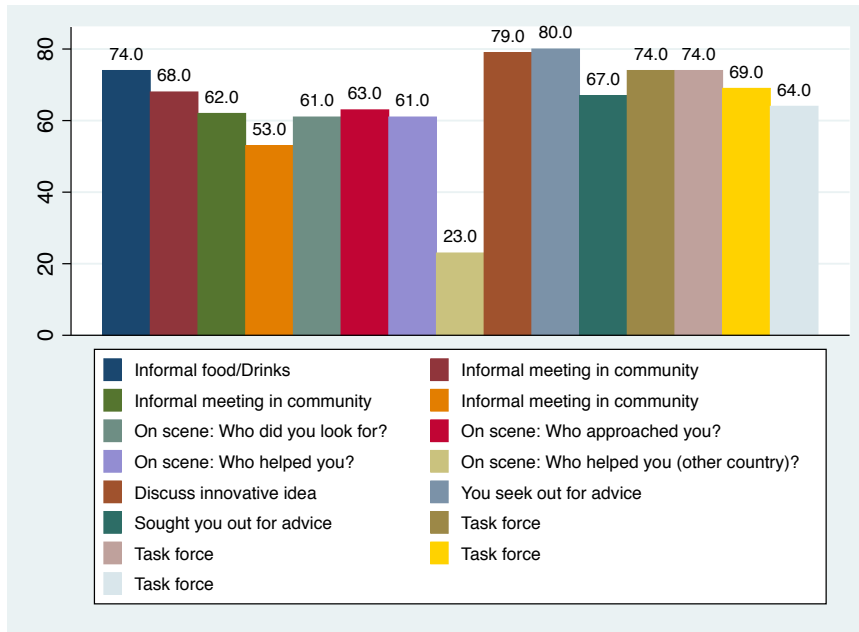


Figure 4.10: Response Rate by Name Generator Question

outside of the study region or otherwise unidentifiable. The figure only represents the response of individuals to the question; in other words, were these questions sufficiently motivating as name generators? This figure shows that – for most questions – they were. 80% of respondents were willing to name someone that they seek out for advice, and 79% were willing to name someone that they would bounce a new idea off of. On the other hand, less than a quarter of respondents could name someone from a different country who helped them on the scene of an emergency situation – this can be expected because the question explicitly stated “if applicable.” It is possible that not everyone who responded had been in an international emergency situation.

*Q1: Who was the last person from a different agency with whom you went out to breakfast, lunch, coffee, or other drinks, one-on-one?*

The purpose of this question was to assess individuals with whom the ego has a personal or informal relationship that is close enough that they may meet for drinks or lunch. Unlike other name generation questions which focus on professional interac-

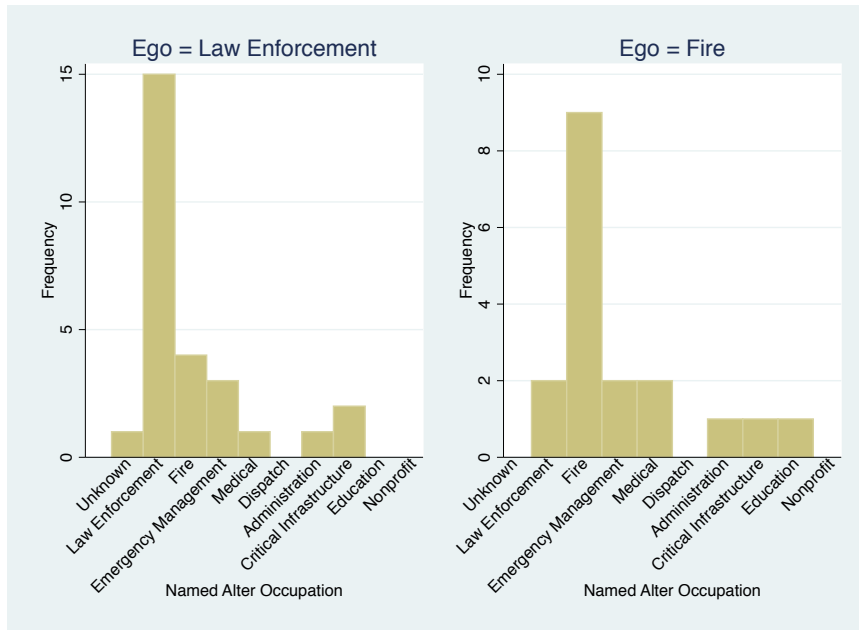


Figure 4.11: Informal Networking Clusters by Occupation

tions, this question uniquely looks at both professional and informal interactions. In addition to providing a name, it hints at a “stronger” and more personal tie between a given ego and alter. Figure 4.11 shows that, for each ego occupation code (in this case law enforcement and fire), respondents were often more likely to have had the last informal one-on-one meeting with someone from their own occupational field, even if they were not from an individual’s own department. This is not surprising, as professionals often have the most in common (and the most to talk about over drinks) with each other, as well as the most opportunities to meet informally.

*Q2 – Q4: Name a few homeland security, public safety, and/or emergency management professional whom you meet regularly in a non-professional setting. For example, bumping into them at kids’ sports games or at church. (Up to three potential alters.)*

This is an informally worded question to get people thinking about individuals in their community, without regard for specific affiliation or job responsibility. For

example, it may be that a low-level ego frequently sees a high-level alter because they happen to attend the same church. Such individuals may not be expected to have any kind of working relationship, but they are both professionals in the same general field, making this question useful for simple name generation without the presumption of a specific value to a relationship, if any even exists. As Figure 4.10 shows, it is not surprising that the number of responses decreases from the first to last of this question – perhaps respondents could only think of one or two people that fit this criteria, but not three.

The next set of questions seek to generate names based on professional function in a professional setting. The question was purposely left open-ended to give respondents the opportunity to draw on a setting that was most memorable to them – and most likely to actually generate names instead of forcing them to remember a specific event where they may not have been present.

These questions are important for understanding the development of trust in an emergency setting. Recall my main argument, that real-world interactions provide important opportunities for professionals to develop trusting relationships through the demonstration of competence on reliability under pressure.

*Q5: Think of an emergency situation that sticks out in your mind from the last few years that involved multiple agencies and countries – Who as the first person you looked for when you arrived on the scene?*

This question is intended to focus the respondent on a specific situation of their own choosing. Unlike earlier questions, asking about “the first person you looked for” invokes professional responsibilities closely tied to job function, role, and level of responsibility. Recall from Chapter I the incident command structure of NIMS in Figure 1.2, which assigns specific duties to individuals in the midst of an emergency. Most first responders enter an emergency setting with specific people in mind that

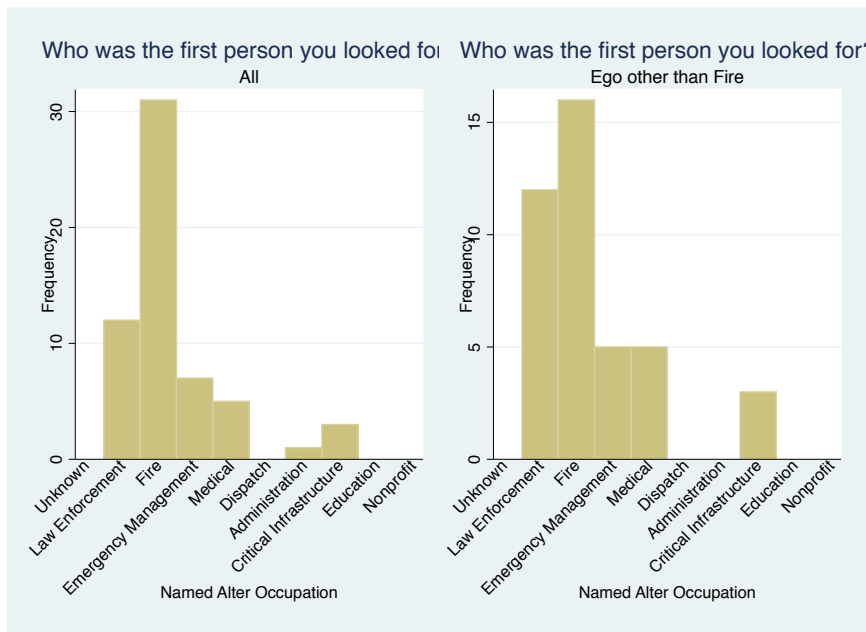


Figure 4.12: Most Respondents Look for Firefighters First

they will look for, so that they can quickly assess and assume their assigned role within the NIMS structure set up for a particular incident. This specific question says little about the potential tie strength between a given alter and ego, but provides a useful point of reference for individuals recalling a specific event. It is also useful as a name generation question, because it should refer to individuals who are in the network being studied.

Figure 4.12 shows that, by a wide margin, individuals in the firefighting profession are the first stop when on the scene of an emergency. This is true even if the ego is not from the fire services themselves, as indicated by the panel on the right side of Figure 4.12. However, Figure 4.13 shows that members of law enforcement tend to look for each other when they arrive at the scene of an emergency.

*Q6: Think of an emergency situation that sticks out in your mind from the last few years that involved multiple agencies and countries – Who was the first person who approached you when you arrived on the scene?*

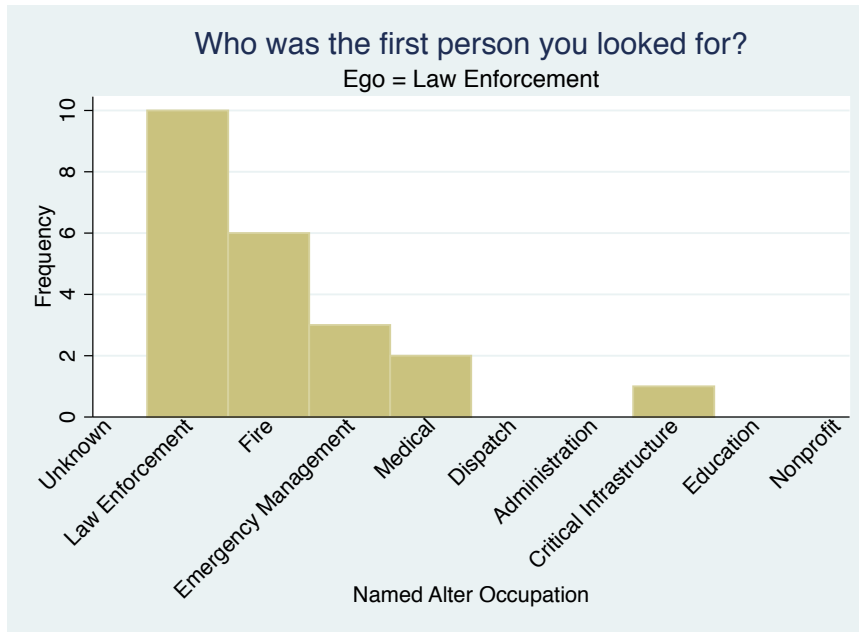


Figure 4.13: Law Enforcement Looks for other Law Enforcement First

This question is slightly different, as it reverses the roles for the respondent recalling a specific event. While the individual may have known who they wanted to approach in the emergency setting to understand their role in the NIMS structure, they have no way of knowing who will approach them first. Again, this question does not speak to the potential strength of a given tie, but rather serves as a useful name generator for procuring names of individuals who should be expected to be in the network due to their professional function.

*Q7: Think of an emergency situation that sticks out in your mind from the last few years that involved multiple agencies and countries – Who was the most important person there who helped you get your job done?*

*Q8: Think of an emergency situation that sticks out in your mind from the last few years that involved multiple agencies and countries – If applicable, who was the most important person from another country who helped you get your job done?*

Unlike the last two questions recalling a specific incident, these questions ask for

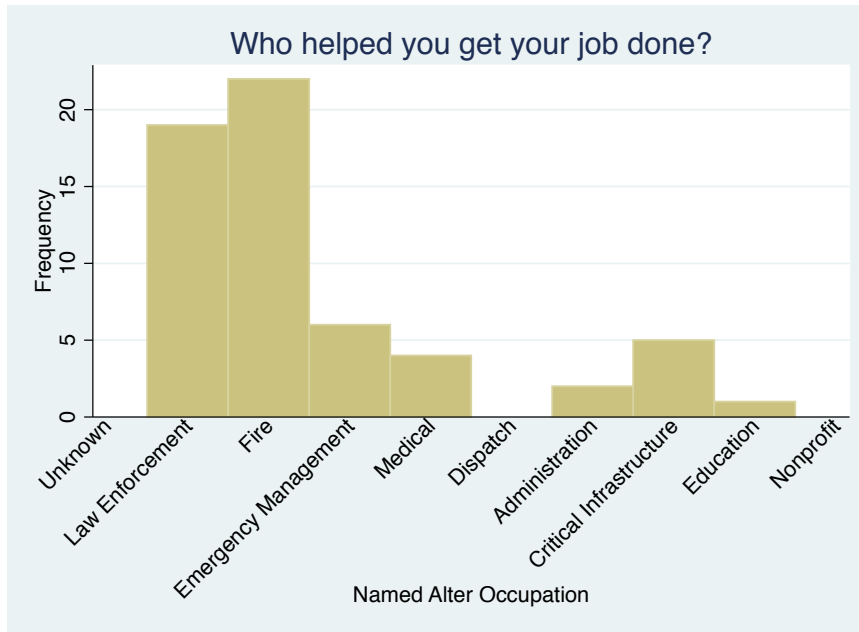


Figure 4.14: Firefighters and Law Enforcement Help Others get their Jobs Done

a subjective assessment of a given alter by the ego. In any situation, but especially a complex emergency involving multiple agencies, some individuals are better than others at carrying out their job functions, be it making decisions and giving orders or following orders correctly. Everyone has a job to do, and these questions assess the role of a given alter in helping the ego when needed. Given the wording of the question, however, this only speaks to positive interactions. Figure 4.14 shows that, for all occupations of ego respondent, law enforcement and fire were the most important agents in helping others get their jobs done.

*Q9: Now, think about day-to-day operations, not a specific emergency situation – Imagine you have an innovative new idea for the professional community, that is not ready for prime-time. Who would you discuss it with first?*

In this question, I sought to elicit alters who are part of the day-to-day community. Instead of asking generally, however, I attempted to elicit a response based on positive, trusting connections. No one wants to look like a fool in the professional

community, but they may have learned about a new technique or idea from a professional association meeting, through internet message boards, or through friends or family members in the same profession, but outside of the community. I wanted to understand who might be a confidant of a given ego, who could be trusted with a novel idea and be able and willing to provide feedback. These questions are important for understanding the development of trust by assessing the sharing of information, which, other than real-world emergency settings, are important to the development of trusting relationships.

*Q10: Now, think about day-to-day operations, not a specific emergency situation – From time to time, people seek out advice from someone in a different agency on homeland security, public safety, and/or emergency management-related matter. Who would you seek out for advice?*

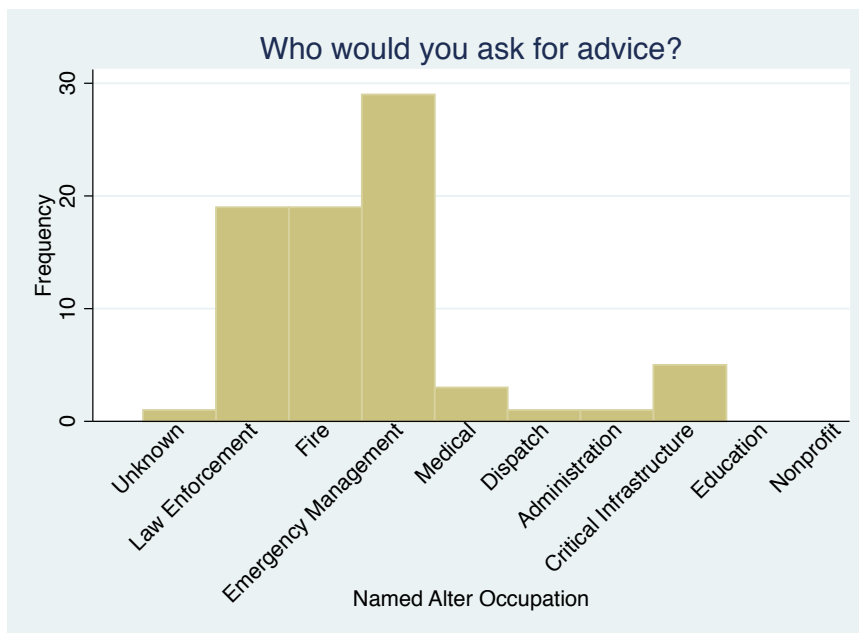


Figure 4.15: Emergency Managers are a Good Source of Advice

In a similar vein, this question seeks to learn the names of alters that the ego trusts enough to ask for advice. Asking for advice is a potentially vulnerable situation, as

is indicates lack of knowledge or understanding about a relevant issue. This question can be seen as representing a greater tie strength between an ego and alter than other questions which only serve to generate names. Figure 4.15 is striking because, despite their small presence in the network, most respondents would ask emergency managers for advice. This reinforces the important role that emergency managers play in any region – they are specifically tasked with knowing members of the network, their roles, and how they can work together to accomplish important multi-organizational tasks.

*Q11: Now, think about day-to-day operations, not a specific emergency situation – Think about a situation where someone from a different agency asked you for advice on a homeland security, public safety, and/or emergency management-related matter. Who asked you for advice?*

This question flips the previous question around, focusing on the role of the ego as the more knowledgeable party, compared to another. Unlike the prior question, however, this may or may not indicate that the ego feels a strong affinity with the alter. It is possible, for example, that the named alter was a brand-new professional with very little experience, asking the most senior person they felt comfortable talking to. Even without the possibility of learning about a stronger tie from the ego to alter, this question remains useful for a name generation task.

*Q12 – Q15: If you had to put together a task force including people not named already, who would be on it? (Up to four potential alters.)*

The last question was purposefully open-ended. What kind of task force? For what purpose? I left these to the imagination of the respondent. The main purpose of this question was to give respondents an interesting task that they might find engaging to generate an additional set of relevant names from the network.

Overall, these questions advance my argument about how the the first step in the development of interpersonal trust begins as a result of interactions under a variety of



conditions, and the importance of repeated interactions for providing the opportunity to prove competence and share information.

### 4.3.3 Network-Level Characteristics

I begin by describing the basic structure and practical meaning of the  $n = 275$  survey-based network that is the primary focus of this analysis.<sup>22</sup> For each network graph, the layout emphasizes the number of connections (also referred to as ties or edges) by focusing on the people (nodes or vertices) in the middle. For the following figures, the edges only represent *any* connection between two nodes – where an alter was identified via the name generation task on the survey. The dots closest to the center represent individuals who have many separate connections – both self-reported and reported by others. Those at the periphery have only one or two.

Figure 4.16 shows graphically the directed network of respondents, excluding isolates (those individuals who are not named by anyone else in the network) highlighting the connections by national affiliation. The arrows in this figure indicate the direction of identification from ego to alter – some arrows are two-headed, indicating that both respondents identified each other, while others show that one respondent identified the other, but not the reverse. Mirroring the response rate data in Section 4.2, this figure shows that there are a larger number of respondents from the U.S. than from Canada, and that U.S. respondents appear to be more “clustered”<sup>23</sup> than their Canadian counterparts. While there are a few Canadians at the center of the network, there are more U.S. respondents overall.

Figure 4.17 portrays a directed network showing the network positions of respondents by occupational sector only, for respondents in both the U.S. and Canada. This figure indicates that *Fire* and *Law Enforcement* play central roles in the network –

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<sup>22</sup>The figures in this section were produced using the *statnet* package (Goodreau et al., 2008) in R version 2.13.0.

<sup>23</sup>In a colloquial sense – this concept as it is used in social network analysis will be described in more detail in Section 4.3.3.1.

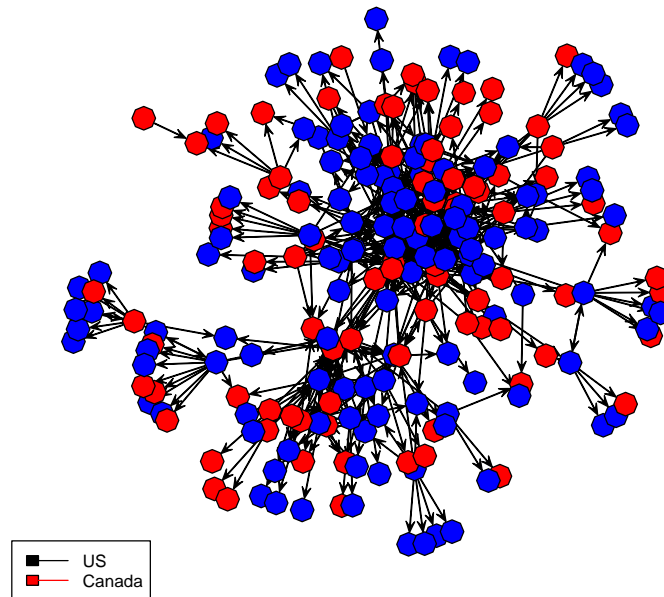


Figure 4.16: Social Network by National Affiliation

they have many connections to others in the network and to each other. However, the most connected individuals in the network are in *Emergency Management*, labeled here in green. This is not surprising, since the role of emergency managers is to act as central contact points, facilitating connections between all members of the networks, regardless of the job function of other network members.<sup>24</sup> Table 4.5 shows the number of referrals for the most central individuals the network.

Figure 4.17 also shows that the pink nodes of *Administration* – general community leaders such as mayors or departmental civil servants – mostly lie the periphery of the network. Many of the *Administration* nodes are only named by one other respondent. This indicates that individuals in this role are often not considered as part of the

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<sup>24</sup>See Section 5.2 in Chapter V for more detailed information on the professional functions of emergency managers generally.

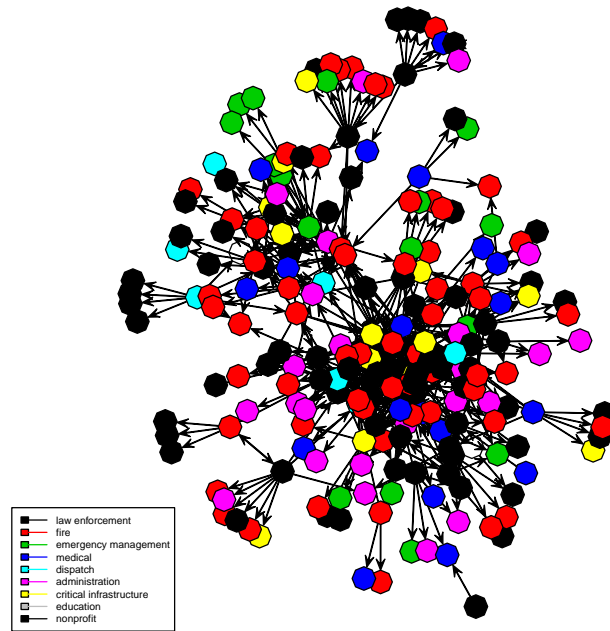


Figure 4.17: Social Network by Occupation

Alters's Job Sector	Number of Referrals
Emergency Management	42
Fire	25
Fire	24
Law Enforcement	16
Medical	15
Law Enforcement	12
Fire	12
Emergency Management	12
Fire	10
Emergency Management	10
Law Enforcement	10
Fire	10

Table 4.5: Occupational Category and Number of Referrals for Most Central Network Members

network, likely because they are not first responders to incidents, and are often not involved until an incident has escalated significantly. Given the connection of public

administrators to political science and public policy, this is an area that is rich for future research.

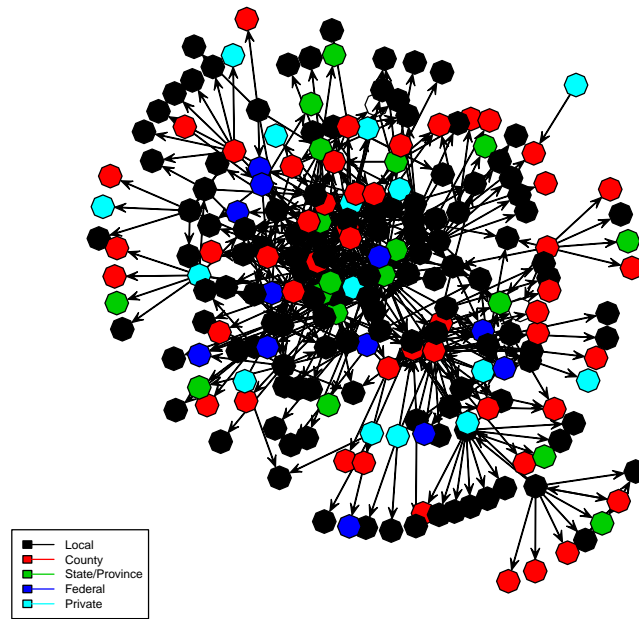


Figure 4.18: Social Network by Level of Government/Sector

Figure 4.18 shows the connections within the network by Level of Government or Sector. Substantively, this figure shows who talks to whom, and how, if at all, respondents are able to make trusted connections to other levels of government or sectors other than their own. It is not surprising that respondents from the *Local* level have the greatest connections to each other. First responders, such as *Law Enforcement* and *Fire*, are frequently from local departments, such as cities, and have the greatest opportunities to talk to each other and get to know each other due to regular professional interaction. Their shared local concerns and, at times, need to share resources facilitate contacts. Nonetheless, the most connected people at the center are from the county level, which is where most respondents from *Emergency*

*Management* work. County-level agents, such as the St. Clair County Sheriff's Office, are often also first responders, and some are also important parts of the network. Also note that state and provincial nodes – in green – are often on the outer edges, indicating fewer directed connections, as are private sector individuals.

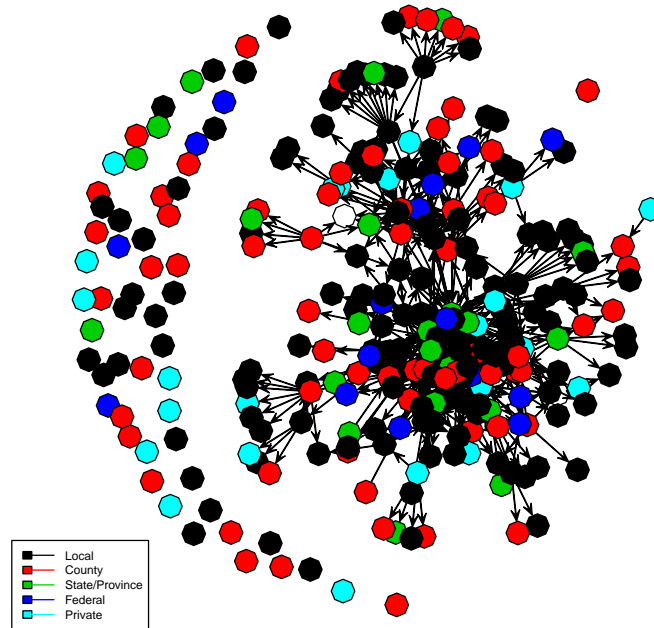


Figure 4.19: Many Isolates in the Social Network by Level of Government/Sector

Figure 4.19 shows the entire network, including isolates. Isolates are those who were not named at all by any survey respondent, although they were in the first wave of contacts provided by St. Clair County Emergency Management and Lambton County Emergency Management. This means that they are on official lists such as the Emergency Management Breakfast list, and thus have some official function in the community. These are not people who did not respond to the survey, but rather those who were not named as contacts.

There were eighty-seven isolates in the network. The reasons for their exclusion

are not clear – this group had an average time in the profession of twenty-two years, and an average time in their specific job of almost thirteen years. They are not, therefore, new to the community. Nineteen people each in *Law Enforcement* and *Fire* were not named by anyone, along with eleven in *Emergency Management*, ten in *Medical*, five in *Dispatch*, twelve in *Administration*, six in *Critical Infrastructure*, three in *Nonprofit* and one *Unknown*. The large number of isolates indicates the sparsity of the network: These individuals may have some role, but because they are not named, I cannot describe what that role may be in detail.

#### 4.3.3.1 Network Density and Basic Network Measures

This directed network of size  $n = 275$  has 43,943 total edges, 43,363 missing edges, 585 non-missing edges, and 48 mutual edges. The overall density of the network is very low at 0.007763769. With the lack of an available comparison group, it is challenging to know if this network is denser or less dense than other homeland security networks. Further, the lack of access to certain key components of the network, specifically employees of the U.S. federal government (See Chapter V) restricts the conclusions I can draw about the importance of network density. Because of this, I limit the networks component of the statistical analysis to descriptive statistics only, and instead try to draw conclusions about network density from the qualitative interviews in Chapter V. Instead, I give a basic overview of some of the important properties of this network.

*Outdegree* refers to the number of people named by others in a network. For *outdegree*,  $\bar{x} = 2.109$  ( $min = 4, max = 2$ ). *Indegree* describes the number of times individuals in the network are named by others. Figure 4.20 shows the distribution of *Indegree* in the network – the distribution of how many times a given individual was named, showing, for example, that most people who were named were named once.

Figure 4.21 shows the link between being named in the network and naming others.

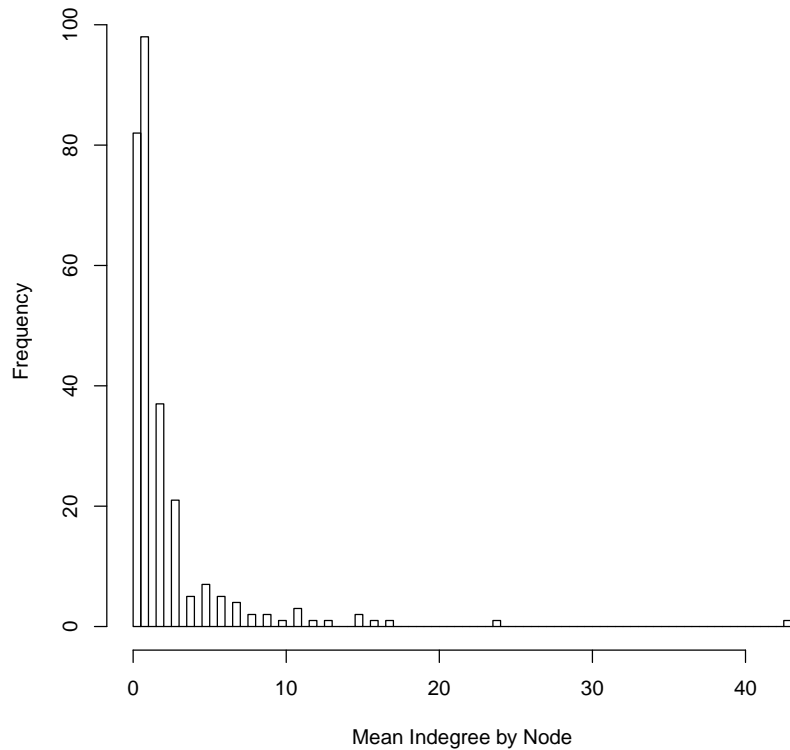


Figure 4.20: Distribution of Indegree in the Network

Recall that the survey was limited in the number of alters that could be named. Each respondent could only name 15 unique alters, although in practice, many respondents named the same alter repeatedly and/or did not provide a full set of fifteen names. The mean  $\bar{x}$  for *indegree* was 2.109, ( $min = 2, max = 43$ ). This means that, for those who were not isolates and not named by anyone, the average respondent (ego) was named by about 2 other respondents.

In the next section, I analyze the network by focusing on the effect of specific dyadic questions which are theoretically independent of the network measures described here.

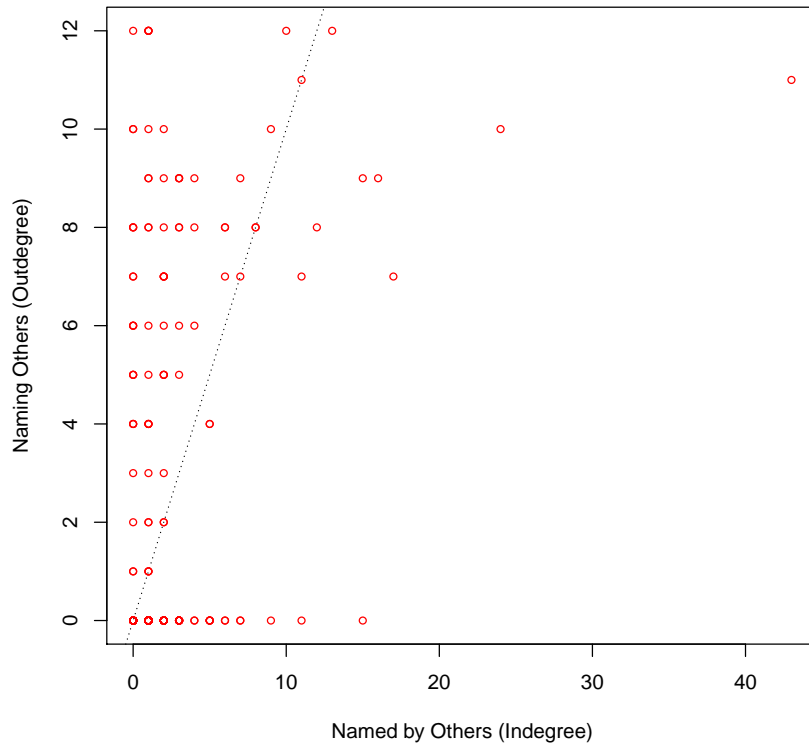


Figure 4.21: Indegree and Outdegree in the Network

#### 4.4 Data Analysis and Hypothesis Testing

The hypotheses proposed in Subection 3.2.0.1 of Chapter III were based on theoretical expectations of the role of trust in group behavior. In this section, I formally test two of these hypotheses using data from the survey described here.

***H1***: Individuals will have greater levels of trust with other members of their in-group than members of other groups and ***H2***: Greater levels of trust within in-groups is correlated with lower levels of trust between groups.

Across all name generation questions, Table 4.6 shows that certain occupational groups tended to name others from the same occupation. Over 73% of law enforce-



Table 4.6: Not All Respondents Named Others in Same Field

<b>Stats</b>	<b>LE</b>	<b>Fire</b>	<b>EM</b>	<b>Medical</b>	<b>Dispatch</b>
mean	.7311828	.7096774	.5483871	.3333333	.0645161
sd	.4457477	.4563714	.5003505	.4739596	.2470017
	<b>Admin</b>	<b>CI</b>	<b>Educ</b>	<b>Nonprof</b>	
mean	.2258065	.2150538	.0645161	.0645161	
sd	.4203785	.4130865	.2470017	.2470017	

ment and 70% of fire professionals named others from the same profession (but different organizations.) Just over half of emergency managers did, as well. However, other fields were less likely to name alters from within their own profession (note that they were underrepresented relative to law enforcement and fire, however.) On its face, this indicates clustering of occupations within the network and thus less opportunity to develop trusting relationships with others. Recalling the earlier discussion on the different meanings of different name generator questions, however, it is important to look deeper into these results in order to understand their meaning.

Table 4.7: Ego-Alter Same Occupation: Informal Food and Drinks

<b>Ego Occupation</b>	<b>Same Occupation Group Ego-Alter: SN1</b>		<b>Total</b>
	Different	Same	
Unknown	3	1	4
Law Enforcement	23	10	33
Fire	19	6	25
Emergency Management	1	6	7
Medical	5	3	8
Dispatch	3	2	5
Administration	2	0	2
Critical Infrastructure	5	1	6
Education	1	0	1
Nonprofit	2	0	2
<b>Total</b>	<b>64</b>	<b>29</b>	<b>93</b>

Table 4.7 shows a cross-tabulation of named alters to the first name generation

question specifically,<sup>25</sup> which asked the last person with whom the respondent had a meal or drinks. For this question, *Law enforcement* was more than twice as likely to have named someone who was not from *Law enforcement*. *Fire* was more than three times as likely to have dined with someone outside the fire services. For the two largest groups of respondents, this indicates a significant amount of cross-occupational connection in an informal setting, something that interviewees in Chapter V indicated was one component of the development of a trust relationship.

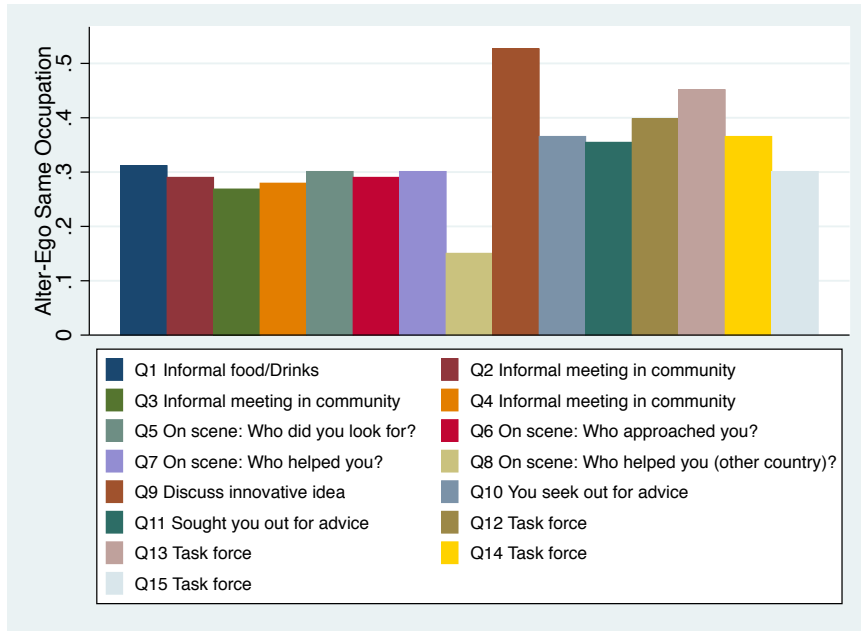


Figure 4.22: Occupational Clustering by Question

For all occupations, Figure 4.22 shows that the tendency of any given  $ego_i$  to name an  $alter_j$  in the same occupational group as themselves (for example, firefighters naming other firefighters, even if they are not in the same organization) varies by the name generator question being asked. For all respondents, a minority responded to the question with an individual of the same occupation type, with the exception of question 9, asking about who the respondent might be willing to discuss an innovative idea yet that is not ready for prime-time. In this case, most respondents would discuss

<sup>25</sup>See Appendix F for crosstabs for all name generation questions.

the idea with someone in the same career, possibly because they would have a greater shared understanding of the developing idea and may be better suited to help the respondent frame the idea to others.

Alter	Obs	Mean	SD
1	60	.7833	.2345
2	57	.7058	.2837
3	52	.6434	.3043
4	47	.6155	.3051
5	93	.8639	.2431
6	51	.6925	.2768
7	93	.8352	.2787
8	19	.6644	.3334
9	62	.7577	.2824
10	65	.7862	.2611
11	56	.6347	.3187
12	60	.7434	.2482
13	60	.6973	.2390
14	57	.6923	.2485
15	54	.6835	.2518

Table 4.8: Average Assessments of Alter Relationships

More generally, how do respondents assess the alters they named among the different proxy assessment questions? This gets to the core of the hypothesis that professionals may be more trusting of others within their same occupational profession than others. The individual assessment questions, or proxy trust questions, answered at the end of the survey, provide more information about how different groups assessed the alters that they named. I generated a new variable that captured the average assessment of the alters named across all questions. Table 4.8 shows the mean of average assessments of each alter by egos across the proxy trust questions. Figure 4.23 shows the average assessment for each named alter 1–15 across all eight of the proxy trust questions. These indicate that there was variation in the average score – on the whole, respondents did not give their named alters a check mark for each and every question, indicating their belief that the questions were applicable to

some alters more than others.

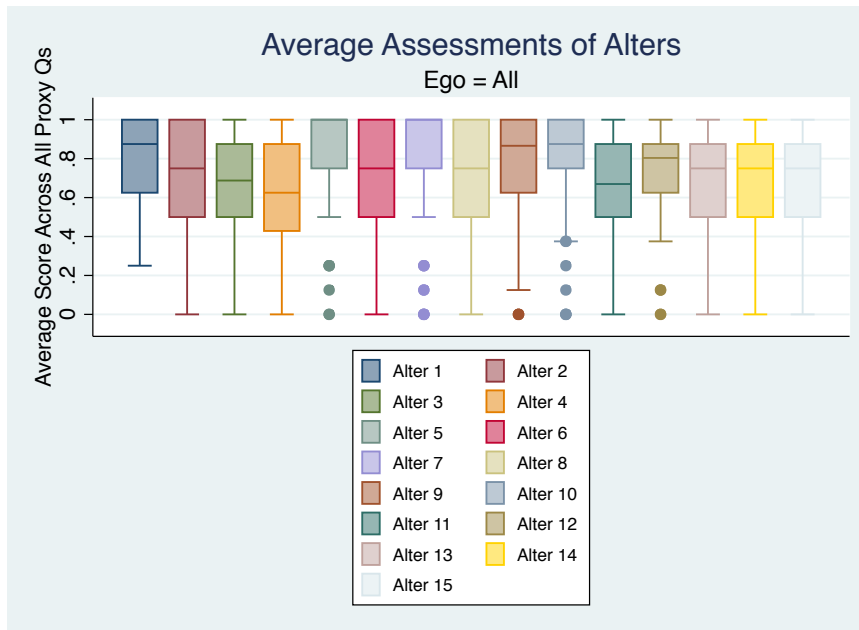


Figure 4.23: Average Assessment of Named Alters across all Proxy Trust Questions

The following figures show the average assessment levels of named alters by the occupation of the ego and the specific assessment question asked in the survey. It is helpful to understand the survey responses at this level in order to better assess basic levels of alter trusting behavior by occupational subgroup. In other words, do some professions tend to rank their alters higher than others?

Figure 4.24 shows that law enforcement and fire have different patterns of average assessments for their named alters. This figure indicates that there is more variation in the responses of fire across more questions, and that law enforcement tends to have a more uniform pattern of positive assessments than fire.

There is less variation of alter assessments by those in the medical field, primarily public health and EMS, as indicated by Figure 4.25. They also have lower average assessments of the first alter named, in response to the question about sharing informal drinks or food.

Figure 4.26, for example, indicates the variation in assessment by egos of named

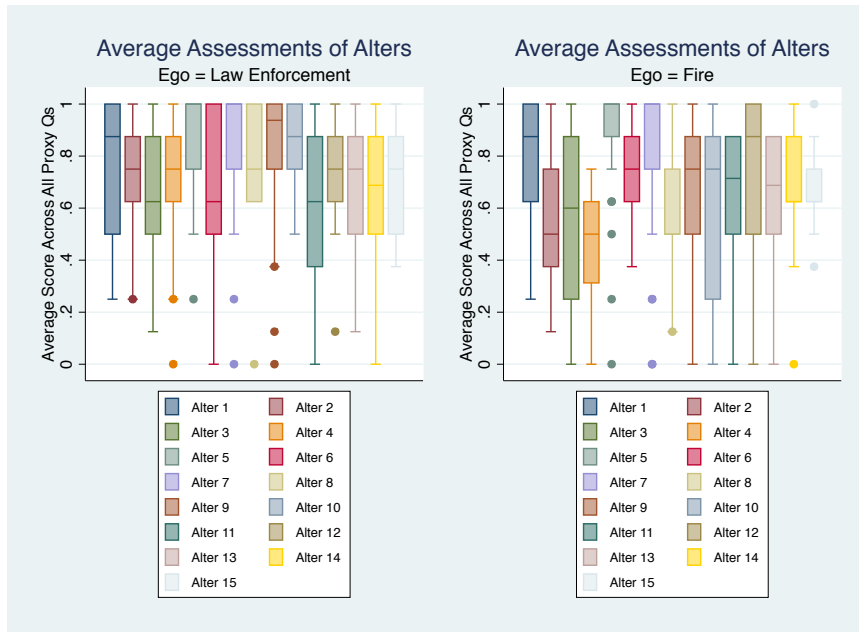


Figure 4.24: Average Assessment of Named Alters: Law Enforcement and Fire

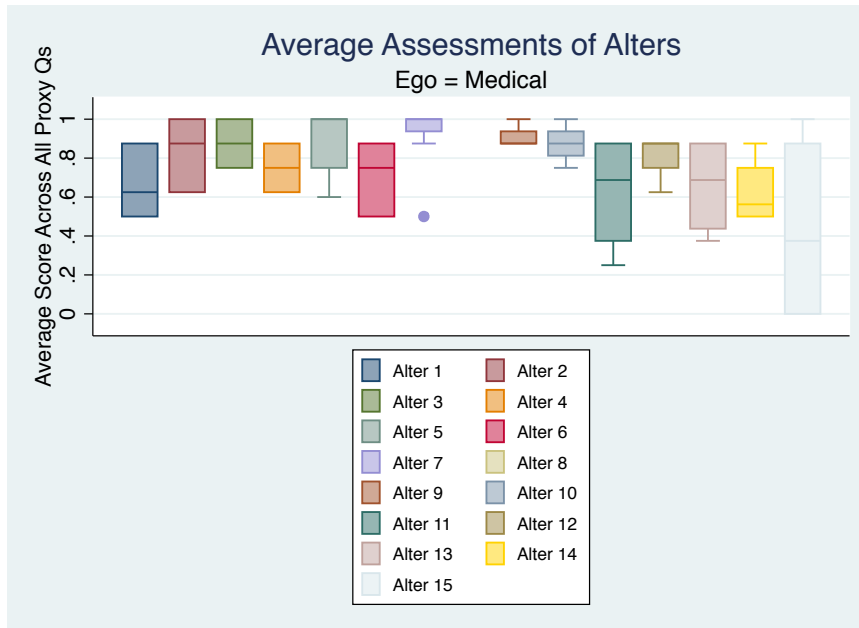


Figure 4.25: Average Assessment of Named Alters: Medical

alters for the question “If you wanted information about an area of expertise other than your own, who would you talk to?” This figure shows a wide variation in assessments by law enforcement and emergency managers. Professionals from the fire services tend to rank their alters lower on this measure, and those in medical rank

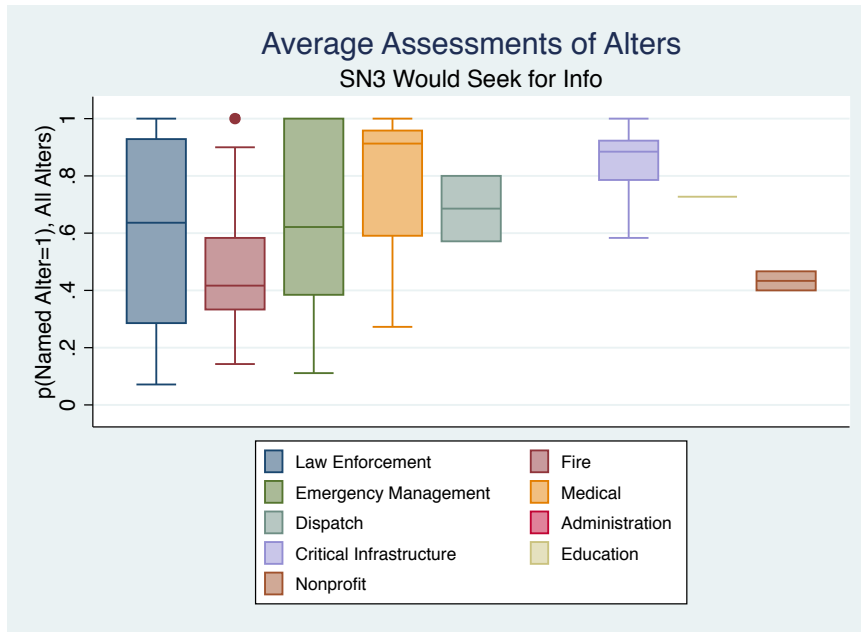


Figure 4.26: Average Assessment of Alters by Occupation: Seeking Information

their alters higher.

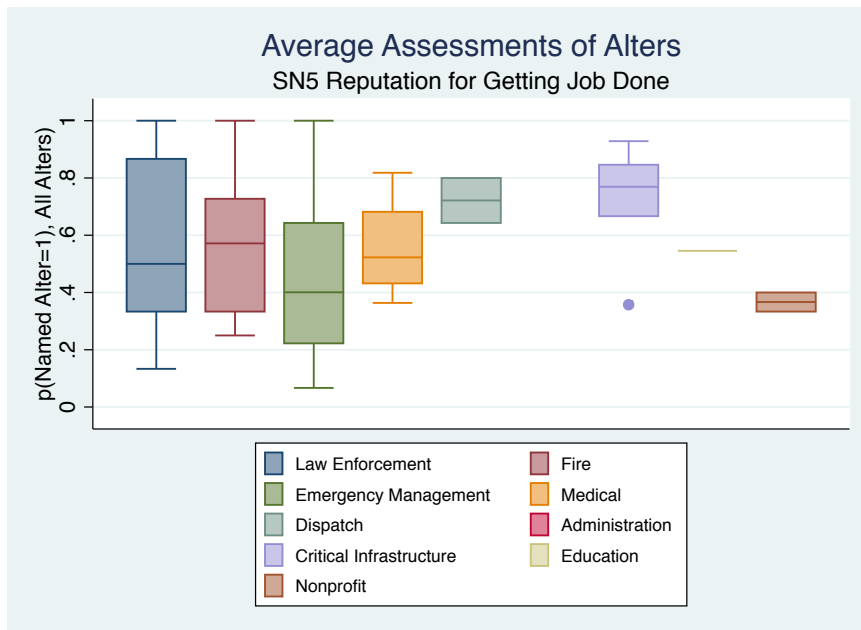


Figure 4.27: Average Assessment of Alters by Occupation: Get the Job Done

Figure 4.27 shows a different pattern, however. The average assessment by fire for their named alters on this measure – “Who has a reputation for getting the job

done?” – is higher than law enforcement, emergency management, or medical. Along this dimension, fire tends to think more highly of the alters they named than the other groups with large responses.

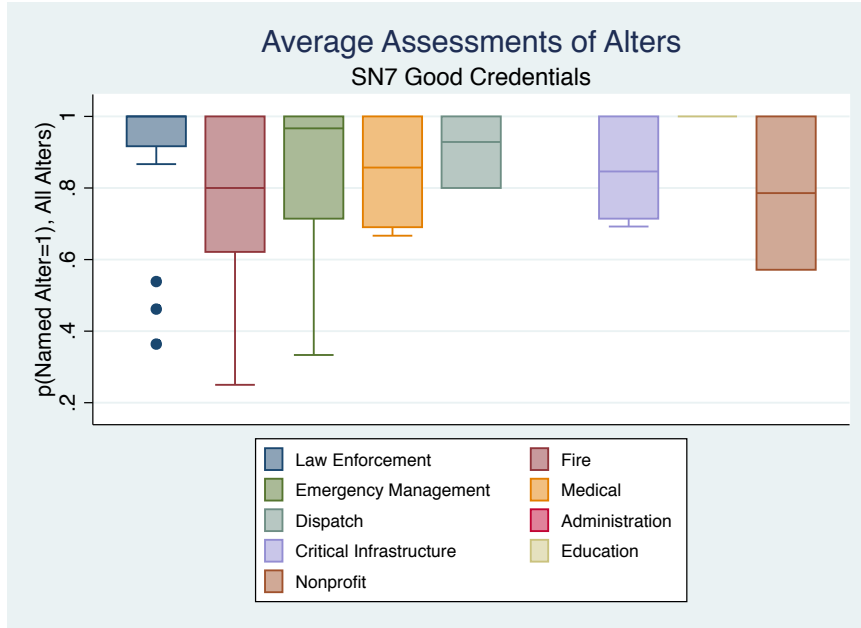


Figure 4.28: Average Assessment of Alters by Occupation: Good Credentials

Finally, it is interesting to see the patterns of assessments across occupational groups for the question of having good credentials. Figure 4.28 shows that, in most cases, egos believe that their named alters possess good credentials, which could be defined as adequate training, for example, or professional titles that are recognizable signs of professional success. This recognition of credentials is especially pronounced for law enforcement.

I test the first and second hypotheses together by examining the survey data in more detail and running a series of logistic regressions on the key survey questions of interest that assess the ego’s assessment of a given alter, the proxy trust questions that are the last eight questions in the survey. These logistic regressions seek to answer the basic question of whether, for any given  $ego_i$ - $alter_j$  dyad, being in the same occupational field makes respondents more or less likely to select “yes” for each

of the alter assessment questions. For example, suppose  $alter_j$  is named in response to the name generator question 5: “Who as the first person you looked for when you arrived on the scene?”, I want to know  $ego_i$ ’s assessment of  $alter_j$  along the dimension of one of the proxy trust questions, question 8: “Reliable/Dependable.” Recall that this assessment is binary: the respondent could either provide a check mark on the survey indicating that this proxy trust question applied to the “Who as the first person you looked for when you arrived on the scene?” alter, or leave it blank, indicating that this characteristic does not apply to this person.<sup>26</sup>

More formally, the logit model used for this estimation is:

$$Pr(Y_{ijq} = 1|X) = \frac{\exp(X'\beta)}{1 + \exp(X'\beta)} \quad (4.1)$$

where  $Y_{ijq}$  is the  $ego_i$  assessment of a given  $alter_j$  for a specific proxy trust question  $q_n$  and  $X$  is a vector of covariates including whether or not they share the same occupational code, the occupational code of  $ego_i$ , ego’s trusting score, national affiliation, and level of government.

The logit model is the most appropriate test for this relationship because it is assessing the probability of observing a binary outcome. Even though the analysis is based on data that was collected in a network setting, the observations from specific survey questions are independent of others. *Prima facie*, there is no reason to expect that an ego’s assessment of one alter has any direct effect on the assessment of other alters, particularly because alters are from other organizations. The logit model is also appropriate for this data since it helps understand the marginal effects of the independent variables on the binary dependent variable – whether or not an ego affirmatively answers a proxy trust question for a given alter. I estimated 300 logit regressions: ten regressions for each ego-alter dyad (by occupation), estimating

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<sup>26</sup>For these questions, responses were only counted as 0 in the presence of other responses indicated with a check mark. In other words, for respondents who did not answer any of these questions at all, blank proxy trust question fields were coded as missing data.



the probability that the ego would mark that named alter as 1 for each of the ten assessment questions. 150 regressions were of the base model with the single covariate of shared occupational category, and 150 with the expanded model including the additional ego-level covariates of ego occupation, trusting score, national affiliation, and level of government.<sup>27</sup>

With one exception, none of the 300 regressions were statistically significant for any of the covariates, including shared occupation. The only exception was the single-covariate regression model of same occupation for social network question 4: “Who are the ‘go to’ people for questions about homeland security, public safety, and/or emergency management in the region?” which was positive and statistically significant at the .05 level. Table 4.9 shows the results of this specific estimation.

Table 4.9: Logit Results for Same Occupation: Base Model

Variable	Coefficient (Std. Err.)
same_sn1	1.219* (0.588)
Intercept	-0.446 (0.320)
Significance levels : † : 10%   * : 5%   ** : 1%	

Substantively, this means that, without controlling for any other ego-level factors, respondents were significantly more likely to say the their named alters were the “ ‘go to’ people” if they shared the same occupational function. This is a surprising result, given the frequency with which emergency managers were named more frequently than individuals from other professions, as indicated by Table 4.5, and frequently sought out for advice by others, as indicated by Figure 4.15. Based on the interviews reported in Chapter V. I am puzzled by the finding. In any case, this question is no longer statistically significant in the full model, as indicated by Table 4.10.

<sup>27</sup>The single covariate model was  $Pr(Y_{ij} = 1|SameOccupation_{ij})$  while the multivariate model is  $Pr(Y_{ij} = 1|SameOccupation_{ij} + TrustingScore_i + NationalAffiliation_i + Sector/Level_i)$

Table 4.10: Logit Results for Same Occupation: Full Model

<b>Variable</b>	<b>Coefficient</b> (Std. Err.)
same_sn1	0.308 (1.351)
code_6	-0.626 (0.449)
trusting_score	-1.295 (2.855)
o.canada	0.000 (0.000)
sector_code	0.755 (0.497)
Intercept	5.066 (11.746)

Significance levels : † : 10% \* : 5% \*\* : 1%

What about the main concern of the hypothesis, however? Do certain groups tend to trust each other more than they trust other groups?

### Law Enforcement

<b>Variable</b>	<b>Coefficient</b>	<b>(Std. Err.)</b>
alter_le	0.424**	(0.129)
alter_fire	0.182*	(0.082)
alter_em	-0.159	(0.109)
alter_med	-0.200	(0.154)
alter_disp	-0.557**	(0.042)
alter_admin	0.010	(0.174)
alter_ci	0.093	(0.152)
alter_edu	0.562**	(0.131)
alter_np	0.614*	(0.228)
Intercept	0.203†	(0.113)

Table 4.11: OLS Regression of Alter Assessments for Law Enforcement: SN3

Table 4.11 displays the results of an ordinary least squares (OLS) regression on the dependent variable of law enforcement's average assessment of named alters for

question 3. OLS is the appropriate in this case because it is measuring an average across multiple assessments, instead of the probability of observing a binary outcome for a given ego-alter dyad pair. Unsurprisingly, the alters of other law enforcement and fire services are statistically significant and positive, along with education and nonprofit. What is surprising is that the named alters from Dispatch have a statistically significant and negative sign. This may indicate that Dispatch is not considered an important source of information in the community. According to law enforcement, they also have statistically significant and negative evaluations for questions 7–10. However, across further regressions (not shown) this relationship is not static. For question 5, “Reputation for Getting the Job Done,” Dispatch was statistically significant and positive, while Administration has a statistically significant and negative sign. For question 7, “Good Credentials,” Fire, Dispatch, and Education are statistically significant and positive, while Administration has a statistically significant and negative sign. For question 8, “Reliable/Dependable,” Fire and Education are significant and positive. For question 9, “Skilled/Competent” question 10, “Experienced” and Fire and Education are significant and positive.

Figure 4.29 shows the average assessment of alters who are and are not law enforcement members for the assessment question “If you wanted information about an area of expertise other than your own, who would you talk to?”. A two-sample t test with equal variances, however, indicates that this difference is not statistically significant. This suggests that law enforcement does not “silo” itself, at least with respect to seeking out information.<sup>28</sup>

Figure 4.30 plots the average assessments of law enforcement of their named alters along this measure for all named alters. It graphically shows the highest level of assessments for other law enforcement, but lower assessments for others. This does not necessarily mean that law enforcement will “circle the wagons” and blindly defend

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<sup>28</sup>In fact, in t-tests of all assessment questions, the difference in assessment levels between law enforcement and other occupations was never statistically significant.

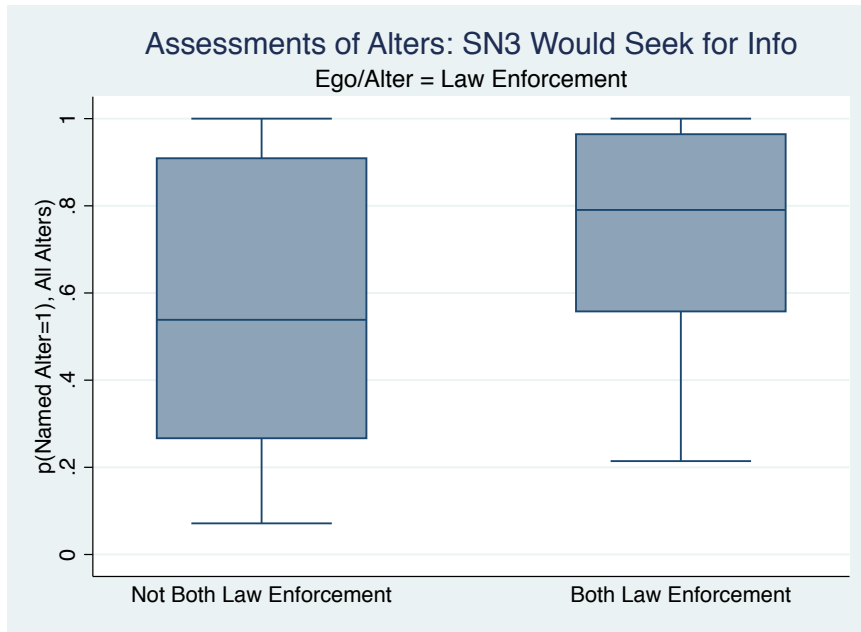


Figure 4.29: Law Enforcement is Slightly More Likely to Seek Out Other Law Enforcement

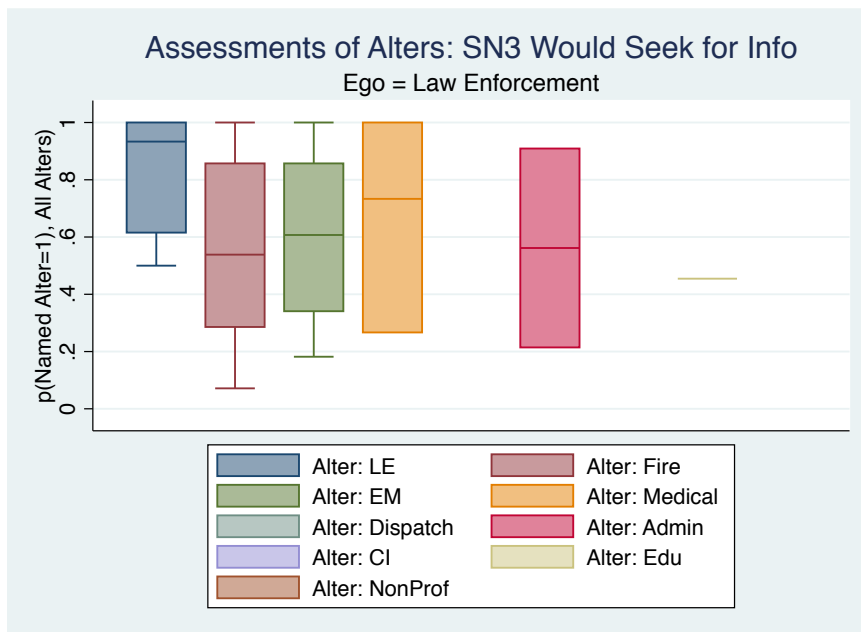


Figure 4.30: Law Enforcement Seeks out Emergency Managers and Medical for Information

the actions of other law enforcement.

Compare this to Figure 4.31, which indicates the highest level of assessments by law enforcement of firefighters for the question of “Who has demonstrated proficiency

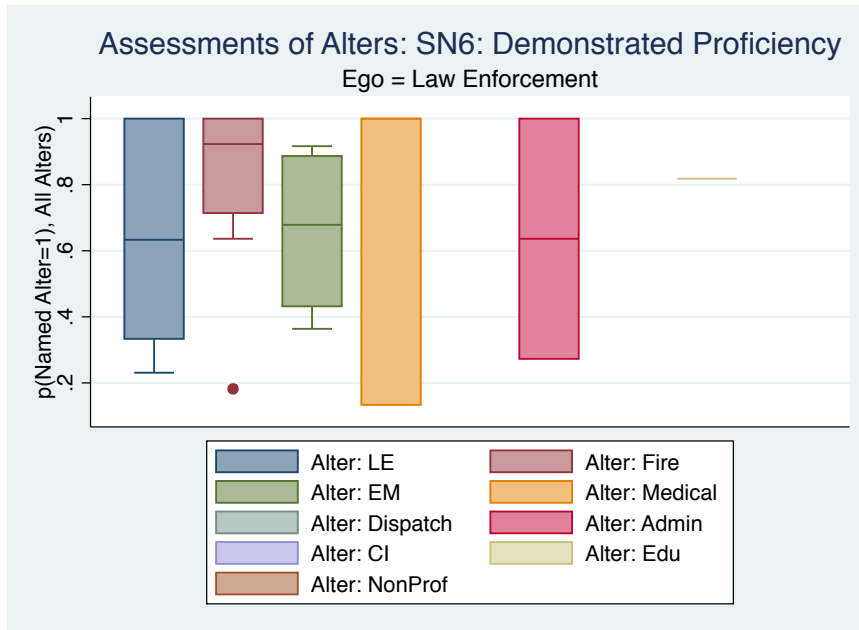


Figure 4.31: Law Enforcement Rates Firefighters Highly on Demonstrated Proficiency

in past incidents?” Here, named alters from firefighting actually rank higher ( $\bar{x} = .804, sd = .272$ ) than the in-group named alters from law enforcement ( $\bar{x} = .638, sd = .323$ ). The average assessment of other law enforcement officers could indicate an exposure to more incidents where fellow officers underperformed, or it may indicate an authentically high regard for individuals in a different profession. It is in any case additional evidence that law enforcement includes other types of professions in its network in a positive manner.

## Fire

Table 4.12 displays the results of an ordinary least squares (OLS) regression on the dependent variable of fire’s average assessment of named alters for question 3. It is interesting that none of the coefficients in this regression are statistically significant. This makes it challenging to make conclusions about trust coming from those in the fire services along this dimension. For question 4, the “go to” person for fire can be found in critical infrastructure, positive and significant at the .01 level. Fire also has

Table 4.12: OLS Regression of Alter Assessments for Fire: SN3

Variable	Coefficient	(Std. Err.)
alter_le	-0.059	(0.138)
alter_fire	-0.022	(0.109)
alter_em	0.049	(0.145)
alter_med	-0.254	(0.143)
o.alter_disp	0.000	(0.000)
alter_admin	-0.248	(0.253)
o.alter_ci	0.000	(0.000)
alter_edu	-0.247	(0.220)
o.alter_np	0.000	(0.000)
Intercept	0.669*	(0.230)

a more positive relationship with Administration which is positive and statistically significant for question 7, “Good Credentials” and question 8, “Reliable/Dependable,” as well as “Skilled/Competent” and “Experienced.”

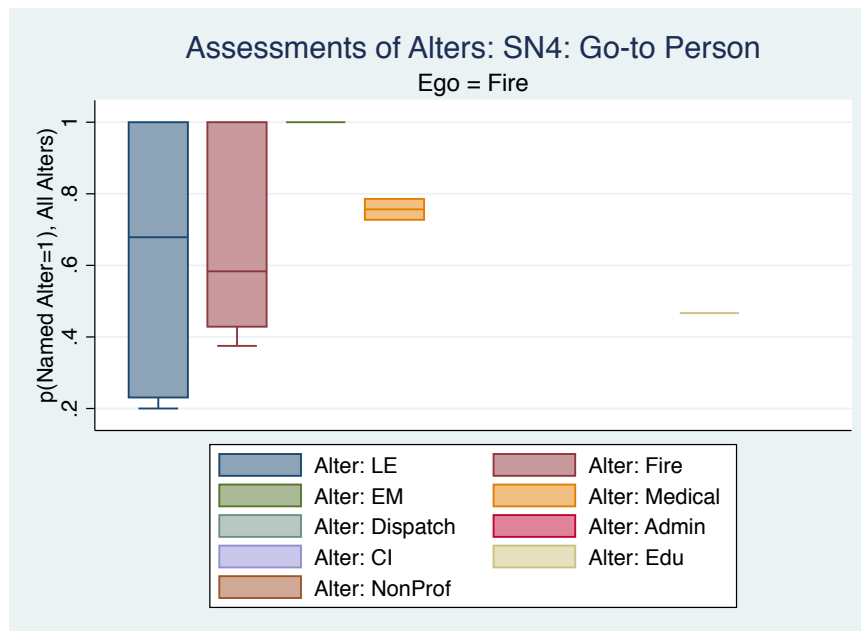


Figure 4.32: Fire Seeks out Law Enforcement for Information

Fire shares some of the same assessments of law enforcement as law enforcement does of itself. Figure 4.32 shows that they are more likely to describe alters in law enforcement as the “go to” people, even higher than other firefighters. Medical gets relatively high ratings as well.

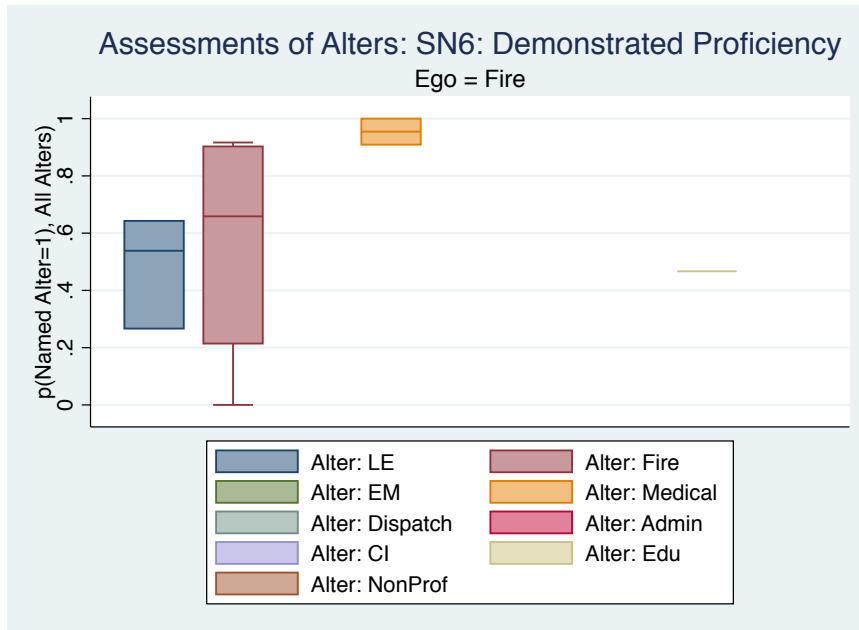


Figure 4.33: Firefighters Assess Each Other as Demonstrating Proficiency

Similar to the responses of law enforcement, firefighters are also the most likely to say that other firefighters demonstrated proficiency in past incidents. They also rank emergency managers slightly higher than law enforcement as well.

### Emergency Management

After law enforcement and fire, emergency management is next largest respondent group. Nonetheless, because of their lower representation in the data, these results are not as robust as for the first two occupational groups.

Emergency managers rank law enforcement highly, at least as far having a reputation for getting the job done, as Figure 4.34 shows. They were also likely to assess law enforcement as skilled/competent, reliable/dependable, and having good credentials. Finally, they named more individuals from critical infrastructure than other respondents, and gave them high marks.

Overall, these results suggest mixed support for H1, that individuals will have greater levels of trust with other members of their in-group than members of other

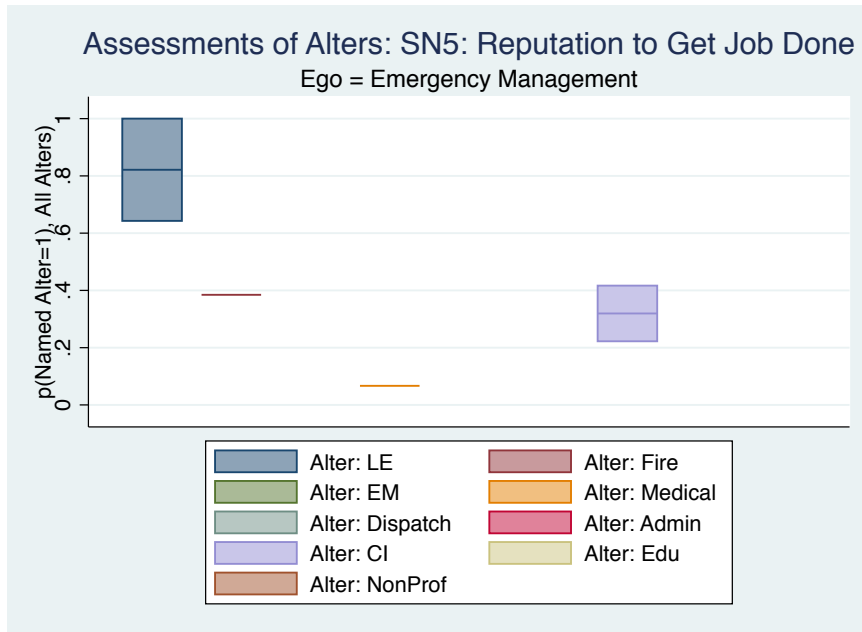


Figure 4.34: Emergency Managers Assess Law Enforcement Highly for Getting the Job Done

groups. While it is the case that some professions rank others with the same occupation more highly than others, this is not true across the board. Depending on the question, or the specific aspect of professional function being assessed, some occupations rank others more highly. This is a promising precondition for the development of trusting relationships, as will be explored further in Chapter V.

These results also suggest rejection of hypothesis H2, that greater levels of trust within in-groups is correlated with lower levels of trust between groups, at least to the extent that in-group is defined by professional function. The logistic regressions, specifically those which account for the full model including ego-level covariates, also support a rejection of this hypothesis, as this kind of “siloing” is not necessarily true across the board in this community.



## 4.5 Conclusion

The core argument about the development of interpersonal trust is that individuals begin such relationships through informal and formal meetings, but dyadic trust actually develops as the result of repeated interactions in real-world settings that allow professionals to demonstrate competence, as well as share useful information. In Chapter III, I argued further that group affiliation might hamper the development of trusting relationships if such membership bolstered cognitive biases. Some of the findings from the quantitative data reinforce findings from the literature, such as group cohesion among select sub-groups, but others challenge it.

The data presented here suggest that the high levels of mutual trust between law enforcement and fire indicated by the proxy trust questions here is a result of the dynamic of shared on-the-job experiences. The findings on law enforcement, in particular, also indicate that, at least in this relatively small community, they are less insular than some may expect. They do have positive and trusting connections with professionals from other fields, a factor which helps facilitate communication and information exchange.

The lower ranking of medical by other groups similarly suggests that the lack of shared experiences and opportunity to demonstrate their capabilities hurts the ability of those in medical to develop trusting relationships, either as ego or alter. At the same time, medical thinks more highly of their named alters as providers of information, indicating a potential cognitive bias in this group that is less apparent than other groups. As I will discuss in more detail in the next chapter, those in the medical profession are especially challenged by formal institutions that impede cooperation because there are more regulations governing both the practice of medicine by EMTs (emergency medical technicians) and complex national-level rules for those in public health. This is an important example of the conflict between formal institutions and the development of interpersonal trust, when accounting for group-level dynamics.

One limitation of the survey is that it is not longitudinal, and therefore is of limited utility to addressing *how* the observed trusting relationships within the network developed over time. To better understand the mechanisms driving these observations, I turn in the next chapter to qualitative interviews.

## CHAPTER V

# Qualitative Evidence: Interviews from a US-Canada Border Region

The main argument of this research is that, for security professionals working in high-pressure potential threat conditions, interpersonal trust relationships start with the opportunity to meet, but develop when both sides can demonstrate professional capabilities and share useful information. The opportunity for repeated interactions allow both demonstration and sharing to occur, allowing interpersonal trust to act as a complement or even a substitute for formal institutions governing the professional relationship between two individuals in the community.

But how do professionals in the community subjectively understand the role of trust? One DHS official interviewed for this dissertation described interpersonal trust in the homeland security setting as,

... a complex relationship that is based on genuine authenticity, that is one definition. And, another definition suggests that true trust is when your problems become someone else's problems and their problems become yours. And because of the requisite security system, the core issue is, that people enter these relationships and they basically take on each others problems as their own in order to take on the desired outcome that is really not possible. So those are two concepts of trust seeking, trust making,

that I would consider on this idea. This idea that a complex relationship takes authenticity and care, it comes obviously over time. There is an underlying commitment beyond empathy is literally one person's problem is yours and yours is theirs. So this idea of . . . a joint mutual support, even at a personal or professional cost.

Note that this definition, coming from a working practitioner, dovetails with the academic definition of trust described in Chapter II of shared "core beliefs" (Leach and Sabatier, 2005). It requires shared interests and shared problems where an individual recognizes their own stake in a shared outcome. Based on the interviews, most of the professionals in the St. Clair County/Lambton County region deem "trust making" a critical component of their job.

How do professionals in the community develop and maintain trust? Interviewees described the trust they have with each other as coming from various sources including shared professional backgrounds, historical events stretching back for decades, having friends and family that work in related professions on both sides of the border, participating in joint training exercises, attending social events together, and witnessing others effectively handle complex emergencies. They described the process of developing trust as one that develops over time in multiple settings, as one metropolitan fire chief described:

Okay, so one of our main mottos is that we believe in networking and the first time we meet somebody shouldn't be on an emergency scene. So we host meetings for sure quarterly, and more often with committees and things like that. It's just a way to get to know people. So St. Clair and Port Huron have been very active in hosting meetings over on the American side. On the Canadian side, we host meetings with homeland security or border patrol and Canadian border patrol just so that we're getting face to face, we're meeting people so we know each other the first

time we have an emergency response. And it's worked famously. I mean I can truly say that chief Eick in Port Huron is a friend, same with Jeff Friedland and that's a wonderful relationship that's been built over the years. So it's more of the casual meeting, business to be done, but not during an emergency scene.

Another respondent, a field manager with a large multi-national chemical company with pipelines crossing the international border, also described the development of trust as involving both informal components and learning about the professional background of others:

You start with a quick meeting, and then you have another meeting, me I'll say after a meeting let's have a beer! Then you just start exchanging stories, how long have you been in the business? You're new at this, I've been at it. Then I start saying, you know I can help you, you can help me, and then you go into the relationship. I mean you talk like that you... So this, I just say what are you going to do, let's have a beer. Okay, okay, now I know who I can call now, if I've got that relationship. I'll go back to work and say "Oh, Cali knows that!"

It is possible that trusting relationships like this are simply a by-product of being as well-known part of the community, or being referred by a trusted individual. However, there are important ways in which new individuals could be introduced to the network. I was specifically interested in this dynamic, and asked respondents what they do when a new person joins the local homeland security community. One respondent, the director of emergency response for a large petrochemical processing company, who also leads technical training of firefighters throughout North America on chemical response, described his own experience being the "new person":

Well, I think you try to get to know them a little bit. You try to welcome

them to the fold. You don't want them to feel like: "Oh this is the good old boys club, and you're not welcome." That would not make anybody feel good about joining up and like: "Oh man, I'm an outsider," and you know how it is when you walk into a room and everybody knows each other but you don't know them, and you feel very insecure, and I know that happened to me in 2004, when I started. And very quickly, the other chiefs or somebody that you met once or twice would quickly introduce you to everyone and say: "This is chief Eick from Port Huron, and this is this person and that is that person," so you get to know them, and they'll talk to you, they'll come over and say: "Hey, if you ever need any help, if you have any questions, call me." I've told him that many times. "If you're concerned about anything going on around here, give me a call. I'm happy to answer the phone. Or call me at home, I don't care. That's fine."

With the exception of one respondent who refused to be identified or recorded, all of the subjects that I interviewed in the St. Clair County/Lambton County study site were part of the *Wave 1* group of survey respondents, and most of them in fact completed and returned their anonymous survey. In this chapter, I use the information from qualitative interviews to give context to the data from the surveys by giving participants the chance to share their perspective of the network, and their role in it, in their own words.

As noted earlier, I selected the St. Clair County/Lambton County region for reasons of feasibility and importance to the research question. This region is relevant to other northern border cases, such as the Detroit/Windsor region or the Buffalo/Niagara region, which also have a large presence of critical infrastructure, multiple major international land border crossings and thus a similar presence of federal border agencies and international threats. They also face similar predictable

emergencies, such as major winter snowstorms which can rise to the level of being declared disasters at the state and provincial levels. While trying to avoid the selection of cases on the dependent variable (Geddes, 1990), I was limited in what I could feasibly accomplish given the time and funding constraints of a dissertation research project.<sup>1</sup>

## 5.1 Interview Methodology

In this section, I follow the guidance of Bleich and Pekkanen (2013) in laying out the process of conducting these interviews in great detail.<sup>2</sup>

Due to the sensitive nature of the questions being asked, I sought out potential interviewees primarily based on referrals from others in the network. See Appendix B for the interview sampling frame, comparing field interviews to survey data collected in this study region. Once I had been “vetted” by the positive experiences of early interviewees, many others were interested in participating. In both the U.S. and Canada, representatives from *Local Fire* and *Law Enforcement, Emergency Management*, and *Private Critical Infrastructure* (primarily petrochemical facilities and railroads) were especially helpful and willing to talk.

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<sup>1</sup>I applied for research funds unsuccessfully from the following: The Canadian Studies Doctoral Student Research Award from the Embassy of Canada, Fulbright Canada (2), The Morris Abrams Award in International Relations, the National Institutes of Justice Ph.D. Graduate Research Fellowship (2), the NSF Political Science Dissertation Award, and the Smith Richardson Foundation. I am grateful to the National Institutes of Justice for substantive, high-quality feedback on my two proposals that improved this project, SCC Department of Homeland Security and Emergency Management, who ultimately funded the survey research, as well as the Department of Political Science, Ford School of Public Policy, the Graduate Seminar on Global Transformations and the University of Michigan Rackham Graduate School who provided additional research funds to complete this work.

<sup>2</sup>They write, “For us, the most important thing a scholar can do is report about the nature of the interviews he or she conducted. Of course, a full description of all these elements for each interview would be time and space consuming. But it helps a great deal if researchers are explicit about key interviewing techniques, such as how the researcher created a record of the interview – through live recording, simultaneous note-taking, or post-event note-taking (and the delay between the interview and the note-taking) – whether interviews were structured, semi-structured, or unstructured; and the length of interviews, especially when the researcher relies on them for critical observations or elements of the analysis” (Bleich and Pekkanen, 2013, p. 92).

However, despite my best efforts, some interviews were simply impossible to obtain. This was especially true with representatives of U.S. federal agencies, who were required to get permission to participate in academic research.<sup>3</sup>

When interviewing respondents, I explicitly followed the methods laid out by Leech (2002) and Rubin and Rubin (2005) in their book, *Qualitative Interviewing: The Art of Hearing Data*. Rubin and Rubin describe the interview process as one of “conversational partnership,” and their guidance about locating useful contacts, establishing trust, expressing empathy, and structuring the interview were particularly important for working with a population that is both busy and suspicious of researchers asking about security issues.<sup>4</sup> An analysis of security networks requires a high degree of trust and credibility, and my professional experiences gave me a unique ability to successfully carry out this research. I worked for two years as an Assistant Policy Advisor for the Governor of Michigan, developing functional professional expertise and professional networks in public safety, corrections and homeland security, then worked for three years as a policy analyst for the Governor’s Homeland Security Advisor, BG (ret) Michael C. McDaniel, in the Michigan National Guard. Once I secured official sponsorship of the project from the SCC Office of Homeland Security and Emergency Management, Mr. Jeff Friedland, the emergency manager, agreed to field any concerns from interviewees or potential survey respondents.

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<sup>3</sup>For example, many interviewees described one particular person who was the head of an important federal critical infrastructure facility, whose father was the former police chief, and who had lived in the area his entire life. I had already interviewed many individuals in other agencies who were his professional colleagues, and he was interested in sharing the point of view of his agency. When he asked the Public Affairs Liaison for Field Operations in the Detroit Field Office for his agency for permission, I sent all of my information, including details of the study and other contacts. Ultimately, the Public Affairs Liaison denied my request to meet with this individual. This individual did return a survey, however, meaning that he is included in the data analysis in the previous chapter.

<sup>4</sup>In fact, one survey respondent, a police chief interviewed at the beginning of the project, told me a story where someone had falsely claimed to be a researcher on security issues. The chief explained that he called his colleague, another police chief in Canada, to verify the credentials being presented by the researcher and discovered that the individual was a criminal. It was not clear to me if I was being told as a way of expressing doubt about me, but after this, I secured a letter of introduction from Dr. Stam, and conducted most of my interviews on a referral basis only.



For each interviewee, I arranged an in-person meeting, usually at their office. The interviews were semi-structured, following the suggested protocols laid out by Rubin and Rubin (2005).<sup>5</sup> I began by introducing myself, providing my business card, and giving a brief overview of my research. I always began with a broad question about the respondent's work, giving them an opportunity to explain their role and function without regard for my research question. I asked main questions related to the content of the survey, but utilizing Rubin and Rubin's suggestions for getting precise and useful information from respondents, for example: "Tell me about a specific event where you worked with other members of the homeland security or public safety community? (Walk me through it)." This allowed the respondents to focus on a specific representative example event, describe it in detail, including the setting, other participants, challenges and successes. From the main questions, I asked follow-up questions and clarifying probe questions to elicit factual detail. At the end of each interview, I asked respondents their opinion on my survey (which they had not yet seen), specifically if they would be willing to answer questions about their professional contacts. I also asked for specific names and the permission to contact others for the purposes of conducting a similar interview. Each interview took between one and two hours to complete.

With two exceptions, all interviews were recorded using a LiveScribe pen, an unobtrusive recording device that is built into an actual ink pen, allowing for simultaneous note-taking and recording.<sup>6</sup> While not all scholars who conduct interview research advocate recording (Woliver, 2002), I found it a useful and unobtrusive tool that resulted in tangible results. I always requested permission to record the respondents, and showed them the LiveScribe pen and how it worked with the note-taking paper.<sup>7</sup>

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<sup>5</sup>See Appendix A for an example of the actual interview protocol used.

<sup>6</sup>The LiveScribe pen produces both an audio file and an interactive graphics file that shows the actual notes being taken. The audio can be exported or it can stay on the pen, in which case it can be accessed by tapping on the location in the notes where the user wishes to hear the audio recorded at the specific time the note was written.

<sup>7</sup>Many interviewees were intrigued by the LiveScribe pen, and asked how it worked, its price, and

All interviews were then transcribed.

## 5.2 Ego-Level Indicators of Trust

In Equation (1.1) in Chapter I, I hypothesized that capturing ego-level “trust-  
ingness” is an important part of understanding the role of interpersonal trust in a  
social network. Some individuals may be less trusting of everyone, even others in  
professional settings, due to their own background and personal experiences. Recall  
from the discussion in Chapter IV, however, that there was not a systematic de-  
tectable variation by profession or sector in ego-level trusting behaviors according to  
the validated scale developed by Yamagishi and Yamagishi (1994) and utilized in the  
survey.

Some interviewees, however, volunteered to discuss their own perceptions of ego-  
level trust. One county-level deputy undersheriff in the U.S. described how he had to  
consciously shift from the “questioning” mentality of police work when he advanced  
in his career to positions requiring more inter-organizational cooperation:

[B]eing in police work for so long, sometimes I go the opposite way. I  
actually try to go out of my way to not alienate or anything like that.  
When I was back before when I was on the road just doing regular police  
work, you had to develop that certain kind of questioning sense right  
off the bat, and I’ve been really trying to develop in this past three years  
some more of trusting sense until somebody proves me wrong... [B]ecause  
I realized pretty quickly when I go to these meetings and I kind of said, I  
don’t know any of you, I’m not going to release anything, I don’t want to  
tell you what I can and cannot do or what our department can and can’t  
do. Don’t worry if you need us we’ll be there, kind of that attitude, and  
after a short time I realized that I’m not getting anywhere with this and  

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how it might function for them in their professional roles.

I will need to rely on these people at some point. So if I don't expand myself a little bit, how can I expect them to do the same, you know? I realized that pretty quickly doing this thing, I can come to these meetings and not share and not participate very much and just here because I have to be here and try to gather information, or I can be an active participant. But being an active participant kind of forces you to trust people.

Another interviewee, a female manager in a U.S. county public health department, referred to other types of ego-level characteristics as a way of developing trust and rapport in inter-organizational settings. She related:

I think the most important thing with the group is not pretending like you're something you're not. Like passion. If you come into a room passionate, and you say, "Look, this is what we do, this is how we do it." And willing to realize that, and women are very good at that. Men are not, generally. I'm usually in a male dominated environment and most of them quietly and politely sit and look at each other, and speak when spoken to. You don't get a lot of cross conversation and the human part of me, if something was not right or correct, I found my passion kicked in and I said, "Now wait a minute. That might not work, because," and then offer that. And I just think that if you don't believe in what you're doing, and you don't understand what you are doing, you shouldn't be doing it, because you represent a whole discipline.

This individual was the only woman in the St. Clair/Lambton study region that I interviewed, which is why I did not seek to gather additional demographic information in the surveys, in order to preserve anonymity in response. The issue of gender in interagency communication in a security setting is a potentially fruitful area of future research that I did not explore further in this project.

The public health manager related that her passionate determination and professional commitment eventually helped her gain the trust of others in the regional homeland security community. She continued:

And you're the face for that whole organization, and you put out on the table, and people disagree with you and interact with you more, they're going to respect you. You got to take your punches basically. And some days you get so down, but the hardest part was I found I was more willing to share information more willing to talk about issues openly than many of them were because they are so disciplined. And maybe that is where the trust comes in. Maybe I am transparent. I know my health officer is very transparent, we try to be that way. Because maybe we don't always impress other organizations, but the [public] community has got to trust us. Because those people we got to get the meds into and the pills into in a worst case scenario, and if we are not transparent, they are not going to come to us. And it's going to be very very bad. So we got to just put ourselves out there and take the cuts. You know it's my personality. I've met people, just by the way they talked, and you know they're here for the right reason. They're not here to look good, they're not here to pretend. Because they couldn't do any other job. They're here because they're that good. And you know them.

Emergency managers have a unique role in the homeland security community, because they are tasked with connecting with and organizing a large number individuals from a wide range of disciplines in order to accomplish a shared goal. In this role, they must balance competing budgetary, organizational, and bureaucratic interests, as well as mollify any interpersonal conflicts. In public safety settings, emergency managers frequently use collaborative management techniques to help different types of organizations better understand each other (Kelman, Hong and Turbitt, 2013),

making the process of building interpersonal trust among others central to their job (Agranoff and McGuire, 2001). The characteristics associated with successful collaborators, including open-mindedness, patience, respectfulness, and persistence are associated with greater levels of ego-level trust (O’Leary, Choi and Gerard, 2012). A county-level emergency manager in the U.S. described how his profession influenced, and was influenced by, his ego-level trustingness of others:

If the person in that position has a similar thought process, similar desires, goals, then naturally you’re going to improve that relationship and become closer. That’s what I think happens, is you maintain your basic level of relationship. I mean, you got to do it with so many agencies, departments, there’s that individual relationship, but definitely you need to capture where the people that have the influence, but have the similar likenesses, such as yourself. I mean, you can kind of be blue in the face to talk to somebody that doesn’t believe in what you’re doing and you get the lip service.

This orientation towards people instead of tasks is characteristic of emergency managers generally (McGuire and Silvia, 2010, 2009).

Emergency managers are not the only individuals required to utilize ego-level trust to facilitate trusting relationships, however. One interviewee is the executive director of a non-profit coalition of private sector owners of critical infrastructure in Canada, primarily petrochemical processing facilities. The non-profit has multiple roles, including community coordination and outreach, and serves as a facilitator between the chemical plants and the surrounding communities. The director described how he builds trust when reaching out to municipal police and fire departments:

Generally speaking, speaking from the experience that [another director] and I had is that I’m pretty sure they look at us like we didn’t have a

clue and they were right and to this day, I will tell anybody who wants to listen, when it comes to an emergency, the last guy you'd want here to would be me. I recognize there are guys, there are people who are trained who do this much better than I do. . . whether it be fire people, whether it be police people. They didn't know me from a hole in the ground. They might have heard my name before but they really didn't know before. I think the other thing, some people always say, "You see and tell us what to do." Somebody else might. I wouldn't. I know where my strengths and capabilities lie, certainly not in telling people how to put out fires, certainly not to tell people how to do law enforcement. I was never trained to do that sort of stuff. Matter of fact, part of the beauty of this job is learning about that stuff.

While I did not ask about ego-level trust directly in the interviews, the respondents provided different examples of how ego-level trust functioned in their professional roles and roles in the network. In the next section, I discuss how culture, the second variable identified in In Equation (1.1) in Chapter I, interacts with individuals' ego-level trusting characteristics when dealing with other alters in the network.

## **5.3 Professional and National Culture**

### **5.3.1 Professional Culture**

"Culture" can operate as a set of shared norms that facilitate communication and trust within a network. Recall from Table 4.5 that two of the top three most frequently named alters were from the fire services. Individuals in the firefighting profession play a central roles in the St. Clair County/Lambton County network. In the survey, and in interviews, individuals who were currently in the fire services, or even had a past history in the fire services, reported high levels of trust with each

other. This was due to a shared cultural understanding of the danger firefighters face on the job, the level of expertise needed to work effectively as part of a firefighting team, and the standards of professionalization that apply to all fire services.

One former firefighter, who is now director of emergency response for a large petrochemical processing company, and leads technical training of firefighters throughout North America on chemical response, commented on the way that fire services network informally with each other. He described the funeral of a firefighter in a nearby community:

You know, chief Eick [Chief of Port Huron Fire] was there, out of respect for the firefighter from Point Edward [who died in a training exercise], not even in the same country as him, so for me, that builds a lot of my respect for him, as in: isn't that nice that he would come over and freeze like the rest of us standing out there on the road for 2 or 3 hours while we were marching in to the funeral? And I know that he hadn't known that individual, I didn't know the individual either, but we were there out of respect for that group. You know, there's a certain amount of those types of things where you would build a respect for the person just by his actions, so the fact that he's there, the fact that he had someone there, you know, again, you build a bit of camaraderie there. Now, after the funeral, when they're having a lunch, we have a chance to chat and just sit in an informal place. So you get to know them a little bit better. So I would say that it's at minimum other than work related things, but we always find a time to be pleasant to one another and just kind of chat. I mean, firefighters are probably pretty informal people.

This informal setting was an opportunity for the Port Huron fire chief to demonstrate respect for a deceased colleague based on a mutual professional connection. The chief was widely known and respected in both communities for his expertise, and the

funeral visit was a way to strengthen existing ties, as opposed to developing trust relationships from scratch.

This was not their only interaction, however. The director of emergency response described another, that illustrated the importance of sharing information as a basis for developing trust:

As a matter of fact, when we had the [major industrial] fire I talked about earlier, when we had mutual aid, I was at a meeting and chief Eick was there, and I hadn't seen him in a while, and it was after the incident, he came over and started talking about my accident, and I said: "Oh yeah," and we were answering questions and talking back and forth, and he said to me: "Would you like a video of it, of your fire?" And I was like: "Video? My fire? How would you own a video of my fire?" He said: "Our city hall security cameras caught the entire thing on video." I said: "I would love to have that." Well, see, in that case, I had no idea that they would have anything, and there were a few things that we're looking at that had tried to understand what had happened, and we didn't have any really good idea, because our recollections are recollections, right? And I knew that the initial fire we had was an explosion, and then we had a secondary explosion a little while later after I got here. And I said to them: "This happened," and a number of people were saying: "Oh no, that never happened." And when he sent me the video, it was timelined, so it had a timerun, because it's a security camera, so 8 minutes after the first explosion there was a second explosion, that's the one I saw, so I had it all on tape, so I had the exact timing, so I could see exactly what happened, so it was so much help for me to have that, and I'm glad he told me, because otherwise I would never have known.

This development of trust through informal information sharing was repeated



by others in the community. One individual – a field manager with a large multinational chemical company with pipelines crossing the international border – drew on his background as a former firefighter in his new role.

That's what me and [a local fire chief] did, just started. Now he realized [how it might just help] to have a firefighting background. He picked up on that. As we got stronger and stronger, at one point he said well what if this valve needs to be shut under the concrete? Well you bring them in, you know how to turn the valve. I said you trust me walking in to your guys – that's definitely not protocol. I really saw that this man saw in us. I trust you with my life, you trust me with yours. When he said that to me I thought holy Jesus, if the world knew that...

Eventually, the field manager ended up informally sharing a substantial amount of information with the local fire chief, including sensitive proprietary information about the monitoring system for the pipes. This was a mutually beneficial arrangement to the fire chief, as he was concerned about how to respond to a potentially very dangerous chemical release given the limited resources of his small town. In the chief's words:

If they have whatever it may be, whether it's a storm event that causes a release into the river or a chemical release that's either into the river or airborne. Depending on the companies, because they're also trying to protect their stockholders. So most of this all revolves around private companies: So a lot of times they're really cautious about who they tell what to because they don't want to necessarily get it out into the media until they find out exactly what it is. But we always try to stress early notification. We'd rather find out about it and have it be nothing than wait until it's too serious and we're behind the eight ball. So it's a real

fine line as developing those relationships so they feel confident to tell us knowing that we'll protect their interest until we determine you know what the true hazard is.

In this case, the mutual firefighting background of these two individuals helped them establish a trust-based relationship, even though they were not necessarily working together in a firefighting capacity.

The high level of trust between the fire services of Port Huron and Sarnia dates back for decades. In our interview, the fire chief of Sarnia described the Sarnia-Port Huron mutual aid agreement, which had in fact been in place in some form for over sixty years. Prior to 9/11, this mutual aid agreement had been uncontroversial, however in the new security environment, it has been tested, as the chief described:

And it's much to the chagrin of the federal government, for example the opinions of the RCMP really had an issue with it because it's an international agreement and I'm not sure how law deals with it on his side but because it's way above our authorities in the sense that we have an agreement with another nation. And so it's really – I've had to deal with it twice since I've been chief. Not in a horrible way but certainly we're being told that it's not a legitimate or legal document. But in fact, Port Huron and city of Sarnia, both mayors had the opportunity to speak to both of them very much feel it's valid. . . . In their time of need or our time of need, we're there for each other. Don't care about the federal rules. Because I don't think anyone's going to stop us from helping. . . . We're just helping, we're about helping each other.

This mutual aid agreement is one of many examples of how agents in this community use interpersonal trust to overcome significant bureaucratic and legal obstacles to cooperation and the sharing of information and resources, particularly across international borders. This will be discussed in more detail in Subsection 5.4.2.

### 5.3.2 Professional Culture: Law Enforcement

Law enforcement, in both the U.S. and Canada, has a unique role in any community, including the local the homeland security community that I studied. After 9/11, new institutions such as local, state, and regional intelligence fusion centers have helped to increase the sharing of information (Joyal, 2012), but law enforcement retains a unique culture that is worth exploring in more detail, as it affects their role in the overall homeland security network.

As noted in Chapter I, the National Strategy for Homeland Security developed immediately after 9/11 brought a fundamental change to the mission and focus of all U.S. police agencies. Even local agencies were affected:

While law enforcement agencies will continue to investigate and prosecute criminal activity, they should now assign priority to preventing and interdicting terrorist activity within the United States. . . . We will redefine our law enforcement mission to focus on the prevention of all terrorist acts within the United States, whether international or domestic in origin. We will use all legal means – both traditional and non- traditional – to identify, halt, and, where appropriate, prosecute terrorists in the United States. (U.S. Office of Homeland Security, 2002, p. 25–26)

Despite the provision of additional federal funding, this change of mandate, particularly the need to work with other organizations, was not immediately welcomed by law enforcement. Unlike other community professionals, police officers generally deal with the most unpleasant people in the community with the greatest problems, often work in the absence of immediate supervision, and, as individuals or two-person teams, are highly autonomous (Cordner and Scarborough, 2010). They also work in difficult conditions under high stress. As a Sarnia police inspector put it:

I think the biggest thing, especially for police officers, I think honestly I

think we're probably the most arrogant profession there is because there's a saying, we can deal with 5% of the population 95% of the time. So you get a jaded view of people, right? And . . . where I've seen our officers fall down or get themselves in trouble is they've just dealt with some strung out meth junky and they've been spit on and the guy says, "I have AIDS and now you do" and then they come to talk to you. And they treat you the same way and you can't do that because then you're offended, right? But a funny quote that I heard at a recruiting conference is the biggest disadvantage to recruiting police officers is that we have to recruit from the human race.

In both the U.S. and Canada, the shared sense of responsibility and duty as police officers leads to a sense of trust, even when threat conditions are quite different, as a city police chief in Canada stated,

Of course you would extend the hand to assist a fellow officer. You know that there is you quite see a lot of times where there's an exchange back and forth, there's a lot of good cooperation and respect to that because you do trust them. You know that no police service is going to ask a police service to do something illegally. And that's respected. But it's the fact of the matter is that they're doing the same type of work we are, which in reality I think the job across the states is more dangerous than here because more people are armed than here.

Researchers have found that police officers tend to believe that, "all essential police knowledge is thought to be contextual, substantive, detailed, concrete, temporally bounded, and particularistic" (Manning, 1992, p. 370) making them reluctant to share information with others, especially those outside of the law enforcement community in the absence of informal contacts and cultural norms (Alain, 2001). This

culture also makes it difficult for law enforcement officers to reach out to others for needed help and information. A deputy undersheriff at a county-level law enforcement agency explained:

[L]etting people know what their capabilities and where their weaknesses lie. That's something by nature that I didn't like to do. It's tough to go into a group of professionals and say we are out of ideas for handling the situation. So to be able to look at that and go the personality and me then I've been trained over years as if there's nothing I can't take care of, so don't worry about it, I'll take care of it. But then you start to realize that you may not really be preparing for a risk at this point. You certainly can't do it alone. So to be able to sit in a group of people and say I can't handle this. I need help is something that you have to be able to kind of do. Bottom line is a lot of these police officers – they don't want to admit that or do that.

In some cases, having a shared background in law enforcement, even if it was with a small organization or one outside of the community, was enough to bridge some of these communication and cooperation problems. One individual interviewed in the U.S. was currently the fire chief of a small municipality, but was previously in law enforcement. This helped him speak the language of law enforcement, and gain the trust of law enforcement officers in the community. Even without this specific background, law enforcement and fire services are used to working together, since they are often statutorily required to respond to emergencies. This gives them an opportunity to develop trust through the mutual demonstration of capabilities, an important indication of trust mentioned by most respondents.

One interviewee, a police investigator with a private critical infrastructure facility, described a series of regional “investigators meetings” where representatives from a wide variety of law enforcement agencies meet to share notes on cases, in an informal

setting. In these meetings, they often find similarities in crimes and cases that cross jurisdictional lines. The investigator described them as an important setting for developing trust between individuals in different law enforcement agencies:

I personally think as being new to it and being a part of it, I think it works very well to build that trust because if you're in that meeting and you're sharing information, you're giving information, you're receiving information, now you have a point of contact - "Hey, you know what, I remember one of our officers comes up and says, 'You know we're having this problem with this.' 'Oh I remember one of the directors talking about that in the meeting two months ago, let me give him a call. Oh, hey do you remember talking about this in the meeting a couple months ago? Do you have any more information on that because we're having that problem now with this.' " And it's a networking system and it's very beneficial in my opinion.

The nature of this culture of law enforcement was repeated by almost all respondents.

As noted in Chapter III, however, I had hypothesized that greater levels of trust within in-groups could be correlated with lower levels of trust between groups. Interviewees indicated that this may be magnified for law enforcement specifically, when compared to other groups in the region. Law enforcement is not uniform, however. Appendix B lists the entire sampling frame of everyone included in the survey. One theme that was echoed by several local and county respondents was the perception of non-cooperation among federal agencies themselves, including federal law enforcement agencies. A fire chief of a small border community with a prior career in law enforcement explained his perspective:

Because being on the border here we have so many different homeland security departments that don't tend to want to talk to each other at

the federal level like Coast Guard, and Border Patrol, and Customs. It seems like for being one agency, falling under one umbrella for homeland security, it seems like we have better relationships with them than they have amongst themselves as far as information sharing.

Clearly, there is variation among trust within law enforcement itself, making the designation of law enforcement as a homogenous “in-group” a likely oversimplification.

### **5.3.3 Professional Culture: Public Health and EMS**

Health services, including state and county public health agencies, private hospitals, EMS, and federal agencies such as the U.S. Centers for Disease Control and Prevention (CDC), play an important role in the expanded homeland security mission. Since the inception of the DHS, the concern about bioterrorism and other health-related threats has been paramount for national and local leaders in both the U.S. and Canada. In the U.S. alone, billions of dollars have been spent since 9/11 on public health preparedness at the national level, including the materiel of the Strategic National Stockpile (SNS) and National Veterinary Stockpile (NVS), the epidemiological laboratories of the Laboratory Response Network (LRN), and multiple levels of medical disaster response teams (U.S. Department of Health and Human Services, 2007). Due to generous federal funding direct to state and local health-related agencies and experience dealing with non-terrorism-related outbreaks such as meningitis, individuals working in the health sector have been among the first to become fully immersed in the new homeland security mission. However, since most of their work is not related to emergency situations,<sup>8</sup> they are not fully immersed in the security community the way fire services and law enforcement are.

One county-level public health manager in the U.S. explained that the public health community does not really see themselves as part of homeland security, due

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<sup>8</sup>Michigan Department of Community Health 2006

to their traditional non-security roles. According to the manager:

Emergency Management was developed like a Band-Aid approach in a sense to be the entity, to bring the disciplines to the table. So they had all the subject matter experts present during an event, and you get the best of the best, and everybody knows what the other is doing, and the communications are better. But, Public Health wasn't there. And there was probably a couple reasons. One, we are much older than most of those organizations. We go way back to quarantining the harbor, and immigrants, and in New York I think, Public Health is probably 300 years old. It's from before we became a country that we had public health. So we are one of those entities that do not have a badge, sirens, uniforms and any of those other things. We just quietly do our thing behind the scenes, so it's not obvious we are present. And if you do not need our services, and you ask most people, Public Health is about head lice and STIs. When in fact, we do quite a bit more than that.

This tendency of security agencies to overlook health agencies is not limited to the U.S., as one Canadian EMS official noted in describing preparation for an international boating event in international border waters:

[T]he EMS was kind of the last one they thought about, police had quite a lot of meetings and conversation and Coast Guard and water rescue, they had a lot of conversation, but it was kind of week before the event that they went: 'Oh I guess we really do need to talk to the EMS as well.' So we were kind of last ones on the table, which isn't uncommon, I don't know why that is, I guess we don't have the same level of public relations that police and fire tend to have over the years, so at the end of the day were kind of the ones that are forgotten a little bit, but were getting better, things are getting better.



Like the fire services, professionals in the health care sector, including EMS, hospital officials, and public health agencies have shared professional norms. In both the U.S. and Canada, they are subject to significant licensing and regulation, specifically related to the administration of medications, that hampers their ability to cooperate, even in an emergency. The executive director of a non-profit service in the U.S. that operates ambulances and EMS noted that,

[W]e've got a waterway that's roughly two or three miles wide, or a couple miles wide and I guess the best way I describe it is I've got another ambulance company that's roughly two or three miles away from me that I can't use simply because we're two different countries. Now I understand that we're two different countries and I understand the legal and/or licensing issues on both sides. The interesting part about it is I think that if you were to analyze it and dissect both of our companies you would find that as it relates to how we treat patients and how we operate, we're probably not very different at all. In fact, we're very similar...

Nonetheless, many respondents who were not in the health care sector described them as being insular, and apart from the day-to-day work of other first response agencies. At the state level, a local liaison from the State of Michigan Public Health and Emergency Preparedness (PHEP) office explained that he rarely talks to “non-health people” as part of his daily professional functions, instead focusing on the connections between levels of the public health field. This may be due in part to the substantially different set of state and federal regulations that workers in the health care sector operate under, which will be described in Subsection 5.4.2 on legal institutions.

### 5.3.4 National Culture

Most interviewees repeatedly reiterated the concept of the Port Huron/Sarnia (St. Clair County/Lambton County) region as one community separated by a river boundary. Recall from Subsection 4.3.1.2 that average tenure in the community was 36.56 years ( $sd = 17.43, min = 0, max = 62$ ). Many interviewees had known each other for many years, and even knew the extended families of other professionals. As with many U.S.-Canada border communities, significant numbers of people live and work on both sides of the border, crossing daily as commuters (DHS, 2012*b*). One Canadian respondent, a civilian working in a law enforcement agency, illustrated:

The other thing is historically my mom and dad growing up in Sarnia, we didn't have a bridge and we had ferries going across back and forth. So there's a lot of inter marriages between this area and Michigan. A lot of us have family in Port Huron or in Michigan somewhere and we went to church across the river, they shopped, whatever, right? And the other thing is, is that over 50% of the nursing staff to this day in Port Huron are Canadians. 50% – that's high. So after 9/11 that was a big issue because even though officially the bridges weren't shut down they weren't moving.

Nonetheless, there are differences in professional cultural norms between respondents in the U.S. and those in Canada, primarily related to the national laws governing certain occupations.

One legal and cultural difference is the approach to firearms by law enforcement. The problem of armed USCG officers entering Canadian waters has been a long-standing issue requiring careful negotiations at the national level (DHS, 2012*a*). Put simply, while armed Canadian law enforcement officers may freely bring their service weapons into the U.S. while in the course of official duty, U.S. law enforcement cannot do the same. This also creates differences in how law enforcement officers conduct

daily police work in both countries. The Emergency Planner (emergency manager) of Sarnia, a civilian housed in the Sarnia police department related one example;

[E]very time you pull that gun out you have to file a report. And then if you do have to use your gun you have to say this officer pulls his gun this many times, he's gun happy. So... and then you probably have strict gun regulations in Canada, too, so it's just not the same. We had an officer who had a shooting here a few years ago and we couldn't find an officer that had been involved in shooting a suspect. So we actually went to the States and they volunteered to come over and talk to those officers for us.

A police inspector in an urban police department in Canada described in more detail how the different cultures within law enforcement lead to different approaches to the same fundamental problem:

Being a border city, from the Canadian point of view is that Canada and the U.S., although they're cooperative and friendly, our outlooks on things are far different. ... just simply the right to bear arms in the states and people having all the guns and Canada doesn't believe in that. We don't have as much gun issues. My personal finding, because I have sat on these committees for cooperation between the agencies that have been involved in the mass project, the U.S. is far more concerned in general with terrorism than Canada is, post 9/11, right? I think that for instance when I am at a meeting with these people, with my counterparts in the states, if we're developing say a mock-emergency for practice, the Canadian side would tend to say, 'Okay, there's a fire at the refinery and a ship has run aground. There's been a major tornado or...' Whereas the U.S., it would usually be some sort of terrorist attack that they're planning for. That's just a mindset I think, I don't think it's terribly different in how we respond, more of the anticipated issues.

## 5.4 Institutional Roles

As noted earlier, institutional roles can help individuals develop trusting relationships that facilitate professional functions in the network. A shared professional background, for example in firefighting, can help new people more effectively leverage information sharing, even in a different setting.

However, institutional roles can also serve as barriers to cooperation, information sharing, and ultimately the development of interpersonal trust. In this section, I examine how institutions – the observable functions determined by statute or regulation and most frequently studied by political scientists – can have both negative and positive effects on information sharing and, ultimately, the ability of the network as a whole to respond to a variety of potential threats. While many documents, such as the decades-old emergency assistance agreement between Port Huron and Sarnia, are matters of public record, it was only through qualitative interviews that I was able to learn just how important interpersonal trust is for the actors in the network to overcome institutional barriers to cooperation.

### 5.4.1 Federal Institutions and Grant Funding

Federal grant funding in the U.S. has been the topic of a large volume of political science research on homeland security to date. (Buono de Mesquita, 2007; Mueller and Stewart, 2011*a*; Goerdel, 2013)<sup>9</sup>. It has also been an important focus for scholars in public policy and public administration (Inamete, 2006; Caruson et al., 2005; Roberts, 2007; Scavo, Kearney and Kilroy Jr., 2007). This is largely due to the availability of public datasets that describe allocation of grant money at the federal level (DHS, 2004; Reese, 2005), making this issue a better fit for extant theories of federalism and domestic politics. However, the focus on federal level grant data overlooks the impact

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<sup>9</sup>Due to its system of dispersed federalism (Simeon, 2004), Canada does not allocate anywhere near the amount of funds to the local level as the U.S., which has spent over \$3 billion per year since 9/11 dispersing funds directly to states and localities (Eisinger, 2006).

these grants have on those charged to administer them and carry out desired federal policies at a local level.

These grants, while intended to foster cooperation, can in fact have the opposite effect, dividing local actors who otherwise have shared interests. One respondent, the director of a non-profit EMS organization that provides and coordinates ambulance services on the U.S. side, suggested that federal grant funding may contribute to the problem of marginalization of the health services in homeland security and public safety planning and response efforts.

One of the concerns I have as I look at homeland security and all of the needs of disaster response and so on is that the [U.S. federal] government has seemed to have set up multiple avenues for addressing homeland security needs and often those of us who are attending all these partnership meetings, it almost feels like there's competition going on between them rather than coordination going on between them... Some of our health departments, who are very important integral part of the overall planning process - sometimes because they have acquired grants through other sources - through the CDC and other avenues - those grants require certain plans to be developed and certain programs to be created but they don't always coordinate with the local group, if you understand what I'm saying, so we end up with... kind of all these different groups going in different directions without a single source of coordination and I think that it becomes frustrating to those of us who are providers on the frontline sometimes because we get the plan from the Health Department that may not be consistent with the plan from Homeland Security or the plan from the Healthcare Coalition and we're like 'Which one are we following here? Can we get these together?'

The lack of coordinated plans coming from the requirements of federal grants has

the potential to create breaks in the system during a time of emergency, as the EMS director illustrates:

One of the plans at the regional level calls for the activation of what they refer to at the regional level ‘casualty transport system.’ Essentially what that is, is it’s an ambulance...it’s the ambulances, okay? They call it ‘casualty transport system,’ for whatever reason. There’s a lot of debate as to who can activate this casualty transport system. Well if you look at the statute and follow the chain of command if you will, all away from emergency management at the governor’s office on down, it’s pretty clear that emergency management has that authority. That authority rests with in that department yet the region has plans in place for them to establish a coordination center in the time of a disaster... Most of us who are participants of that have kind of settled with, ‘when real disaster hits, we’re going to probably ignore the region because they don’t really have any regulatory authority anyway,’ it’s emergency management and homeland security that has all the regulatory authority. So while these guys have plans for CTS [casualty transport system] activation, they don’t really have any authority to activate it, and so it puts those of us in that CTS in quandaries of ‘okay, do they activate it or do they activate it? And which one do I follow’ and so we tend to follow the local plan and emergency management and so while these other plans exist, nobody seems to really know why they exist. They just exist because the grant requires them to be in place in order for the local region to get the funding but in reality, this is a grant program that has no regulatory authority over anybody, they’re not an official entity, they’re really just an entity receiving funds is all they are.

In Canada, there is far less funding directly from the federal and provincial levels

of government to local agencies. The deputy fire chief of a small border community in Canada illustrated the outsize disparity between the opportunities available to professionals in the U.S. and those in Canada who face shared threats in this small region:

What I found between my experience with working with Jeff [Friedland] and the different departments and entities in the U.S., they seem to have more of an organizational structure that, I want to say is integrated. . . I guess the easiest way to put this is like Jeff and his staff, as emergency planner for the county of St. Clair, there's himself and then he has, I don't know half a dozen or dozen staff, that implement all these programs and one of the big things they're always talking about there is their funding and their grant program and all that sort of thing. When you come to our side of the river, our county emergency planner consist of one man in the county office that has no real financial backing. All of the emergency planning, a lot of the stuff that Jeff is involved with, is left to the municipalities, the individual municipalities within the county. We go to these meetings across the border and they talk, 'let's do this, let's do that.' And they seem to have more staff and more resources to put towards that, whereas we don't receive federal funding. We don't receive provincial funding. This alerting system, it's been our single municipality's effort to get that in place. We found the funding for it. We did the leg work for it. There's 3 of us in this office and that's it. I find that's been the big difference between the two sides, as far as the emergency planning and the way we react. In Canada we do have those other groups. We have federal level emergency planning, we have provincial level emergency planning but we don't tend to have like homeland security directive type that come up with a standard or a direction for the entire country and then have

some sort of backing I guess. This is my perception. Maybe that's not the case over there but it's certainly is what seems to be from our side of it, whereas from our direction it's really a lot more locally driven.

In Sarnia, for example, the lack of provincial and federal grant support means that most response initiatives must come out of the municipal policing budget, directly trading off with other community priorities. The Emergency Planner (emergency manager) of Sarnia, a civilian housed in the Sarnia police department, related:

In Canada communities have to... there's not the big federal dollars coming. For example, we're talking about \$155,000 and we think we've hit the jackpot. Whereas I know with Jeff [Friedland, emergency manager of St. Clair County], he's got a number of projects last year in million dollar figures. That's not heard of here, in Canada, anywhere. So the reason why we do it is because industry has been here for so long. We represent 80% of the chemicals either manufactured, transported, produced or shipped in Ontario [...] or that's equivalent to 40% for Canada.

The fire chief of Sarnia, who was actually the recipient of a rare federal grant, described the comparatively small scale of funding of another Canadian federal grant program through the Canadian Research Council:

The one opportunity we had, which we called the JEPP program, which is joint emergency preparedness program which you could sometimes get funding up to 50%, well actually I think as high as 60% one time, was just canceled this year. So we don't even have access to that anymore, and it was only to the maximum 50 thousand dollars or 70 thousand dollars anyway. But it was just canceled. The federal government has deemed that they've reached their mandate and everybody's fine, that the emergency preparedness is at the goal has been achieved.



This forces small communities at the border, especially those with large industrial facilities such as Sarnia, to greatly increase their cooperation with the private sector, and their local, county, and state counterparts in the U.S., in order to address security concerns. Lacking stand-alone capabilities, local Canadian first responders in the Sarnia/Lambton county area rely on the capabilities of the SCC dive team for water rescue and the materiel provided by industry through the Chemical Valley Emergency Coordinating Organization, Sarnia (CVECO) organization, to name just two examples.

CVECO has a particularly notable history that illustrates the long-standing role of partnerships between the small border municipality of Sarnia and both private and international partners. Sarnia's Emergency Planner described the origins of the public-private CVECO partnership, which goes back more than sixty years.

And we've been doing this role since about '52, 1952 I guess so before we were legislated we had some type of emergency planner of some kind. And it started historically with a major fire down in the Palmar plant, where numerous people went down to see the fire and crews could not control it because they were already there, fire services, ambulances couldn't get through, it's an explosion. And so in '52 [...] Ernie Duffield got together with four of the plants, Esso, Dow, Palmar plant which is the rubber plant and... I'm sorry, one other plant [...] and they formed a traffic committee. And later that year a fire committee was formed. Anyways the first call for help, or the first offer for help came from the governor of Michigan back in May of '53. Days if not weeks before anyone in Ontario offered the city any help. So that probably set the stage for our co-operation.

Other interviewees also described the lack of direct participation from either the Canadian government at the federal level, or the government of Ontario at the provincial level. The director of Lambton county EMS noted that, while his relationships

with the local OPP officers were positive, these lines of communication and trust-based relationships were quickly cast aside in an emergency situation. He described two specific disaster situations – a tornado and a debilitating snowstorm – that became declared regional disasters:

I mean, [local detachment OPP] are very quick to come and over and tell us what they're doing, what they need help with, or what we're doing and what we need help with. The problem is when it kind of wraps up shortly thereafter, when they realize the extent of that emergency, it jumped up to kind of regional OPP looking after it, so instead of it just being the local guys, it kind of goes up to the regional command, that type of thing. As soon as that happens, communication stops. I don't know if it's because they're not used to working with us one-on-one, but when that happened, we lost really that open window of communication... Once they take charge, it becomes their operation, and it is almost... They just don't seem to see the same value in that level of communication, I think."

For Canadians, the lack of financial support from the federal and provincial governments makes them feel especially vulnerable, and therefore much more active in developing trusting relationships with local private owners of critical infrastructure and U.S.-based professionals with greater resources. For those in the U.S., while they receive more federal grant support, the system of grants comes from different federal agencies and creates a fragmented system that sometimes impedes policy implementation at the local level. While the federal government in both countries expects the locals to act as effective first responders to a serious emergency, this connection is not seamless.

#### 5.4.2 Legal Institutions Affecting Network Actors

Individuals in this network operate under tremendous and overlapping legal and bureaucratic constraints, many of which are expressly designed to hamper communication between agencies, particularly between professionals in the U.S. and those in Canada. This is particularly challenging, as many individuals are long-standing members of the community, which, prior to 9/11, operated as a local region largely unencumbered by national divisions. As one respondent noted, and others echoed, the St. Clair County/Lambton County county region has long felt like “one community with a river running through it.” Even as they work within their required legal and regulatory frameworks, actors repeatedly gave examples of how they used interpersonal trust as a *substitute* for legal institutions that sought to prevent communication and cooperation between them.

There are a number of major differences in the laws between Canada and the U.S. that make cooperation difficult. One example is laws pertaining to privacy and information sharing. While in the U.S., intelligence fusion centers have become an important tool in sharing information between different levels of government (United States Senate, 2012), international intelligence sharing, at least for actors at the local level, has been much more challenging. The chief of a local urban police force in Canada related:

I think one of the biggest issues right now going back and forth is how much information can be shared. In Canada, we’re heavily protected by freedom of information legislations, what we can and can’t give out. Whereas I think it’s a little more lax. I think probably [U.S.] homeland security can get any information they want when they want. And sometimes we’re even tighter because from privacy commissioners, what information can go out to the public, what information cant go to the public, right down to the court rulings, we have to dot all our I’s, cross our T’s when we’re

guarding information. Privacy issues are major in this country.

There are also legal restrictions on the ability of provincial law enforcement in Canada to leave the country, making their regular cooperation in cross-border meetings less frequent than for locals. The deputy fire chief of a small border community said,

On our side, we do, because again fire here is a municipal requirement but the policing and EMS are provincially mandated, we do have informal breakfast meetings, informal meetings with the representatives from the OPP and from EMS, supervisors and staff sergeants and that sort of thing where we'll just...sit down and we discuss these kinds of issues in an informal matter and we kind of hash those out. It works so well for us because again they're provincially driven so they know their requirements on that side of it, so we get a better perspective on that side of it, so we get a better perspective from that. It also allows them access to what's going on internationally because we go to these meetings. We can freely go to these meetings with Jeff [Friedland], whereas as I said, the OPP you need written permission to leave the country. Their interaction is extremely limited and it has to go through the hierarchy and it has to be authorized and all that sort of thing, whereas we have the freedom here to pursue these ideas and concepts and that sort of thing, and then in turn, at least at a local level, we can kind of push that up the provincial chain to those guys.

The director of a U.S.-based EMS described the challenge of working through established legal protocols when trying to cooperate with his Canadian counterpart for providing acute care in emergencies:

What we have proposed to both the Ministry of Ontario as well as the

state of Michigan is some kind of a reciprocal agreement where again, drilling down to our level we both see ourselves as very similar in terms of how we operate so what we have proposed is when we would go over to Canada, we would abide by our local protocols and guidelines, established and proved by the state of Michigan, and when they come over here, they would abide by the Canadian protocols. Again, when you're treating a heart attack, not a lot of different varieties in how to do it. We're both administering pretty much the same medications, we're treating it the same way and so that is really what we have been proposing all along, and we just have not been able to get both governments to agree to a treaty or anything that would allow that to occur in writing.

Other legal restrictions on cooperation include the sharing of emergency radios and frequencies across the U.S.–Canada border (Michigan uses 800 MHz radios, while Canada uses an incompatible system nationwide), the carrying of weapons across the border, and the ease of crossing the border with an ambulance in the case of an acute emergency. Each of these is a legal issue at a higher level of government that the local respondents are not empowered to officially change. As many indicated, however, they have found informal workarounds based on established trust relationships that they would only consider using under the most dire circumstances.

### **5.4.3 The Institutions of Planning and Exercising**

The process of planning and exercising before a critical disaster occurs is an important institution to everyone in the professional community. These exercises can either be compulsory for certain grant funding, or organically developed based on the needs of individuals in the network.

Exercises are a potentially important vehicle for individuals from different agencies to meet and learn about the operational plans of others whom they might not be

familiar with. They are especially critical for helping agencies see how others might respond based on different organizational priorities. A public health emergency coordinator in St. Clair County, Michigan used one example to illustrate how her agency saw potential problems very differently:

One of the exercises, they were going to have this very SARS like outbreak and we didn't know in advance. While that was going on, there would be fires, a drowning, a murder, a school's bomb threat. All these things were on the table. And every discipline had only their own thing going on. I'm worried about the first responders getting exposed to the thing and not knowing to take the precautions. So I'm trying to talk to the sheriff next to me who was marine division. Who was too busy to talk to me because there was a dead body floating in the water somewhere in his scenario. And I'm like who cares? Which is what I was trying to say. And we had a really hard time getting each other's attention, and everybody wanted something from somebody else, but everybody had their blinders on. And I'm sitting there going, "Please don't waste your time on him, he's already dead. Get him later. We have a bigger problem. Everywhere people go, they're going to get exposed to something." And it was hard for us as a group to put aside who is important and who wasn't because the scenarios where we weren't important at all, we just sat there and went, "Oh, is there a donut I can eat here, is there anything I can do?"

As this example illustrates, exercises, especially inter-organizational exercises, can be frustrating, but they can be chances to learn from other agencies and anticipate future responses in real emergencies. The public health official described what happened after the exercise was over:

But that night, I remember everyone turning up to watch an NBA basketball game or something. . . . And the sheriff patted me on the back and

said, “Why do you get so wound up in there about this and that. The first responders.” I said, “You don’t understand. . . you’re essential personnel, if we can’t get you to pay attention. You guys need to wear masks. If we can’t protect you, who is going to protect the rest of the people?” See we think about you, you’re thinking about the other person, and we’re trying to get your attention. So we had this really good conversation, and I had to explain to him that you see my cooperative agreement in my work plan, that’s 40 pages long and I’m one person and all these requirements for risk communication and this and that.’ . . .I felt from that day on, I had started this progress and a working relationship with him and then the other ones, and he would advocate for me.

Exercises and plans are not enough to develop trust and confidence in the abilities of others, especially new people in the community, however. The Canadian EMS director of Lambton County pointed out that,

I mean, you get a little bit of that, as I said, with training and with meetings and so on, but I’ve seen people and worked with people that are amazing when you give them an exercise or tabletop or an exercise to do, but when something really bad happens, they lose the ability to concentrate and focus on that. And I think as time goes and you do a few more, you get better that, but assuming it’s your first one, it’s a very stressful event, and that’s when you really see how they’re going to function, no matter how many exercises or training they had. It really hits the ground and they’re going to be running for it.

Planning and exercising, which are important components of NIMS and generally seen by policymaker principals as a way of ensuring they get the outcomes they seek, do not necessarily have the function of developing trust. Respondents described

planning meetings and exercises as a potential opportunity to make connections and get to know new people, but the structure of exercises does not ensure this.

## 5.5 Lessons Learned on Trust

The qualitative data presented from these interviews complements the quantitative data presented in Chapter IV and advances my core argument on the development of interpersonal trust out of certain types of repeated interactions. The individuals interviewed for this dissertation came from a wide variety of backgrounds, with widely varying experiences, experience, and levels of professional stature. However, they shared similar themes of trust development and maintenance, and its effect on the effectiveness of the professional community.

First, most interviewees described the “institution” of having credentials as being just a first pass. As with day-to-day relationships, just having a title is not enough to make others trust or even like you. As a deputy undersheriff at a county-level law enforcement agency explained,

I mean if you came to me and said “Hi I’m the chief of this fire department and here’s who I am,” I’ve never met you before. You’ve got the credentials you are who you’re supposed to be I have kind of a basic trusting sense until you prove me wrong kind of a thing.

This is quite different from the DHS official’s definition of trust described in the introduction to this chapter, although it is more in line with the expectations of NIMS that people will cooperate based on a known set of established roles. If, as most respondents stated, interpersonal trust truly matters for carrying out effective planning and response for large-scale critical disasters, then NIMS serves to only create the most fragile threads between individuals.

Second, although they are important components of NIMS, usually tied directly



to grant funding, exercises and planning are not the most important institutions for building trust. While they could potentially be an opportunity for others to build trust by demonstrating their capabilities, most respondents discounted the role of exercises, even live exercises, for this purpose. Only actual critical emergency events were described as significant for building trust (or the lack thereof) by witnessing others perform well, or buckle under pressure.

Third, while information sharing happens through formal channels, it also happens spontaneously and through informal channels. The informal sharing of information is perceived as being especially important to developing trust, especially if it would be impossible to come by any other way. One example is the pipeline manager sharing private and possibly proprietary information about the pipelines with the small-town fire chief in whose community the pipes operated. Having a shared background in firefighting was a sufficient condition for the developing of the trust relationship that allowed this to happen.

Fourth, for respondents in Canada specifically, the lack of federal and provincial financial support creates a sense of vulnerability that drives the development of trusting relationships with local private owners of critical infrastructure and their counterparts in the U.S. with greater resources. In Sarnia, a tremendous amount of responsibility falls square on the city fire department and police department, and in most cases, they must trade off security priorities with other priorities in the city budget without supplementary resources. This effort has paid off, as one Sarnia police inspector described:

And we have another cooperative thing that we've always done is our St. Clair County Sheriff patrol is very, very willing and able and helpful for scuba diving for the police department here. We don't have a dive team. . . . they come over all the time. Now technically, can they have their guns with them? No. Do they? They're out in the river. I suppose. There's a

floatable boundary somewhere, right? But we very much appreciate their help.

As this statement indicates, they are also somewhat more willing to bend the rules. The need to share materiel and other resources, and the trust-based relationships that have developed, keep these professionals more focused on outcomes or potential outcomes than bureaucratic obstacles.

Finally, most respondents emphasized that their interpersonal trust relationships were especially important, if not absolutely critical to them in the case of some future large-scale emergency, supporting the propositions of “politics from below” advanced by Brower and Abolafia (1997) in Chapter II. In this community specifically, everyone is concerned about the dangerous petrochemical facilities in Canada which are just miles from both cities. This ongoing danger has also brought people together, in ways that might not occur if there was not a shared mutual threat. If there were ever to be a major incident at the border, many respondents indicated that their immediate calls would be to each other, both offering and receiving necessary assistance. Interviewees indicated that in such circumstances, interpersonal trust could potentially act a substitute for institutional requirements, laws and procedures.

## CHAPTER VI

### Conclusion and Policy Implications

As Joyal (2012, p. 1) notes, "...there have been many positive strides with respect to information sharing and interagency collaboration; however, interpersonal relationships and trust lie at the core of true change." Professionals who work in the homeland security context at an international border must operate on a day-to-day basis with limited resources and outsized threats. Simply having the opportunity to meet others in exercised or meetings, as mandated by formal institutions such as NIMS is a necessary but not sufficient conditions for the development of trusting relationships. Easily identifiable, formally sanctioned mechanisms cannot replace the role of interpersonal relationships and trust that functions at the heart of local homeland security. At the end of the day, well-trained professionals must assess threats and respond to the daily challenges of protecting a vulnerable locality under constant threat. The quantitative and qualitative data I collected reinforces my argument that repeated interactions are important to the formation of trust relationships as individuals have the opportunity to prove their competence and reliability under pressure and share important and relevant information.

My research indicates that the connections of a social network can undergird existing relationships in a way that leverages the strengths of multiple actors, with many levels of experience in different fields. The survey data indicates that survey

respondents had high levels of cooperation that crossed disciplinary boundaries. In emergency settings, where individuals are acting in their capacity as first responders, firefighters are often the first people that individuals seek out. Both firefighters and law enforcement officers help people get their job done, regardless of their own profession. On the other hand, emergency managers are the most frequently named when individuals are looking for advice. Taken together, these findings indicate especially important roles for these professions, emphasizing the need for them to reach out to others. In this community at least, individuals report having contacts with and positive assessments of others who are outside of their own professional field. Most professionals are able to build bridges of interpersonal trust with others and not be stuck in silos that hinder performance.

The interviews explained, for these respondents, the sources of interpersonal trust and its consequences for communication and information sharing. They build interpersonal trust by sharing information, demonstrating competence, and recognizing and respecting and expertise of others. With a shared regional history going back decades, this has helped produce formal and informal agreements that facilitate planning and emergency response by sharing expertise and materiel. This is especially notable due to the numerous legal and bureaucratic challenges that are present at the international border. The interviews demonstrate how developing interpersonal trust increases the resources available to handle shared security concerns at a critical international location.

In terms of scholarly contribution, the survey as an instrument provides a new tool that can be used to better understand social networks, especially networks of individuals who may not wish to share information online. Although web-based surveys can potentially reach many more respondents, individuals in certain fields may not wish to enter information into an online system for reasons of privacy or concerns about data security and the potential for data leakage. Individuals working

in other sensitive settings, such as journalists or those living in domestically oppressive countries, may be more responsive to such a survey instrument, particularly if it could be administered in-person and alter names could be anonymized.

The survey also provides a novel dataset on homeland security networks. While other research on such networks rely on case studies (Fedorowicz, Gogan and Williams, 2007), public records content analysis (Kapucu and Demiroz, 2011), and Twitter (Butts, Petrescu-Prahova and Cross, 2007), the data I collected, with multiple covariates and alter assessments, provides potentially much richer network information to analysts interested in this topic.

This dissertation contributes to the interpersonal literature on trust in two ways. First, it explores the issues of trust in a novel setting – and international security community. The multi-organizational collaborative problems of homeland security are challenging everywhere, but even more so at the international border. Due to the heightened sense of security, this is a difficult setting in which to collect data or even conduct interviews, especially for academic researchers with no connections to homeland security. The respondents' comments on trust, its development and contribution to professional effectiveness complement existing work in this area, providing a different perspective on how interpersonal trust functions in an empirical setting that is not frequently studied.

Second, as noted in Chapter II, the theoretical work from political science suggested that institutions with monitoring and enforcement rules are preconditions for the development of trust. At least in an inter-organizational setting, this may not necessarily be true. At the international border, there is no such mechanism in place. As the Sarnia fire chief indicated,<sup>1</sup> the two cities maintained a mutual aid agreement despite legal objections from RCMP, representing the federal government of Canada. In this situation, interpersonal trust, based on shared professional norms and length

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<sup>1</sup>Page 120

of experience, actually functions to override the will of policymaker principals, at least those at higher levels of government who maintain laws to prevent such agreements from being executed. These findings also help better understand political science theories about inter-bureaucratic cooperation and competition, providing support for the “Politics from Below” theories of Brower and Abolafia (1997) by adding new types of evidence beyond their original ethnographic study.

## **6.1 Potential Criticisms and Next Steps**

There are a number of potential criticisms of this research. I will highlight two of the main issues, and how future research can address them.

### **6.1.1 Generalizability**

Due to funding and time limitations, it was not possible to carry out this work over a larger area or with more respondents. The cost of mailing each survey, along with pre-notification postcards, and post-survey follow-up letters was very high. In addition to the fixed costs of printing, the per-unit cost of postage, particularly for Canadian respondents to return pre-paid surveys to the United, was very expensive.

However, the basic design of the survey, and particularly the survey instrument itself, lends itself to replication in other areas. This survey could be replicated first at other northern border regional communities, such as the Buffalo-Niagara region, or the Seattle-Vancouver Pacific Northwest region, as well as smaller communities. Such replication would be an important next step to validate the results of this research, and test to see if, at the minimum, the same types of agencies report any relationships at all.

From a public policy perspective, this type of replication can help emergency managers identify gaps in relationships or informal communication that they can then take steps to rectify, through informal meetings or other forms of outreach. In

any replication, however, it is important to recognize the role of a local champion. Even for more experienced and prestigious researchers, respondents do not necessarily see the value of sharing information, particularly about their social networks which they consider sensitive. The importance of establishing interpersonal trust with respondents, and having that trust validated by someone who is neutral but well-known in the community, such as an emergency manager, cannot be overstated. Therefore, conducting future replications of the survey can help address some of the concerns about generalizability, at least among other U.S.-Canada border regions.

### **6.1.2 Geographic Limitations**

Some may argue that the issues facing homeland security actors at the U.S.-Canada border do not apply to other border regions. In the U.S. alone, the southern border with Mexico is far more dangerous, with literally hundreds of murders occurring there each year. CBP agents, for example, who work at the southern border, work under far more intense threats from extremely violent drug gangs. Furthermore, the Mexican government is a far less reliable ally than the Canadian government, and the economic disparity between U.S. citizens and Mexicans living just a few hundred feet away from each other at the southern border is much larger than between U.S. citizens and Canadians at the northern border. The northern border, some argue, is simply more peaceful and less threatened, making any understanding of relationships there irrelevant to the conditions of the southern border, or even anywhere else. Finally, some may argue that the southern border is much more important to public policy than the northern border. The immigration crisis and the fear of terrorists crossing the large stretches of unfortified southern border and major concerns to lawmakers and the general public, who rarely give the supposedly safe northern border a second thought.

Despite the clear public policy importance, there were and continue to be serious

problems with conducting this kind of research at the southern border. First, it is a very dangerous region. This research as designed seeks to understand cooperative relationships that occur across borders – how local actors from two different countries learn to cooperate through the development of mutual interpersonal trust. This would require conducting the research with the cooperation of Mexican officials at multiple levels.

While the language barrier is easily overcome, at least for this researcher and certainly for others, the development of the researcher-subject relationship may be more difficult. Mexican officials are frequently threatened or even killed by the violent criminal gangs in the region. Some may even be complicit with the activities of such gangs, whether voluntarily or not. Asking sensitive questions about the social networks of Mexican officials could potentially put them and/or the researcher in serious or even mortal danger. This alone should make this type of research at the southern border prohibitive, at the minimum due to IRB policies to protect human subjects but more importantly due to research ethics. Furthermore, subjects may not be willing to be forthcoming with this information. While this was certainly a possibility in the Port Huron-Sarnia region where this research was conducted, it was possible to verify at least the existence of most of the individuals named in the survey. At this point, it is not advisable to replicate this research at the southern border, even if the results would be particularly beneficial to public policy.

## **6.2 Policy Recommendations**

As a public policy dissertation, this work is focused less on theory and more on how insights from political science, scholarly public policy research, and the empirical findings of social network research can help individuals better do their work. As part of the agreement to carry out this research, I wrote a public policy report in accessible language with concrete action steps for emergency managers based on the findings



from this study. I conclude with a review of the recommendations from this report. It is particularly important to understand the dynamics of networks when working with multiple agencies across levels of responsibility and jurisdiction. In social network studies in numerous settings, the following concepts have been identified as critical:

### **The Strength of Weak Ties**

This research underlines the importance of interactions that give professionals the opportunity to get to know other in formal and informal non-emergency settings. While this is not a sufficient condition for the development of trusting relationships, it is necessary. Early research by Granovetter (1973) found that more information of various types flowed through channels where the relationship was “infrequent and distant” Kilduff and Tsai (2003, p. 33) than very close. Sociologists studying this phenomenon suggest it is because people have to invest less time and energy in acquaintanceships, freeing up more time to “give a little and get a little” information from more people, allowing them to share information between more groups than otherwise possible. It is important, therefore, to facilitate the opportunity for people to meet on an occasional basis.

#### *Policy Recommendations*

- Ask “regulars” to bring along a new person from their agency to multi-organizational meetings from time to time.
- Ensure that there is at least one new person from the organization who is participating in a meeting or exercise for this first time.

### **Network Density – Missing Links**

The homeland security and public safety professional network of St. Clair County and Lambton County is somewhat sparse. This is not surprising, since most individuals are part of organizations that have a separate mission from their emergency

management responsibilities. What this low density means, however, is that there is the potential for many more interpersonal connections than are currently in place. The current measurable size of the network is 276 individuals, who have among them 259 person-to-person relationships.

Put another way, there are a potential for 34,723 different permutations of person-to-person relationships. That leaves 34,464 connections that have not been realized. These “missing links” can be bridged by something as simple as an “infrequent and distant” acquaintance in order to facilitate greater information sharing within the network.

Recall from Chapter IV, Figure 4.19 showed how many “isolates” are in the network. These are not people who did not respond to the survey, but rather those who were not named as contacts. There is an opportunity to include them more directly in the network.

#### *Policy Recommendations*

- At multi-organizational meetings, make sure that individuals from different agencies have the opportunity to meet others from a different sector.
- Ensure that at least one individual from the medical sector is included in every exercise, even if a medical component is not required.

#### **Centrality – Referrals within the network**

There are multiple types of centrality – a measure of “popularity” in the network. The simplest type of centrality indicates how often someone is named as a contact by others.

Recall from Chapter IV, Table 4.5, that twelve people were named as a contact by at least 10 other people – these are the most central individuals in the network. One individual was named as a contact by 42 different people – this emergency management official is, not surprisingly, the most central person in the regional network.

The other most frequently named professionals came from fire (5), emergency management (3), law enforcement (3), and medical (1). All of the most frequently cited individuals came from the county or local level.

Kilduff and Tsai (2003, p. 32) caution that, “Organizations with highly centralized informal networks may tend to be more mechanistic in their functioning, whereas organizations with multiple centers may be more organic.” Since the beginning of this research project, there have already been a number of retirements of important people in the network, with more to come in the next few years. When information is overly centralized in a network, the removal of certain components (i.e. retirement of certain individuals) can have a destabilizing effect on other, unanticipated, parts of the network.

#### *Policy Recommendations*

- Facilitate formal (meeting / exercise) and informal opportunities for people to demonstrate capabilities or share ideas who are some years from retirement.
- Develop a meeting or exercise specifically for such individuals.

### **Boundary Spanners**

People naturally tend to stick with their own group, be it by profession, local area, or for some other reason. This is made visually clear through the network maps presented here. This is also why Boundary Spanners – those who have connections in several fields other than their own – are some of the most important people in the network. These individuals are not necessarily the most well-connected, with the largest number of connections. Instead, Boundary Spanners have connections in multiple sectors.

Network research has shown that they tend to be more professionally successful than those who stick with others similar to them (Kilduff and Tsai, 2003). But Boundary Spanners are also important to the community as a whole. Even if they

only have a few connections across professional fields and sectors, Boundary Spanners serve a critical role in disseminating information on an informal basis.

These individuals – regardless of level or function – should be encouraged as much as possible to make ties outside their agency and outside their field. Kilduff and Tsai (2003, p. 58) warn, however, that: “...the role of broker in social networks may be advisable only for actors who have legitimacy in the social context. Actors who are considered to be outsiders, or who are from non-traditional groups, may be punished for attempting to span across structural holes.” Therefore, this role is best filled by a current member of the community.

#### *Policy Recommendation*

- Identify Boundary Spanners, particularly those at different stages in their careers, and take steps to include them regularly in formal and informal multi-agency meetings.

#### **Targeted Outreach**

87 people were not named at all by any survey respondent, although they were in the first wave of contacts provided by St. Clair County Emergency Management and Lambton County Emergency Management. The reasons for their exclusion are not clear – this group had an average time in the profession of 22 years, and an average time in their specific job of almost 13 years. They are not, therefore, new to the community. 19 people each in law enforcement and fire were not named by anyone, along with 11 in emergency management, 10 in medical, 5 in dispatch, 12 in administration, 6 in critical infrastructure, 3 in non-profit and 1 unknown. These individuals have an average of 15 employees working for them, making it especially important to engage them. This is an area where putting network concepts into practice can help strengthen the resilience of the regional community.

Professionals in the St. Clair County / Lambton County region have clearly

worked hard to overcome institutional barriers to cooperation and shared security outcomes. Recognizing the role that social networks play in facilitating this cooperation is an important step forward. When key individuals retire in the future, they will take with them not only important institutional knowledge, but their close (and distant) social networks. Recognizing this, a long-term strategy should include concrete and measurable steps to facilitate connections between individuals from many sectors and levels. This does not necessarily require a substantial investment of time, but it does require ongoing attention. With its established coordinating role, the SCC Office of Homeland Security and Emergency Management is in the best position to include this dimension in future planning.

### **U.S. Federal Partners**

I was only able to conduct one interview with a U.S. federal representative, from DHS. Nonetheless, a number of U.S. federal employees chose to respond to the survey, and their input is included in this analysis. Most interviewees had positive things to say about CBP agents, specifically their cooperation in helping first responders on both sides get credentials and cross the border quickly in case of an emergency. However, in St. Clair County, several respondents expressed frustration with the Border Patrol service, indicating that they were less cooperative on local issues than they wished. Nonetheless, Border Patrol Agents were named as part of the social network by several respondents to the survey. This indicates the potential for bridges to be built with Border Patrol through Boundary Spanners (see above.) The potential exists to increase cooperation and trust with representatives of this agency by engaging them on an informal basis.

#### *Policy Recommendation*

- Create opportunities for informal engagement with Border Patrol, with the goal of developing acquaintances.

### **6.3 Conclusion**

Homeland security is a vexing policy problem that ultimately falls on the backs of local actors for the first and last line of defense. Despite spending billions of dollars, the federal governments of the U.S. and Canada are not always able or willing to fully empower or even help these locals accomplish their critical missions. Legal and bureaucratic obstacles coming from the top can even make the already difficult jobs of local actors working with limited resources even more challenging. At least in the Port Huron-Sarnia community, professionals have turned to each other for support and assistance. Interpersonal trust is the crucial basis of this relationship. Through this study, policymakers seeking to leverage the power of local communities can begin to appreciate the importance of such trust and learn how to facilitate it in order to keep borders secure.

## APPENDICES

## APPENDIX A

### Interview Protocol



## **Interview with Fire Chief/Community Emergency Management Coordinator**

Our Fire Chief/Community Emergency Management Coordinator would like to meet with you. He would be your primary contact. I am including his Administrative Assistant in this email so she can schedule a time for you to meet with him. He may also refer you to a few other people once you have had a chance to speak with him.

1. Main Questions
2. Follow up questions
3. Probes
4. Ask easy questions, show empathy

### **Introduce yourself and your topic**

Dissertation is on interpersonal trust between members of different agencies in different jurisdictions who are cooperating for a common security mission. I am looking specifically at interpersonal networks and how professionals from different types of organizations cooperate and use these relationships to solve local security problems despite obstacles like the international border.

### **Main question**

- Interpersonal trust between organizations as a means to cooperation
- Focus is on interpersonal trust between individuals (the network component)
- Looking for instances of when interpersonal trust helps to overcome specific institutional barriers
- *idea: trust is a (strategic?) substitute with institutions in terms of getting things done*
- Design main question based on goal of eliciting information that will answer this question

- Listen for responses that answer the main question and design follow-up questions to answer pieces of the main question

## **Interview Questions - Fire Chief/Community Emergency Management Coordinator**

1. Tell me about your roles as Fire Chief/Community Emergency Management Coordinator. What do you do?
2. What do you think is different about your department's roles and responsibilities, as compared to other security entities (agencies, organizations) you know in the US or Canada?
3. How do you define the role of Emergency management in the Canadian context?
4. Could you describe your relationships to other agencies who work on homeland security or public safety in this community? (I am especially interested in how you work with people in other types of organizations, such as fire, health, etc. in a cross-border setting)
5. How long have you known the people you work with on homeland security or public safety issues?
6. What do you do (to develop trust) when a new person joins the border security community?
7. Tell me about a specific event where you worked with other members of the homeland security or public safety community? (Walk me through it)
8. How do you communicate with your contacts when there is not a specific mandate? Who would be the first few people you call in such a situation?
9. Do you use the American NIMS system? Is it adhered to? When is it not adhered to?)
10. At the end, if you are willing, I would appreciate it if you could provide a few references of other people I could get in touch with for an interview. (What I really want to know is about interpersonal networks of trust. So, if I were to show you a list, who should be on it, who should not.
11. I will also explain the survey I am planning for the winter and ask what you think of it.

## APPENDIX B

### Interview Sampling Frame

Occupation (Level/Sector)	Number of Interviews	Total Number in Survey Network	Respondents in Survey Network
Law Enforcement (Local)	3	33	17
Law Enforcement (County)	1	30	10
Law Enforcement (State/Provincial)	1	15	3
Law Enforcement (Federal)	1	10	3
Law Enforcement (Private)	0	2	0
Fire (Local)	4	75	25
Fire (County)	NA	NA	NA

Occupation (Level/Sector)	Number of Interviews	Total Number in Survey Network	Respondents in Survey Network
Fire (State/Provincial)	NA	NA	NA
Fire (Federal)	NA	NA	NA
Fire (Federal)	NA	NA	NA
Fire (Private)	NA	NA	NA
Emergency Management (Local)	1	14	4
Emergency Management (County)	2	4	3
Emergency Management (State/Provincial)	0	0	0
Emergency Management (Federal)	0	0	0
Emergency Management (Private)	NA	NA	NA
Medical	0	0	0

Occupation (Level/Sector) (Local)	Number of Interviews	Total Number in Survey Network	Respondents in Survey Network
Medical (County)	2	12	4
Medical (State/Provincial)	1	3	0
Medical (Federal)	0	0	0
Medical (Private)	1	12	4
Dispatch (Local)	0	1	7
Dispatch (County)	0	7	5
Dispatch (State/Provincial)	NA	NA	NA
Dispatch (Federal)	NA	NA	NA
Dispatch (Private)	0	1	0
Administration (Local)	0	18	0
Administration (County)	0	9	2
Administration	0	0	0

Occupation (Level/Sector) (State/Provincial)	Number of Interviews	Total Number in Survey Network	Respondents in Survey Network
Administration (Federal)	0	0	0
Critical Infrastructure (Local)	0	0	0
Critical Infrastructure (County)	0	0	0
Critical Infrastructure (State/Provincial)	0	4	0
Critical Infrastructure (Federal)	0	6	3
Critical Infrastructure (Private)	3	7	3
Education (Local)	0	0	0
Education (County)	0	3	1
Education (State/Provincial)	0	0	0
Education (Federal)	0	0	0
Education (Private)	0	0	0
Nonprofit	0	1	0

Occupation (Level/Sector) (Local)	Number of Interviews	Total Number in Survey Network	Respondents in Survey Network
Nonprofit (County)	0	3	1
Nonprofit (State/Provincial)	0	0	0
Nonprofit (Federal)	0	0	0
Nonprofit (Private)	1	2	1

Table B.1: Interview Sampling Frame

## APPENDIX C

### Survey Instrument



ST. CLAIR COUNTY  
EMERGENCY MANAGEMENT



SOCIAL NETWORKS SURVEY  
UNIVERSITY OF MICHIGAN



	Ex. <i>John A. Example</i>
	1 <input type="checkbox"/>
	2 <input type="checkbox"/>
	3 <input type="checkbox"/>
	4 <input type="checkbox"/>
	5 <input type="checkbox"/>
	6 <input type="checkbox"/>
	7 <input type="checkbox"/>
	8 <input type="checkbox"/>
	9 <input type="checkbox"/>
	10 <input type="checkbox"/>
	11 <input type="checkbox"/>
	12 <input type="checkbox"/>
	13 <input type="checkbox"/>
	14 <input type="checkbox"/>
	15 <input type="checkbox"/>
	16 <input type="checkbox"/>
	17 <input type="checkbox"/>
	18 <input type="checkbox"/>

### A FEW BASIC QUESTIONS ABOUT YOU

How long have you been in this job sector? (not necessarily in this job or at this level)

Answer: \_\_\_\_\_

How long have you been in this specific job?

Answer: \_\_\_\_\_

How long have you lived in this community (the St. Clair County / Lambton County region)?

Answer: \_\_\_\_\_

Approximately how many people work for you? (number of employees you supervise, number of people under you in your department or division, number of people who answer to you)

Answer: \_\_\_\_\_

## A QUICK PRE-TEST

Using the following scale, please indicate how much you agree or disagree with the following statements (circle one):

Most people are basically honest.

1	2	3	4	5
Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

Most people are trustworthy.

1	2	3	4	5
Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

Most people are basically good and kind.

1	2	3	4	5
Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

Most people are trustful of others.

1	2	3	4	5
Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

I am trustful.

1	2	3	4	5
Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

Most people will respond in kind when they are trusted by others.

1	2	3	4	5
Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

THANKS!

- 3 -

Ex. *John A. Example*

1

2

3

4

5

6

7

8

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10

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12

13

14

15

\*\* Please fold over cover & yellow flap when list is complete and return the survey in the enclosed pre-paid envelope. \*\*

## MAPPING YOUR SOCIAL NETWORK NAME GENERATION

This section asks you to fill in names in the **yellow column on the right**.

Social network surveys like this one first ask you to name your contacts, then later describe your relationships. For this part, please think of those people with whom you have a professional working relationship in homeland security, emergency management, and/or public safety context in St. Clair and Lambton Counties. Specifically, **think of people in organizations or agencies other than your own.**

For the purposes of this study, please think of homeland security, emergency management, and/or public safety **as broadly as you see fit**. For example, if you work with someone in a different agency closely, but exclusively on non-homeland security matters please do not list them. However, if you know someone professionally and work with them on homeland security, emergency management, and/or public safety matters from time to time, please write his/her name down. If any question does not apply, feel free to skip ahead to the next one.

List as many people as you can for each question, using their **First and Last names**. Remember, no personally identifiable information will be revealed publicly as part of this analysis. **Everyone that you have listed will be assigned an anonymous ID code.** I am the **ONLY** person who can connect your ID code on this page to the answers given in the survey, with an electronic file that will be destroyed before analysis.

Let's begin.

(please turn the page)

*You are done!  
Thank you very much for your time!*

WE'LL START WITH A GENERAL QUESTION ABOUT OTHER PROFESSIONALS  
IN THIS REGION WHOM YOU MAY ENJOY SPENDING TIME WITH.

Please ✓ if these qualities especially apply to the people  
that you have listed in the yellow column.

	SKILLED/COMPETENT	EXPERIENCED
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		

Please ✓ if these qualities especially apply to the people that you have listed in the yellow column.

	GOOD CREDENTIALS	RELIABLE / DEPENDABLE
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		

Reminder: Please name only people **from a different agency**.

- 1 Who was the last person from a different agency with whom you went out to breakfast, lunch, coffee, or other drinks, one-on-one?
- 2 Name a few homeland security or public safety professionals you meet regularly in a non-professional setting. For example, bumping into them at kids' sports games or at church.
- 3
- 4

Remember: Please write the person's name on the yellow column that corresponds with the number

Think of an emergency situation that sticks out in your mind from the last few years that involved *multiple agencies and countries*.

Again, focus on professionals *from a different agency*.

Referring to the list of names on the yellow column, please mark with a ✓ to indicate the person(s) to whom the question applies.

Who has a reputation for getting the job done?

1	<input type="checkbox"/>
2	<input type="checkbox"/>
3	<input type="checkbox"/>
4	<input type="checkbox"/>
5	<input type="checkbox"/>
6	<input type="checkbox"/>
7	<input type="checkbox"/>
8	<input type="checkbox"/>
9	<input type="checkbox"/>
10	<input type="checkbox"/>
11	<input type="checkbox"/>
12	<input type="checkbox"/>
13	<input type="checkbox"/>
14	<input type="checkbox"/>
15	<input type="checkbox"/>

Who has demonstrated proficiency in past incidents?

1	<input type="checkbox"/>
2	<input type="checkbox"/>
3	<input type="checkbox"/>
4	<input type="checkbox"/>
5	<input type="checkbox"/>
6	<input type="checkbox"/>
7	<input type="checkbox"/>
8	<input type="checkbox"/>
9	<input type="checkbox"/>
10	<input type="checkbox"/>
11	<input type="checkbox"/>
12	<input type="checkbox"/>
13	<input type="checkbox"/>
14	<input type="checkbox"/>
15	<input type="checkbox"/>



Referring to the list of names on the yellow column, please mark with a ✓ to indicate the person(s) to whom the question applies.

If you wanted information about an area of expertise other than your own, who would you go to for advice?

1	
2	
3	
4	
5	
6	
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9	
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12	
13	
14	
15	

Who are the 'go to' people for questions about homeland security and public safety in the region?

1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	
13	
14	
15	

*Remember: Please write the person's name on the yellow column that corresponds with the number*

- 5 Who was the first person you looked for when you arrived on the scene?
- 6 Who was the first person who approached you when you arrived on the scene?
- 7 Who was the most important person there who helped you get your job done?
- 8 If applicable, who was the most important person from another country who helped you get your job done?

*Reminder: Please name only people from a different agency.*

*Remember: Please write the person's name on the yellow column that corresponds with the number*

Now, THINK ABOUT DAY-TO-DAY OPERATIONS,  
NOT A SPECIFIC EMERGENCY SITUATION.

- 9 Imagine you have an innovative new idea for the professional community, that is not ready from prime-time. Who would you discuss it with first?
- 10 From time to time, people seek out advice from someone in a **different agency** on a homeland security or public safety-related matter. Who would you seek out for advice?
- 11 Think about a situation where someone **from a different agency** asked you for advice on a homeland security or public safety-related matter. Who asked you for advice?

How long have you known this person in a professional capacity? (estimate)

Ex.	5 years
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	
13	
14	
15	

How many times have you worked together in the past year? (approx.)

Ex.	9 times
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	
13	
14	
15	

## DESCRIBING YOUR SOCIAL NETWORK

### *Last Questions!*

You are almost done!

Now that you have created your social network map, I want to understand a little bit about how you interact with people in your network. The next few pages ask you questions about the people you have named on the yellow sheet.

The first two questions on page 14 ask for each contact listed how long you have known them and how often you interact with them.

The rest of the questions ask you to look over your list and say whether the question applies to some of your contacts. For example, one question asks who you might go to for advice. ✓ only those people you think best fit the situation.

*Remember: Please write the person's name on the yellow column that corresponds with the number*

*Reminder: Please name only people **from a different agency**.*

12

13

14

15

### Last Question!

If you had to put together a task force including people not named already, who would be on it?

### CONTACT INFORMATION

This is the last section of the survey. Now I'm going to ask some questions about the people that you have named, who are listed on in the yellow column on the right.

To map a social network, I need to be able to send a survey to the people that you named here.

For each named person in the yellow column, I will send them the exact same survey that you just filled out. They will be told it came from another professional in the community, but they will not be told who referred them.

They will be randomly assigned a different ID code, and the only link in the data will be your code and their code. The questions on this page will help me find the information to send them a survey, too.

- List this person's organization or agency.
- List this person's national affiliation, if known.
- The numbers on pages 12 to 18 correspond to the names in the yellow column at right.

	ORGANIZATION	NATIONAL AFFILIATION / COUNTRY
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		

## APPENDIX D

### Survey Supporting Documentation

Study ID: HUM00056239 IRB: Health Sciences and Behavioral Sciences Date Approved: 1/15/2013

Dear Colleague,

In the next few days, you will receive a survey from Cali Mortenson Ellis of the University of Michigan. My office has hired Cali to conduct an Organizational Network Analysis of homeland security and public safety officials in St. Clair and Lambton Counties.

I selected you to receive this survey because you are an important part of our professional community. Please take a few minutes to fill out and return the survey when it arrives.

Beyond the benefit to our office, Cali will utilize this research to fulfill her PhD requirements and has my full cooperation and support. Please feel free to contact me if you have any questions about Cali or her research.

Thanks for your help!

*Jeff Friedland*



**Consent to Participate in a Research Study**

**DISSERTATION RESEARCH:**

**TRUST AND COMMUNICATION IN CROSS-BORDER COUNTERTERRORISM NETWORKS**

**Principal Investigator: Cali Mortenson Ellis, PhD Candidate, University of Michigan**  
**Faculty Advisor: Dr. Allan Stam, Professor of Political Science, University of Michigan**  
**Faculty Advisor: Dr. Phil Potter, Assistant Professor of Public Policy, University of Michigan**

**Invitation to participate in a research study**

Cali Mortenson Ellis invites you to participate in a research study about the social networks of homeland security and public safety professionals at the US/Canada border. The purpose is to understand the social networks of professionals from different fields and countries. The study is being conducted to fulfill the requirements for a PhD in Public Policy and Political Science. You have been selected because you have been identified as a professional member of the homeland security and public safety community in St. Clair and Lambton Counties. The study is funded by the **St. Clair County Office of Emergency Management**.

**Description of subject involvement**

If you agree to be part of the research study, you will be asked to **complete an anonymous survey**. This survey is anticipated to take between 10 and 15 minutes to complete.

**Benefits**

Although you may not directly benefit from being in this study, others may benefit because the survey will provide valuable information to the **St. Clair County Office of Emergency Management** about the connections between members of the community.

**Risks and discomforts**

There are no risks associated with this study because the data collection is completely anonymous and the topic is not sensitive. **Your name is not on the survey or any related instruments.**

**Confidentiality**

I plan to publish the results of this study, but will not include any information that would identify you. There are some reasons why people other than the researchers may need to see information you provided as part of the study. This includes organizations responsible for making sure the research is done safely and properly, including the University of Michigan, government offices or the study sponsor, **St. Clair County Office of Emergency Management**. Only anonymized data, without any personally identifying information, will be released to researchers or any party.

Study ID: HUM00056239 IRB: Health Sciences and Behavioral Sciences Date Approved: 1/15/2013

To keep your information safe, I will take the following steps:

- Your name will not be attached to any data, but a study number will be used instead.
- The data will be kept on a password-protected computer using special software that scrambles the information so that no one can read it.

#### **Storage and future use of data**

The paper survey you fill out will be stored in a locked storage facility at the University of Michigan. After the data from the survey has been entered into a database, the original will be destroyed. The only file linking names and code numbers will be kept on a flash drive in this locked storage facility. When all surveys have been collected and code numbers assigned, the key file linking names and codes will be destroyed. The latest that all surveys and key files are destroyed will be June 1, 2013. Only data containing code numbers will be made available to other researchers for academic purposes.

#### **Voluntary nature of the study**

Participating in this study is completely voluntary. Even if you decide to participate now, you may change your mind and stop at any time. If you decide to withdraw early, **your information will not be retained or used in any way.**

#### **Contact information**

If you have questions about this research you may contact:  
Cali Mortenson Ellis, [cmortens@umich.edu](mailto:cmortens@umich.edu), (310) 683-2149  
Dr. Allan Stam, [stam@umich.edu](mailto:stam@umich.edu), (734) 763-2599  
Dr. Phil Potter, [pbkp@umich.edu](mailto:pbkp@umich.edu), (734) 615-6905

If you have questions about your rights as a research participant, or wish to obtain information, ask questions or discuss any concerns about this study with someone other than the researcher(s), please contact the University of Michigan Health Sciences and Behavioral Sciences Institutional Review Board, 540 E Liberty St., Ste 202, Ann Arbor, MI 48104-2210, (734) 936-0933 or toll free, (866) 936-0933, [irbhsbs@umich.edu](mailto:irbhsbs@umich.edu).

#### **Consent**

By returning this survey you are agreeing to be in the study. Please keep this consent form for your records. Be sure that questions you have about the study have been answered and that you understand what you are being asked to do. You may contact the researcher if you think of a question later.





Greetings!

My name is Cali Mortenson Ellis and I am a PhD candidate in public policy and political science at the University of Michigan. I have been hired by St. Clair County Emergency Management to conduct a survey of homeland security and public safety professionals in the St. Clair and Lambton County region. I am also conducting this survey for my PhD dissertation.

My research is about how homeland security and public safety professionals like you build trust as a community to overcome barriers that come from being in different countries, and different agencies with different missions. I am particularly interested in the US-Canada border because of its economic and political significance.

I recently had the chance to meet a number of professionals in the region and learned about how some of you work with other agencies to achieve shared security goals of the whole community. You are receiving this because we met in person, or you have been identified by a colleague as an important member of the St. Clair-Lambton security and public safety community.

The survey is important to me and to St. Clair County Emergency Management because it provides to opportunity to gather information from many more people than I could ever interview in person. I hope you find the survey interesting to complete – it should only take between 10 and 15 minutes of your time.

Social network studies like this want to find relationships between people and understand how these connections affect an entire group. Why does this matter? Because, of course, no one works in isolation. Changes in one part of the network – for example, someone moving to a new job – have effects in other parts of the network that you might not see right away. Everybody knows this, but the survey allows us to step back and quantify these relationships. Having this kind of data can help St. Clair County Emergency Management and everyone else better understand the strengths of your network, and where there are chances to improve opportunities for resilience.

Please let me know if you have any questions or concerns about the survey or my research. I am happy to talk to you on the phone to answer any questions you may have. Please feel free to email me any time at [cmortens@umich.edu](mailto:cmortens@umich.edu) or call me at (310) 683-2149.

Sincerely,

Cali Mortenson Ellis

Dear Colleague,

Recently, I contacted you to let you know about this survey from Cali Mortenson Ellis of the University of Michigan -- Ann Arbor. As I mentioned, my office has hired Cali to conduct an Organizational Network Analysis of homeland security and public safety officials in St. Clair and Lambton Counties. This analysis will help St. Clair County Emergency Management better understand how we work together across boundaries and organizations.

I recommended that Cali send this survey to you because you are an important part of our professional homeland security and public safety community. Therefore, your response is very important. Due to the social network nature of the survey, we need everyone's cooperation for the survey to succeed.

I have known Cali since the time she was working for the Governor's Homeland Security Advisor, Mike McDaniel, at the Michigan National Guard. This research will be the focal point of Cali's PhD requirements and has my full cooperation and support. Please feel free to contact me if you have any questions or concerns about Cali's research. You can also reach Cali directly at [cmortens@umich.edu](mailto:cmortens@umich.edu) or (310) 683-2149.

Thanks for your help!

Sincerely,

Jeff Friedland

Study ID: HUM00056239 IRB: Health Sciences and Behavioral Sciences Date Approved: 1/15/2013



5700 HAVEN HALL  
505 S. STATE STREET  
ANN ARBOR, MI 48109-1045  
734 764-6313 FAX 734 764-3522  
[www.lsa.umich.edu/polsci](http://www.lsa.umich.edu/polsci)

Greetings!

Recently, you received a survey from me asking about your professional network of homeland security and public safety officials in St. Clair and Lambton Counties. As I mentioned earlier, I have been hired by St. Clair County Emergency Management to conduct an Organizational Network Analysis from this survey, which is also part of my PhD dissertation research.

I would really like to get your input, too. Unlike regular surveys, social network surveys really need the cooperation of everyone in order to get a true picture of what is going on. As a reminder, you were sent this survey because someone identified you as an important member of the professional community of public safety and homeland security officials in the St. Clair and Lambton county region. I already know that you are in the network, but without your response, I won't know where you fit into the network.

This letter and survey does not have your name anywhere on it, and all the information you provide is only linked with an anonymous code. The survey will only take 10-15 minutes to fill out and return.

I am happy to answer any questions or concerns you have about the survey and my PhD research. Please feel free to email me any time at [cmortens@umich.edu](mailto:cmortens@umich.edu) or call me at (310) 683-2149.

Thanks for your help!

Sincerely,

Cali Mortenson Ellis

Study ID: HUM00056239 IRB: Health Sciences and Behavioral Sciences Date Approved: 1/15/2013

Dear Colleague,

Last month, you received a survey from my office and Cali Mortenson Ellis of the University of Michigan -- Ann Arbor. If you have had the chance to fill out and return the survey – thanks! Cali and I appreciate the time you took to contribute to this Organizational Network Analysis of homeland security and public safety officials in St. Clair and Lambton Counties.

Unfortunately, we have not received as many responses as we need. Due to the social network nature of the survey, we need everyone’s cooperation for the survey to succeed.

As I mentioned in my last letter, this analysis will help St. Clair County Emergency Management better understand how we work together across boundaries and organizations. This survey will provide results that we can all use to show that we have a demonstrated and robust commitment to community preparedness and resilience. Participation in the survey will also show our commitment to rigorous academic research on our important work.

As I said before, Cali is conducting this research to fulfill her PhD requirements and has my full cooperation and support. If you have any questions or concerns about Cali’s survey, please let me know.

Otherwise, please take just a few minutes today to fill out and return the survey. I have taken the survey myself and it only requires about 10 minutes.

Thanks again!

Sincerely,

Jeff Friedland

## APPENDIX E

### Stata Log File

descriptive\_stats.log

```
1 -----
2 name: <unnamed>
3 log: /Users/elliscm/Desktop/active_projects/
4 dissertation_current/Umich_Dissertation_LaTeX_Template/stata_log_file
5 > s/descriptive_stats.log
6 log type: text
7 opened on: 13 Jul 2015, 15:24:41
8
9 . set more off
10
11 .
12 . *** 4.1.0.9 Survey Procedure ***
13
14 . *** Out of Network Descriptive Statistics ***
15
16 .
17 . * Categorical Variable Descriptors *
18
19 .
20 . insheet using "/Users/elliscm/Desktop/active_projects/
21 dissertation_current/network_data/data/outside_network.csv"
22 (7 vars, 189 obs)
23
24 .
25 . count if in_site == 1
26 118
27
28 .
29 . la val canada canada
30
31 . la var canada "Country Affiliation"
32
33 . la def canada 0 "American" 1 "Canadian"
34
35 .
36 . la val occ_code occ_code
37
38 . la var occ_code "Occupation"
39
40 . la def occ_code 0 "Unknown" 1 "Law Enforcement" 2 "Fire" 3 "Emergency
41 Management" 4 "Medical" 5 "Dispatch" 6 "Administr
42 ation" 7 "Critical Infrastructure" 8 "Education" 9 "Nonprofit"
43
44 . la val sector_code sector_code
45
```

descriptive\_stats.log

```
45 . la var sector_code "Level of Government/Sector"
46
47 . la def sector_code 0 "Unknown" 1 "Local" 2 "County" 3 "State/
Province" 4 "Federal" 5 "Private", replace
48
49 .
50 . hist canada if in_site == 1, discrete frequency addlabels xla(0/1,
notick valuelabel angle(45))
51 (start=0, width=1)
52
53 .
54 . graph export /Users/elliscm/Desktop/active_projects/
dissertation_current/Umich_Dissertation_LaTeX_Template/Chap4/outsid
55 > e_network_by_country.pdf, as(pdf) replace
56 (file /Users/elliscm/Desktop/active_projects/dissertation_current/
Umich_Dissertation_LaTeX_Template/Chap4/outside_network
57 > _by_country.pdf written in PDF format)
58
59 .
60 . hist occ_code if in_site == 1, discrete frequency addlabels xla(0/9,
notick valuelabel angle(45))
61 (start=1, width=1)
62
63 .
64 . graph export /Users/elliscm/Desktop/active_projects/
dissertation_current/Umich_Dissertation_LaTeX_Template/Chap4/outsid
65 > e_network_by_occupation.pdf, as(pdf) replace
66 (file /Users/elliscm/Desktop/active_projects/dissertation_current/
Umich_Dissertation_LaTeX_Template/Chap4/outside_network
67 > _by_occupation.pdf written in PDF format)
68
69 .
70 . hist sector_code if in_site == 1, discrete frequency addlabels
xla(0/5, notick valuelabel angle(45))
71 (start=0, width=1)
72
73 .
74 . graph export /Users/elliscm/Desktop/active_projects/
dissertation_current/Umich_Dissertation_LaTeX_Template/Chap4/outsid
75 > e_network_by_sector.pdf, as(pdf) replace
76 (file /Users/elliscm/Desktop/active_projects/dissertation_current/
Umich_Dissertation_LaTeX_Template/Chap4/outside_network
77 > _by_sector.pdf written in PDF format)
78
79 .
80 . clear
81
82 .
```

descriptive\_stats.log

```
83 . *** 4.2 Survey Response ***
84
85 . *** Response Rate ***
86
87 .
88 . run "/Users/elliscm/Desktop/active_projects/dissertation_current/
network_data/stata/stata_setup_code.do", nostop
89 .
90 . use "/Users/elliscm/Desktop/active_projects/dissertation_current/
network_data/data/attributes.dta"
91
92 .
93 . sort sector_code
94
95 . by sector_code: tab arrived
96
97 -----
98 -> sector_code = 0
99
100   arrived |      Freq.   Percent   Cum.
101 -----+-----
102         1 |          2    100.00   100.00
103 -----+-----
104   Total |          2    100.00
105
106 -----
107 -> sector_code = 1
108
109   arrived |      Freq.   Percent   Cum.
110 -----+-----
111         0 |         96    66.67    66.67
112         1 |         48    33.33   100.00
113 -----+-----
114   Total |        144   100.00
115
116 -----
117 -> sector_code = 2
118
119   arrived |      Freq.   Percent   Cum.
120 -----+-----
121         0 |         42    61.76    61.76
122         1 |         26    38.24   100.00
123 -----+-----
124   Total |         68   100.00
125
```



descriptive\_stats.log

```
126 |-----|
127 |-----|
128 |-> sector_code = 3
129 |-----|
130 |   arrived |   Freq.   Percent   Cum.
131 |-----|
131 |         0 |        19    86.36    86.36
132 |         1 |         3    13.64   100.00
133 |-----|
134 |       Total |         22   100.00
135 |-----|
136 |-----|
137 |-> sector_code = 4
138 |-----|
139 |   arrived |   Freq.   Percent   Cum.
140 |-----|
141 |         0 |        10    62.50    62.50
142 |         1 |         6    37.50   100.00
143 |-----|
144 |       Total |         16   100.00
145 |-----|
146 |-----|
147 |-> sector_code = 5
148 |-----|
149 |   arrived |   Freq.   Percent   Cum.
150 |-----|
151 |         0 |        15    65.22    65.22
152 |         1 |         8    34.78   100.00
153 |-----|
154 |       Total |         23   100.00
155 |-----|
156 |-----|
157 | . by sector_code: tab occ_code
158 |-----|
159 |-----|
160 |-> sector_code = 0
161 |-----|
162 |   occ_code |   Freq.   Percent   Cum.
163 |-----|
164 |         0 |         2   100.00   100.00
165 |-----|
166 |       Total |         2   100.00
167 |-----|
168 |-----|
```

descriptive\_stats.log

169 -> sector\_code = 1

```
170
171   occ_code |      Freq.   Percent   Cum.
172   -----+-----
173         0 |         2     1.39     1.39
174         1 |        33    22.92    24.31
175         2 |        75    52.08    76.39
176         3 |        14     9.72    86.11
177         5 |         1     0.69    86.81
178         6 |        18    12.50    99.31
179         9 |         1     0.69   100.00
180   -----+-----
181   Total   |       144   100.00
182
183
```

184 -> sector\_code = 2

```
185
186   occ_code |      Freq.   Percent   Cum.
187   -----+-----
188         1 |        30    44.12    44.12
189         3 |         4     5.88    50.00
190         4 |        12    17.65    67.65
191         5 |         7    10.29    77.94
192         6 |         9    13.24    91.18
193         8 |         3     4.41    95.59
194         9 |         3     4.41   100.00
195   -----+-----
196   Total   |        68   100.00
197
198
```

199 -> sector\_code = 3

```
200
201   occ_code |      Freq.   Percent   Cum.
202   -----+-----
203         1 |        15    68.18    68.18
204         4 |         3    13.64    81.82
205         7 |         4    18.18   100.00
206   -----+-----
207   Total   |        22   100.00
208
209
```

210 -> sector\_code = 4

```
211
212   occ_code |      Freq.   Percent   Cum.
213   -----+-----
```

descriptive\_stats.log

```
214 |         1 |         10      62.50      62.50
215 |         7 |          6      37.50     100.00
216 |-----|-----
217 |       Total |          16     100.00
218 |
219 |-----|-----
```

```
220 -> sector_code = 5
```

```
221 |
222 |   occ_code |      Freq.   Percent   Cum.
223 |-----|-----
224 |         1 |          2      8.70      8.70
225 |         4 |         12     52.17     60.87
226 |         5 |          1      4.35     65.22
227 |         7 |          6     26.09     91.30
228 |         9 |          2      8.70     100.00
229 |-----|-----
230 |       Total |          23     100.00
231 |
232 |-----|-----
```

```
233 |
234 | . sort occ_code
235 |
236 | . by occ_code: tab arrived
237 |
238 |-----|-----
```

```
239 -> occ_code = 0
```

```
240 |
241 |   arrived |      Freq.   Percent   Cum.
242 |-----|-----
243 |         1 |          4     100.00     100.00
244 |-----|-----
245 |       Total |          4     100.00
246 |
247 |-----|-----
```

```
248 -> occ_code = 1
```

```
249 |
250 |   arrived |      Freq.   Percent   Cum.
251 |-----|-----
252 |         0 |         57     63.33     63.33
253 |         1 |         33     36.67     100.00
254 |-----|-----
255 |       Total |          90     100.00
256 |
257 |-----|-----
```

descriptive\_stats.log

258 -> occ\_code = 2

arrived	Freq.	Percent	Cum.
0	50	66.67	66.67
1	25	33.33	100.00
Total	75	100.00	

268 -> occ\_code = 3

arrived	Freq.	Percent	Cum.
0	11	61.11	61.11
1	7	38.89	100.00
Total	18	100.00	

278 -> occ\_code = 4

arrived	Freq.	Percent	Cum.
0	19	70.37	70.37
1	8	29.63	100.00
Total	27	100.00	

288 -> occ\_code = 5

arrived	Freq.	Percent	Cum.
0	4	44.44	44.44
1	5	55.56	100.00
Total	9	100.00	

298 -> occ\_code = 6

arrived	Freq.	Percent	Cum.
---------	-------	---------	------

descriptive\_stats.log

```
302 |         0 |         25     92.59     92.59
303 |         1 |          2      7.41    100.00
304 |-----|-----
305 |   Total |          27    100.00
306 |
307 |-----|-----
```

308 -> occ\_code = 7

```
309 |   arrived |   Freq.   Percent   Cum.
310 |-----|-----
311 |         0 |        10     62.50     62.50
312 |         1 |         6     37.50    100.00
313 |-----|-----
314 |   Total |         16    100.00
315 |
316 |-----|-----
317 |-----|-----
```

318 -> occ\_code = 8

```
319 |   arrived |   Freq.   Percent   Cum.
320 |-----|-----
321 |         0 |         2     66.67     66.67
322 |         1 |         1     33.33    100.00
323 |-----|-----
324 |   Total |         3    100.00
325 |
326 |-----|-----
327 |-----|-----
```

328 -> occ\_code = 9

```
329 |   arrived |   Freq.   Percent   Cum.
330 |-----|-----
331 |         0 |         4     66.67     66.67
332 |         1 |         2     33.33    100.00
333 |-----|-----
334 |   Total |         6    100.00
335 |
336 |-----|-----
337 |-----|-----
```

338 . by occ\_code: tab sector\_code

341 -> occ\_code = 0

```
342 | sector_code |   Freq.   Percent   Cum.
343 |-----|-----
344 |         0 |         2     50.00     50.00
345 |
```

descriptive\_stats.log

```
346 |         1 |         2     50.00     100.00
347 |-----+-----
348 |       Total |         4     100.00
349 |
350 |-----
```

```
351 -> occ_code = 1
```

```
352
353 sector_code |      Freq.   Percent   Cum.
354 -----+-----
355         1 |         33     36.67     36.67
356         2 |         30     33.33     70.00
357         3 |         15     16.67     86.67
358         4 |         10     11.11     97.78
359         5 |          2      2.22    100.00
360 -----+-----
361       Total |         90    100.00
362
363 |-----
```

```
364 -> occ_code = 2
```

```
365
366 sector_code |      Freq.   Percent   Cum.
367 -----+-----
368         1 |         75    100.00    100.00
369 -----+-----
370       Total |         75    100.00
371
372 |-----
```

```
373 -> occ_code = 3
```

```
374
375 sector_code |      Freq.   Percent   Cum.
376 -----+-----
377         1 |         14     77.78     77.78
378         2 |          4     22.22    100.00
379 -----+-----
380       Total |         18    100.00
381
382 |-----
```

```
383 -> occ_code = 4
```

```
384
385 sector_code |      Freq.   Percent   Cum.
386 -----+-----
387         2 |         12     44.44     44.44
388         3 |          3     11.11     55.56
389         5 |         12     44.44    100.00
```

descriptive\_stats.log

```
390 -----+-----  
391 Total |      27    100.00  
392  
393 -----
```

```
394 -> occ_code = 5
```

```
395  
396 sector_code |      Freq.    Percent    Cum.  
397 -----+-----  
398          1 |         1     11.11     11.11  
399          2 |         7     77.78     88.89  
400          5 |         1     11.11    100.00  
401 -----+-----  
402 Total |         9    100.00  
403  
404 -----
```

```
405 -> occ_code = 6
```

```
406  
407 sector_code |      Freq.    Percent    Cum.  
408 -----+-----  
409          1 |        18     66.67     66.67  
410          2 |         9     33.33    100.00  
411 -----+-----  
412 Total |        27    100.00  
413  
414 -----
```

```
415 -> occ_code = 7
```

```
416  
417 sector_code |      Freq.    Percent    Cum.  
418 -----+-----  
419          3 |         4     25.00     25.00  
420          4 |         6     37.50     62.50  
421          5 |         6     37.50    100.00  
422 -----+-----  
423 Total |        16    100.00  
424  
425 -----
```

```
426 -> occ_code = 8
```

```
427  
428 sector_code |      Freq.    Percent    Cum.  
429 -----+-----  
430          2 |         3    100.00    100.00  
431 -----+-----  
432 Total |         3    100.00  
433
```

descriptive\_stats.log

```
434 |-----|
435 |-----|
436 |-----|
437 |-----|
438 |-----|
439 |-----|
440 |-----|
441 |-----|
442 |-----|
443 |-----|
444 |-----|
445 |-----|
446 |-----|
447 |-----|
448 |-----|
449 |-----|
450 |-----|
451 |-----|
452 |-----|
453 |-----|
454 |-----|
455 |-----|
456 |-----|
457 |-----|
458 |-----|
459 |-----|
460 |-----|
461 |-----|
462 |-----|
463 |-----|
464 |-----|
465 |-----|
466 |-----|
467 |-----|
468 |-----|
469 |-----|
470 |-----|
471 |-----|
472 |-----|
473 |-----|
474 |-----|
475 |-----|
476 |-----|
477 |-----|
478 |-----|
```

```
-> occ_code = 9
```

sector_code	Freq.	Percent	Cum.
1	1	16.67	16.67
2	3	50.00	66.67
5	2	33.33	100.00
Total	6	100.00	

```
. tab wave arrived
```

wave	arrived 0	1	Total
1	112	69	181
2	70	24	94
Total	182	93	275

```
. tab canada arrived
```

canada	arrived 0	1	Total
0	97	70	167
1	85	23	108
Total	182	93	275

```
. sort arrived
. by arrived: tab sector_code occ_code
```

```
-> arrived = 0
```

sector_cod	1	2	3	occ_code	5
e	7	8		4	
6					
		Total			



descriptive\_stats.log

```

479 |-----+-----+-----+-----+-----+-----+-----+-----+
480 |      1 |      16 |      50 |      10 |      0 |      1 |
18  |      0 |      0 |      96 |      0 |      1 |      8 |
481 |      2 |      20 |      0 |      1 |      8 |      2 |
7  |      0 |      2 |      42 |      0 |      0 |      3 |
482 |      3 |      12 |      0 |      0 |      3 |      0 |
0  |      4 |      0 |      19 |      0 |      0 |      0 |
483 |      4 |      7 |      0 |      0 |      0 |      0 |
0  |      3 |      0 |      10 |      0 |      8 |      1 |
484 |      5 |      2 |      0 |      0 |      8 |      1 |
0  |      3 |      0 |      15 |      0 |      0 |      0 |
485 |-----+-----+-----+-----+-----+
486 |      Total |      57 |      50 |      11 |      19 |      4 |
25 |      10 |      2 |      182 |      0 |      0 |      0 |
487 |-----+-----+-----+-----+-----+
488 |
489 | sector_cod | occ_code | Total
490 | e | 9 |
491 |-----+-----+-----+
492 |      1 |      1 |      96
493 |      2 |      2 |      42
494 |      3 |      0 |      19
495 |      4 |      0 |      10
496 |      5 |      1 |      15
497 |-----+-----+-----+
498 |      Total |      4 |      182
499 |
500 |
501 |-----+-----+-----+-----+-----+
502 | -> arrived = 1
503 |
504 | sector_cod | occ_code |
505 | e | 0 | 1 | 2 | 3 | 4 |
5 | 6 | 7 | Total |
506 |-----+-----+-----+-----+-----+
507 |      0 |      2 |      0 |      0 |      0 |
0  |      0 |      0 |      2 |      0 |      0 |
508 |      1 |      2 |      17 |      25 |      4 |
0  |      0 |      0 |      48 |      0 |      0 |
509 |      2 |      0 |      10 |      0 |      3 |
5 |      2 |      0 |      26 |      0 |      4 |

```

descriptive\_stats.log

```
510      3 |      0      3      0      0      0
511      0 |      0      0 |      3
512      4 |      0      3 |      6      0      0      0
513      0 |      5 |      0      0      0      0      4
514      0 |      0      3 |      8
```

```
-----+-----
514      Total |      4      33      25      7      8
515      5      2 |      6 |      93
```

```
516
517 sector_cod |      occ_code      9 |      Total
518      e |      8
519 -----+-----
520      0 |      0      0 |      2
521      1 |      0      0 |      48
522      2 |      1      1 |      26
523      3 |      0      0 |      3
524      4 |      0      0 |      6
525      5 |      0      1 |      8
526 -----+-----
527      Total |      1      2 |      93
```

```
528
529
530
531 .
532 . clear
533
534 .
535 .
536 . *** Categorical Variable Descriptors ***
537
538 .
539 . insheet using "/Users/elliscm/Desktop/active_projects/
540 dissertation_current/network_data/data/attributes.csv"
541 (17 vars, 276 obs)
542
543 . la val canada canada
544
545 . la var canada "Country Affiliation"
546
547 . la def canada 0 "American" 1 "Canadian"
548
549 .
550 . la val occ_code occ_code
```

descriptive\_stats.log

```
551 |
552 | . la var occ_code "Occupation"
553 |
554 | . la def occ_code 0 "Unknown (n = 4)" 1 "Law Enforcement (n = 33)" 2
555 | "Fire (n = 25)" 3 "Emergency Management (n = 8)" 4 "
556 | > Medical (n = 8)" 5 "Dispatch (n = 5)" 6 "Administration (n = 2)" 7
557 | "Critical Infrastructure (n = 5)" 8 "Education (n =
558 | > 1)" 9 "Nonprofit (n = 2)"
559 |
560 |
561 | . la val sector_code sector_code
562 |
563 | . la var sector_code "Level of Government/Sector"
564 |
565 | . la def sector_code 0 "Unknown (n = 2)" 1 "Local (n = 48)" 2 "County
566 | (n = 26)" 3 "State/Province (n = 3)" 4 "Federal (n
567 | > = 6)" 5 "Private (n = 8)", replace
568 |
569 |
570 | . la val wave wave
571 |
572 | . la var wave "Wave"
573 |
574 | . la def wave 1 "Original Respondents" 2 "Referrals", replace
575 |
576 |
577 | . *** 4.3.1.1 Generalized Trust ***
578 |
579 | . *** Continuous Variable Descriptors ***
580 |
581 | . la var pt1 "Most people are basically honest."
582 |
583 | . la var pt2 "Most people are trustworthy."
584 |
585 | . la var pt3 "Most people are basically good and kind."
586 |
587 | . la var pt4 "Most people are trustful of others."
588 |
589 | . la var pt5 "I am trustful."
590 |
591 | . la var pt6 "Most people will respond in kind when they are trusted by
592 | others."
593 |
594 |
595 | . drop trusting_score
```

descriptive\_stats.log

```
595 . gen trusting_score = (pt1 + pt2 + pt3 + pt4 + pt5 + pt6)/6
596 (193 missing values generated)
597
598 . la var trusting_score "Generalized Trust Score"
599
600 .
601 . tabplot occ_code sector_code, xla(1/6, value label angle(45)
    labs(small))
602
603 . graph export /Users/elliscm/Desktop/active_projects/
    dissertation_current/Umich_Dissertation_LaTeX_Template/Chap4/tabplo
604 > t_occ_by_sector.pdf, as(pdf) replace
605 (file /Users/elliscm/Desktop/active_projects/dissertation_current/
    Umich_Dissertation_LaTeX_Template/Chap4/tabplot_occ_by_
606 > sector.pdf written in PDF format)
607
608 .
609 . * Occupation *
610
611 .
612 . graph box trusting_score, over(occ_code, label(angle(45)))
    ytitle("Generalized Trust Scale (Likert 1-5)")
613
614 .
615 . graph export /Users/elliscm/Desktop/active_projects/
    dissertation_current/Umich_Dissertation_LaTeX_Template/Chap4/trusti
616 > ng_by_occupation.pdf, as(pdf) replace
617 (file /Users/elliscm/Desktop/active_projects/dissertation_current/
    Umich_Dissertation_LaTeX_Template/Chap4/trusting_by_occ
618 > upation.pdf written in PDF format)
619
620 .
621 . tab occ_code, summarize(trusting_score)
622
623 Occupation | Summary of Generalized Trust Score
624             |      Mean      Std. Dev.      Freq.
625 -----|-----
626 Unknown ( | 3.9583334  1.0573815      4
627 Law Enfor | 3.8638889  .47670007     30
628 Fire (n = | 3.9365079  .30035251     21
629 Emergency | 4.0714285  .31706317      7
630 Medical ( | 4.0208333  .20773726      8
631 Dispatch | 3.6666666  .30429032      4
632 Critical  | 4.0555555  .25092423      6
633 Education | 4.3333335  0              1
634 Nonprofit | 4.1666667  .23570237      2
635 -----|-----
636 Total     | 3.936747   .41739577     83
```

descriptive\_stats.log

```
637 |
638 | .
639 | . anova trusting_score occ_code
640 |
641 |                               Number of obs =      83      R-squared      =
642 | 0.0689                               Root MSE      = .423975      Adj R-squared =
643 | -0.0318
644 |
645 |                               Source |   Partial SS   |   df   |   MS   |   F   |
646 | Prob > F                               +-----+
647 |                               Model | .984125614     |    8   | .123015702 | 0.68 |
648 |                               occ_code | .984125614     |    8   | .123015702 | 0.68 |
649 |                               Residual | 13.3018511    |   74   | .179754744 |
650 |                               +-----+
651 |                               Total | 14.2859767    |   82   | .174219228 |
652 |
653 | .
654 | . * Level of Government/Sector *
655 |
656 | .
657 | .
658 | . graph box trusting_score, over(sector_code, label(angle(45)))
659 | ytitle("Generalized Trust Scale (Likert 1-5)")
660 |
661 | . graph export /Users/elliscm/Desktop/active_projects/
662 | dissertation_current/Umich_Dissertation_LaTeX_Template/Chap4/trusti
663 | > ng_by_sector.pdf, as(pdf) replace
664 | (file /Users/elliscm/Desktop/active_projects/dissertation_current/
665 | Umich_Dissertation_LaTeX_Template/Chap4/trusting_by_sec
666 | > tor.pdf written in PDF format)
667 |
668 | .
669 | . tab sector_code, summarize(trusting_score)
670 |
671 | Level of | Summary of Generalized Trust Score
672 | Government/ | Mean Std. Dev. Freq.
673 | Sector | +-----+
674 | Unknown ( | 4.6666667 .47140441 2
675 | Local (n | 3.8391472 .4242934 43
```

descriptive\_stats.log

```
675 | County (n | 3.9761905 .37000643 21
676 | State/Pro | 3.7777778 .38490023 3
677 | Federal ( | 4.25 .43140599 6
678 | Private ( | 4 .21821792 8
679 |-----+
680 | Total | 3.936747 .41739577 83
```

```
681 |
682 | .
683 | . anova trusting_score sector_code
684 |
685 |                               Number of obs =      83      R-squared      =
686 | 0.1543                               Root MSE      =  .39611      Adj R-squared =
```

```
687 |
688 |                               Source | Partial SS   df      MS      F
689 | Prob > F   -----+-----
690 |                               Model | 2.20442847   5   .440885693   2.81
691 | 0.0220
692 |                               sector_code | 2.20442847   5   .440885693   2.81
693 | 0.0220
694 |                               Residual | 12.0815482  77   .156903224
695 |-----+-----
696 |                               Total | 14.2859767  82   .174219228
```

```
697 |
698 | .
699 | . * Canada *
700 |
701 | .
702 | . graph box trusting_score, over(canada, label(angle(45)))
703 | ytitle("Generalized Trust Scale (Likert 1-5)")
704 |
705 | . graph export /Users/elliscm/Desktop/active_projects/
706 | dissertation_current/Umich_Dissertation_LaTeX_Template/Chap4/trusti
707 | > ng_by_country.pdf, as(pdf) replace
708 | (file /Users/elliscm/Desktop/active_projects/dissertation_current/
709 | Umich_Dissertation_LaTeX_Template/Chap4/trusting_by_cou
710 | > ntry.pdf written in PDF format)
711 |
712 | . ttest trusting_score, by(canada)
```

descriptive\_stats.log

```
713 Two-sample t test with equal variances
714 -----
715      Group |      Obs      Mean   Std. Err.   Std. Dev.   [95% Conf.
716      Interval]
717 -----+-----
717 American |      62   3.893817   .0573037   .45121     3.779231
718 4.008403
718 Canadian |      21   4.063492   .0580505   .266021     3.942401
719 4.184583
719 -----+-----
720 combined |      83   3.936747   .0458151   .4173958     3.845606
721 4.027888
721 -----+-----
722      diff |           -.1696749   .1043448           -.3772882
723 0379385
723 -----+-----
724      diff = mean(American) - mean(Canadian)          t =
725 -1.6261
725 Ho: diff = 0          degrees of freedom =
726 81
726      Ha: diff < 0          Ha: diff != 0          Ha: diff
727 > 0
728 Pr(T < t) = 0.0539          Pr(|T| > |t|) = 0.1078          Pr(T > t) =
729 0.9461
730
731 * 4.3.1.2 Professional and Community Tenure *
732
733
734 . sum q1, detail
735
736      Q1
737 -----+-----
738      Percentiles      Smallest
739 1%          5          5
740 5%          7          5
741 10%         8          5      Obs          87
742 25%         16         6      Sum of Wgt.    87
743
744 50%         23
745          Largest      Mean          22.54598
746 75%         28          Std. Dev.    9.319781
746          39
```

descriptive\_stats.log

```
747 90%          35          39      Variance      86.85833
748 95%          38          42      Skewness      -.0613238
749 99%          42          42      Kurtosis      2.382258
750
751 . sum q2, detail
752
753                Q2
754 -----
755      Percentiles      Smallest
756 1%      .0833333      .0833333
757 5%      .33333      .0833333
758 10%     1.5      .1666667      Obs          87
759 25%     3      .25      Sum of Wgt.   87
760
761 50%     7
762                Largest      Mean          9.217433
763 75%     14      27      Std. Dev.    8.408262
764 90%     20      33      Variance     70.69886
765 95%     26      35      Skewness     1.533247
766 99%     42      42      Kurtosis     5.553058
767
768 . sum q3, detail
769
770                Q3
771 -----
772      Percentiles      Smallest
773 1%      0      0
774 5%      5      0
775 10%     10      .8333333      Obs          84
776 25%     22      2      Sum of Wgt.   84
777
778 50%     42
779                Largest      Mean          36.56349
780 75%     50.5      60      Std. Dev.    17.43051
781 90%     57      60      Variance     303.8226
782 95%     59      60      Skewness     -.5358584
783 99%     62      62      Kurtosis     2.140951
784
785 . sum q4, detail
786
787                Q4
788 -----
789      Percentiles      Smallest
790 1%      0      0
791 5%      0      0
792 10%     0      0      Obs          82
793 25%     3      0      Sum of Wgt.   82
794
```



descriptive\_stats.log

```
795 50%          12.5          Largest          Mean          29.76829
796                                     140          Std. Dev.      46.70033
797 75%           30           180
798 90%           80           180          Variance       2180.921
799 95%          110          200          Skewness       2.888166
800 99%          265          265          Kurtosis       12.33044
801
802 .
803 . sort q1
804
805 . scatter trusting_score q1 || lfit trusting_score q1
806
807 .
808 . sort q2
809
810 . scatter trusting_score q2 || lfit trusting_score q2,
811 ytitle("Generalized Trust Scale (Likert 1-5)") ti("Time in this jo
> b")
812
813 . graph save /Users/elliscm/Desktop/active_projects/
814 dissertation_current/Umich_Dissertation_LaTeX_Template/Chap4/trusting
815 > _score_q2.gph, replace
816 (file /Users/elliscm/Desktop/active_projects/dissertation_current/
817 Umich_Dissertation_LaTeX_Template/Chap4/trusting_score_
818 > q2.gph saved)
819
820 .
821 . sort q3
822
823 . scatter trusting_score q3 || lfit trusting_score q3,
824 ytitle("Generalized Trust Scale (Likert 1-5)") ti("Time in Communi
> ty")
825
826 . graph save /Users/elliscm/Desktop/active_projects/
827 dissertation_current/Umich_Dissertation_LaTeX_Template/Chap4/trusting
828 > _score_q3.gph, replace
829 (file /Users/elliscm/Desktop/active_projects/dissertation_current/
830 Umich_Dissertation_LaTeX_Template/Chap4/trusting_score_
831 > q3.gph saved)
832
833 .
834 . graph combine /Users/elliscm/Desktop/active_projects/
835 dissertation_current/Umich_Dissertation_LaTeX_Template/Chap4/trust
836 > ing_score_q2.gph /Users/elliscm/Desktop/active_projects/
837 dissertation_current/Umich_Dissertation_LaTeX_Template/Chap4/tr
838 > usting_score_q3.gph
839
840 .
```

descriptive\_stats.log

```
835 . graph export /Users/elliscm/Desktop/active_projects/  
dissertation_current/Umich_Dissertation_LaTeX_Template/Chap4/trusti  
836 > ng_score_q2_q3.pdf, as(pdf) replace  
837 (file /Users/elliscm/Desktop/active_projects/dissertation_current/  
Umich_Dissertation_LaTeX_Template/Chap4/trusting_score_  
838 > q2_q3.pdf written in PDF format)
```

```
839  
840 .  
841 . sort q4  
842  
843 . scatter trusting_score q4 || lfit trusting_score q4  
844  
845 .  
846 . pwcorr q1 trusting_score, sig st(95) o list  
847
```

```
848 |          q1 trusting_s~e  
849 -----+-----  
850 |          q1 | 1.0000  
851 |          |  
852 |          |          82  
853 |          |  
854 | trusting_s~e | 0.0117* 1.0000  
855 |          | 0.9169  
856 |          |          82          82  
857 |          |  
858 |          |
```

```
859 . pwcorr q2 trusting_score, sig st(95) o list  
860
```

```
861 |          q2 trusting_s~e  
862 -----+-----  
863 |          q2 | 1.0000  
864 |          |  
865 |          |          82  
866 |          |  
867 | trusting_s~e | 0.0374* 1.0000  
868 |          | 0.7388  
869 |          |          82          82  
870 |          |  
871 |          |
```

```
872 . pwcorr q3 trusting_score, sig st(95) o list  
873
```

```
874 |          q3 trusting_s~e  
875 -----+-----  
876 |          q3 | 1.0000  
877 |          |  
878 |          |          79  
879 |          |  
880 | trusting_s~e | -0.0633* 1.0000
```

## APPENDIX F

### Data Analysis: Additional Tables

Table F.1: Ego Occupation by Same Occupation Group Ego-Alter: SN2

<b>Ego Occupation</b>	<b>Same Occupation Group Ego-Alter: SN2</b>		<b>Total</b>
	Different	Same	
Unknown	2	2	4
Law Enforcement	22	11	33
Fire	17	8	25
Emergency Management	5	2	7
Medical	5	3	8
Dispatch	4	1	5
Administration	2	0	2
Critical Infrastructure	6	0	6
Education	1	0	1
Nonprofit	2	0	2
<b>Total</b>	<b>66</b>	<b>27</b>	<b>93</b>

Table F.2: Ego Occupation by Same Occupation Group Ego-Alter: SN3

<b>Ego Occupation</b>	<b>Same Occupation Group Ego-Alter: SN3</b>		<b>Total</b>
	Different	Same	
Unknown	3	1	4
Law Enforcement	24	9	33
Fire	16	9	25
Emergency Management	5	2	7
Medical	5	3	8
Dispatch	4	1	5
Administration	2	0	2
Critical Infrastructure	6	0	6
Education	1	0	1
Nonprofit	2	0	2
<b>Total</b>	<b>68</b>	<b>25</b>	<b>93</b>

Table F.3: Ego Occupation by Same Occupation Group Ego-Alter: SN4

<b>Ego Occupation</b>	<b>Same Occupation Group Ego-Alter: SN4</b>		<b>Total</b>
	Different	Same	
Unknown	3	1	4
Law Enforcement	25	8	33
Fire	16	9	25
Emergency Management	4	3	7
Medical	4	4	8
Dispatch	4	1	5
Administration	2	0	2
Critical Infrastructure	6	0	6
Education	1	0	1
Nonprofit	2	0	2
<b>Total</b>	<b>67</b>	<b>26</b>	<b>93</b>

Table F.4: Ego Occupation by Same Occupation Group Ego-Alter: SN5

<b>Ego Occupation</b>	<b>Same Occupation Group Ego-Alter: SN5</b>		<b>Total</b>
	Different	Same	
Unknown	2	2	4
Law Enforcement	24	9	33
Fire	15	10	25
Emergency Management	3	4	7
Medical	7	1	8
Dispatch	3	2	5
Administration	2	0	2
Critical Infrastructure	6	0	6
Education	1	0	1
Nonprofit	2	0	2
<b>Total</b>	<b>65</b>	<b>28</b>	<b>93</b>

Table F.5: Ego Occupation by Same Occupation Group Ego-Alter: SN6

<b>Ego Occupation</b>	<b>Same Occupation Group Ego-Alter: SN6</b>		<b>Total</b>
	Different	Same	
Unknown	2	2	4
Law Enforcement	25	8	33
Fire	14	11	25
Emergency Management	4	3	7
Medical	7	1	8
Dispatch	3	2	5
Administration	2	0	2
Critical Infrastructure	6	0	6
Education	1	0	1
Nonprofit	2	0	2
<b>Total</b>	<b>66</b>	<b>27</b>	<b>93</b>

Table F.6: Ego Occupation by Same Occupation Group Ego-Alter: SN7

<b>Ego Occupation</b>	<b>Same Occupation Group Ego-Alter: SN7</b>		<b>Total</b>
	Different	Same	
Unknown	3	1	4
Law Enforcement	23	10	33
Fire	15	10	25
Emergency Management	4	3	7
Medical	6	2	8
Dispatch	3	2	5
Administration	2	0	2
Critical Infrastructure	6	0	6
Education	1	0	1
Nonprofit	2	0	2
<b>Total</b>	<b>65</b>	<b>28</b>	<b>93</b>

Table F.7: Ego Occupation by Same Occupation Group Ego-Alter: SN8

<b>Ego Occupation</b>	<b>Same Occupation Group Ego-Alter: SN8</b>		<b>Total</b>
	Different	Same	
Unknown	4	0	4
Law Enforcement	27	6	33
Fire	22	3	25
Emergency Management	5	2	7
Medical	6	2	8
Dispatch	5	0	5
Administration	2	0	2
Critical Infrastructure	5	1	6
Education	1	0	1
Nonprofit	2	0	2
<b>Total</b>	<b>79</b>	<b>14</b>	<b>93</b>

Table F.8: Ego Occupation by Same Occupation Group Ego-Alter: SN9

<b>Ego Occupation</b>	<b>Same Occupation Group Ego-Alter: SN9</b>		<b>Total</b>
	Different	Same	
Unknown	2	2	4
Law Enforcement	18	15	33
Fire	5	20	25
Emergency Management	1	6	7
Medical	4	4	8
Dispatch	3	2	5
Administration	2	0	2
Critical Infrastructure	6	0	6
Education	1	0	1
Nonprofit	2	0	2
<b>Total</b>	<b>44</b>	<b>49</b>	<b>93</b>

Table F.9: Ego Occupation by Same Occupation Group Ego-Alter: SN10

<b>Ego Occupation</b>	<b>Same Occupation Group Ego-Alter: SN10</b>		<b>Total</b>
	Different	Same	
Unknown	2	2	4
Law Enforcement	19	14	33
Fire	17	8	25
Emergency Management	5	2	7
Medical	3	5	8
Dispatch	3	2	5
Administration	2	0	2
Critical Infrastructure	5	1	6
Education	1	0	1
Nonprofit	2	0	2
<b>Total</b>	<b>59</b>	<b>34</b>	<b>93</b>

Table F.10: Ego Occupation by Same Occupation Group Ego-Alter: SN11

<b>Ego Occupation</b>	<b>Same Occupation Group Ego-Alter: SN11</b>		<b>Total</b>
	Different	Same	
Unknown	3	1	4
Law Enforcement	21	12	33
Fire	13	12	25
Emergency Management	4	3	7
Medical	4	4	8
Dispatch	4	1	5
Administration	2	0	2
Critical Infrastructure	6	0	6
Education	1	0	1
Nonprofit	2	0	2
<b>Total</b>	<b>60</b>	<b>33</b>	<b>93</b>



Table F.11: Ego Occupation by Same Occupation Group Ego-Alter: SN12

<b>Ego Occupation</b>	<b>Same Occupation Group Ego-Alter: SN12</b>		<b>Total</b>
	Different	Same	
Unknown	1	3	4
Law Enforcement	20	13	33
Fire	15	10	25
Emergency Management	5	2	7
Medical	2	6	8
Dispatch	3	2	5
Administration	2	0	2
Critical Infrastructure	5	1	6
Education	1	0	1
Nonprofit	2	0	2
<b>Total</b>	<b>56</b>	<b>37</b>	<b>93</b>

Table F.12: Ego Occupation by Same Occupation Group Ego-Alter: SN13

<b>Ego Occupation</b>	<b>Same Occupation Group Ego-Alter: SN13</b>		<b>Total</b>
	Different	Same	
Unknown	1	3	4
Law Enforcement	21	12	33
Fire	9	16	25
Emergency Management	4	3	7
Medical	2	6	8
Dispatch	3	2	5
Administration	2	0	2
Critical Infrastructure	6	0	6
Education	1	0	1
Nonprofit	2	0	2
<b>Total</b>	<b>51</b>	<b>42</b>	<b>93</b>

Table F.13: Ego Occupation by Same Occupation Group Ego-Alter: SN14

<b>Ego Occupation</b>	<b>Same Occupation Group Ego-Alter: SN14</b>		<b>Total</b>
	Different	Same	
Unknown	2	2	4
Law Enforcement	20	13	33
Fire	14	11	25
Emergency Management	6	1	7
Medical	3	5	8
Dispatch	3	2	5
Administration	2	0	2
Critical Infrastructure	6	0	6
Education	1	0	1
Nonprofit	2	0	2
<b>Total</b>	<b>59</b>	<b>34</b>	<b>93</b>

Table F.14: Ego Occupation by Same Occupation Group Ego-Alter: SN15

<b>Ego Occupation</b>	<b>Same Occupation Group Ego-Alter: SN15</b>		<b>Total</b>
	Different	Same	
Unknown	2	2	4
Law Enforcement	22	11	33
Fire	16	9	25
Emergency Management	7	0	7
Medical	4	4	8
Dispatch	3	2	5
Administration	2	0	2
Critical Infrastructure	6	0	6
Education	1	0	1
Nonprofit	2	0	2
<b>Total</b>	<b>65</b>	<b>28</b>	<b>93</b>

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