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FROM SIMPLE TO SOPHISTICATED: THE ORGANIZATION OF TERRORIST
GROUPS

By

Michael K. Logan

A DISSERTATION

Presented to the Faculty of

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University of Nebraska, 2020

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Abstract

This dissertation draws on gang organization research and organizational theory to assess the underlying dimensions of organization in terrorist groups. Using the Leadership for the Extreme and Dangerous for Innovative Results (LEADIR) dataset, findings suggest that organization is a multidimensional construct in terrorist groups, including the structuring of activities dimension and the concentration of authority dimension. In relation to violence, terrorist groups high on the structuring of activities dimension were significantly more lethal in general and more lethal when attacking hard targets, whereas terrorist groups high on the concentration of authority dimension attacked hard targets at a significantly higher rate. These findings demonstrate that both dimensions of organization were related to an increased capacity for violence yet in different ways. In light of these findings, a theoretical model is outlined, and practical implications are discussed with a focus on how both organizational dimensions highlight the role of criminal capital and bureaucratic control mechanisms in terrorist groups.

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CHAPTER 1

INTRODUCTION

In recent years, a number of terrorism studies have examined the structural form of terrorist groups (e.g., Arquilla & Ronfeldt, 2001; Ligon et al., 2013; Shapiro, 2005; Volder, 2016) as well as the relationship between terrorist group characteristics and violent outcomes such as lethality or soft target selection (Asal & Rethemeyer, 2008; Heger et al., 2012). Despite advances, few scholars have utilized a criminological approach to understand the organizational features of terrorist groups. While terrorism studies are relatively new, there is a large body of literature on the structure of street gangs and its influence on violence (Bouchard & Spindler, 2010; Decker, 2001; Decker & Curry, 2000; Decker & Van Winkle, 1995; Sanchez-Jankowski, 1991; Spindler & Bouchard, 2011; Thrasher, 1927; Yablonsky, 1959). Drawing from a group process perspective, this literature focuses on how street gangs and criminal groups have specific properties that influence the behavior of its members (Short & Strodtbeck, 1965; also see Klein & Crawford, 1967). Broadly speaking, insights from street gang research are applicable to the study of terrorist groups for two reasons. First, street gangs and terrorist groups are difficult to reach populations consisting of mostly young males that engage in public violence (Curry, 2011; Decker & Pyrooz, 2011, 2015a, 2015b). Second, research has shown that both street gangs and terrorist groups share similar group characteristics and vary in degrees of organization (Valasik & Phillips, 2017).

In this dissertation, I examine the dimensions of organization in terrorist groups and their influence on violence. In doing so, this study is of the first to quantitatively assess how the dimensions of organization manifest in terrorist groups. To understand

terrorist group organization, I rely on gang organization research and the group processes perspective in criminology.¹ Organization refers specifically to the “work environment” and ways in which gangs bring order, planning, or coordination to their criminal activities (Bouchard & Spindler, 2010, p. 922). Organization is also related to the extent to which criminal groups are complex such as a division of labor and specialization, coordinated and governed by formal rules, and purposeful with a shared objective (Best & Luckenbill, 1980; Cressey, 1972). Gang organization research is beneficial for this study for two reasons. First, gang organization research is methodologically robust and provides measureable indicators of organization that can also be used to examine terrorist group organization. Second, gang organization research have demonstrated that more organized gangs have higher levels of criminal offending and other deviant activities across multiple levels of analysis (Bjerregaard, 2002; Bouchard & Spindler, 2010; Decker, 2001; Decker, Bynum, & Weisel, 1998; Decker, Katz & Webb, 2008; Decker & Pyrooz, 2015a; Hagedorn, 1994; Liverso & Matsueda, 2019; Moule Jr, Pyrooz, & Decker, 2013; Pyrooz, Fox, Katz, & Decker, 2012; Sheley, Zhang, Brody, & Wright 1995). Thus, gang organization research provides a foundation for the expected relationship between organization and violence in terrorist groups.

Statement of the Problem

There are two primary limitation with the current literature on terrorist group organization. First, the majority of research on terrorist group organization is theoretical in nature or relies on case studies (e.g., Arquilla & Ronfeldt, 2001; Jackson, 2006; Ligon

¹ According to Papachristos, Hureau, and Braga (2013) group processes focus on “a range of interactional mechanisms and normative processes fostered by the coming together of members and the formation of collective identity” (p. 420).

et al., 2013; Shapiro, 2005; Volders, 2016; Zelinsky & Shubik, 2009). Subsequently, few studies focus on measurement or offer ways to quantitatively examine terrorist group organization. While terrorism scholars put forth common organizational dimensions underlying terrorist groups such as centralization or interconnectedness, little is known regarding how to quantify these dimensions. This is problematic for the study of terrorism since there is no systematic approach to understand organization across a large number of terrorist groups. This is also problematic for law enforcement and those in the field since there is no empirical basis on what terrorist groups to prioritize based on a tangible set of organizational characteristics.

The second broad limitation is that the majority of terrorism research has examined individual or environmental predictors of terroristic violence. In contrast, few studies have examined predictors of terrorism at the *group level* (for exception Abrahms & Potter, 2015; Asal & Rethemeyer, 2008; Heger et al., 2012). Moreover, studies that have examined the link between terrorist group organization and violence typically classify groups into broad categories (i.e., hierarchical or non-hierarchical). By doing so, organization is viewed as a definer as opposed to a descriptor in terrorist groups. Such an approach to classifying terrorist groups neglects important variation in organization that exists between categories.

To address the limitations in the existing literature, I draw upon existing research on gang organization to identify what indicators of organization are frequently used. If gangs and terrorist groups are similar (Curry, 2011; Decker & Pyrooz, 2011, 2015a, 2015b; Valasik & Phillips, 2017; Vishnevetsky, 2009) then many of the indicators of organization used to examine gangs should be applicable to terrorist groups. Next, I

assess how those indicators of gang organization map onto specific organizational dimensions (e.g., centralization, complexity, formalization) discussed in organizational theory. Organizational theory focuses on how organizational features influence performance (e.g., Lammers, 1978; Mintzberg, 1979; Rogers, 2003). In a recent study, Moule Jr and colleagues (2014) proposed a similar strategy and argued that five organizational dimensions typically found in theories of organizational behavior are applicable to gangs including centrality, formalization, complexity, interconnectedness, and organizational slack. While Moule Jr and colleagues (2014) used a top-down strategy and selected the indicators of organization based on theory, I use a bottom-up approach where I identified common indicators in the gang literature, then explore the organizational theory literature to contextualize the representation of these indicators. Finally, I examine how the indicators found in gang research and their underlying dimension manifest in terrorist group and influence violent outcomes of terrorist groups.

Research Questions and Agenda

The overarching goal of this dissertation is to better understand the organization of terrorist groups drawing from existing gang organization research and organizational theory. This dissertation addresses two central research questions. The first research question addressed: *Which indicators of gang organization can be applied to terrorist groups to develop a classification schema of terrorist group structure?* Classification schemas have a long history in the field of criminology (e.g., Moffitt, 1993) and offer an approach to organizing complex information into coherent taxonomies. In terrorism research, a large body of literature focuses on typologies of terrorist organizations based on their structural characteristics (e.g., Arquilla & Ronfeldt, 2001; Kilberg, 2012). The

drawback is the majority of this research is either theoretical or based solely on case studies. Thus, the goal of the first research question is to identify which indicators of organization -- drawn from the gang organization literature and supported by organizational theory -- are applicable to and vary between terrorist groups.

The second research question addressed: *Do terrorist groups that are more highly organized engage in more group level violence than less organized terrorist groups?*

With regard to violence, I examined two main types: lethality and hard target selection. The first type of violence, lethality, is related to the total number of victims killed by a terrorist group. Prior research has shown that terrorist groups who are centralized and share a strategic vision are more lethal than groups who do not meet those criteria (Heger et al., 2012). Studies on gang organization also suggest that members of more organized gangs are more violent and criminally active than members of less organized gangs (Decker et al., 2008). This, the working hypothesis is that terrorist groups with higher levels of organization are more lethal than those with lower levels of organization.

The second violent outcome, hard target section, examines the degree to which terrorist groups attack targets that are heavily protected such as members of the government, or those charged with protecting against violent attacks such as police or military members. Relative to soft targets, which typically have few protections in place and require little skill to attacks, hard targets demand a considerable amount of coordination and expertise to attack given their capacity to deter and combat terrorist attacks. While target selection is an essential facet of terrorist organization decision-making (Abrahms & Potter 2015; Asal, Rethemeyer, Anderson, Stein, Rizzo, & Rozea, 2009; Drake 1998; de la Calle & Sanchez-Cuenca 2006), few studies have focused on

attacks on hard targets (for exception see, Asal, Gill, Rethemeyer, & Horgan, 2015; Berman & Latin, 2008; Piazza, 2020). I expect that terrorist groups with greater levels of organization are more likely to attack hard targets relative to those with lower levels of organization. This is in line with Best and Luckenbill's (1980) notion that criminal collectives with higher levels of organizational sophistication have a greater capability for complex deviant operations.

Key Terms: Terrorism and Terrorist Groups

There is no universally accepted definition of terrorism. In some cases, the term "terrorism" is used subjectively to label someone or some group to delegitimize their actions. In other cases, the term is used in reference to a tactic used by an organization or an individual (e.g., Hoffman, 2006). For this dissertation, the definition of terrorism is as follows:

the threatened or actual use of illegal force and violence by a non-state actor to attain a political, economic, religious, or social goal through fear, coercion, or intimidation (START, 2020).²

In a study of more than fifty scholarly articles, Schmid and Jongman (1988) found that the basic definition is that terrorism is a violent tactic used to intimate or coerce an audience towards a political or social goal. In a more recent analysis of seventy-three definitions from the four leading academic journals on the study of terrorism, Weinberg, Pedahzur, and Hirsch-Hoefler (2014) came up with the consensus definition: "Terrorism is a politically motivated tactic involving the threat or use of force or violence in which

² This definition does not include acts of state terrorism and the term terrorism is interchangeable with the term violent extremism."

the pursuit of publicity plays a significant role" (p. 786). The definition of terrorism used in this dissertation satisfies these tenants.³

Similar to the concept of terrorism, prior research has defined terrorist groups in a number of ways (e.g., Asal & Rethemyer, 2008; Crenshaw, 1991; Cronin, 2009; Della Porta, 1995; de la Calle & Sánchez-Cuenca 2011, Enders & Sandler, 2012; Findley & Young, 2012; Shapiro & Siegel, 2012). For this dissertation, the definition of terrorist groups is as follows:

Subnational political organizations that use terrorism (Phillips, 2015, p.231)

This definition is suitable for two reasons. First, it meets three criteria commonly found in prior research including subnational, political organization, and the use of terrorism (see Phillips, 2015 for review). The focus on subnationality and political goals excludes state terrorism and criminal groups who use violence for instrumental purposes. Second, this definition is inclusive and treats a group as a terrorist group regardless of whether it meets other exclusive criteria (e.g., holding territory or not).

Criminological Study of Terrorism

Sutherland and Cressey (1960) defined crime as “behavior in violation of the criminal law” (p. 4). By this definition, terrorism and other acts of political violence are crimes and fall within the domain of criminology (Maier-Katkin, Mears, & Benard, 2009; Pickett, Baker, Metcalfe, et al., 2014). Some scholars argue that acts of political violence

³ Section 802 of the USA Patriot Act defines terrorism as an act dangerous to human life that is a violation of the criminal laws of a state or the United States, if the act appears to be intended to: (i) intimidate or coerce a civilian population; (ii) influence the policy of a government by intimidation or coercion; or (iii) to affect the conduct of a government by mass destruction, assassination or kidnapping. While the USA Patriot Act focuses on acts against US citizens in their definition, the definition of terrorism used in this dissertation does not.

such as terrorism and genocide are relevant to what some consider “core criminology,” given their association with increased levels of street crime and delinquency (Gartner, 1990; Pickett et al., 2014). However, this view of terrorism has not always been the case. Early research on the link between crime and terrorism rested on the assumption that the terrorist is altruistic and believes he or she is serving a “good” cause whereas the criminal serves no cause outside of his or her personal aggrandizement and material satisfaction (Hoffman, 2006). Prominent criminologists, such as Hirschi and Gottfredson (2001), also supported the view that crime and terrorism are distinct concepts and that criminological theory is poorly suited to explain terrorism since it “reflect[s] commitment to a political cause” (p. 94).

Over time, the treatment of crime and terrorism as distinct concepts has diminished as researchers have increasingly pointed out similarities, both in motives and tactics, between terrorist groups and criminal organizations. For instance, researchers have shown that criminal organizations such as Mexican drug cartels employ terrorist tactics to advance their interests (Phillips, 2018), while terrorist organizations such as the Revolutionary Armed Forces of Columbia (FARC) engage in extortion, kidnapping, and drug trafficking to support their political goals (Treverton, 2009). Other scholars have pointed out that, despite differing goals, terrorists and criminals appropriate each other’s activity and seek expertise from one another (Shelley & Picarelli, 2005; Windle, Morrison, Winter, & Silke, 2018). Today, a wide range of criminological theories have been used to help understand the motivations, tactics, risk factors, and protective factors related to violent extremism including life course theory (Simi, Sporer & Bubolz, 2016), techniques of neutralization (Liddick, 2013; Sporer, Logan, Ligon, & Derrick, 2019),

social disorganization (Fahey & LaFree, 2015; Freilich, Adamczyk, Chermak, Boyd, & Parkin, 2015), routine activities (Parkin & Freilich, 2015), displace and diffusion (Hsu & Apel, 2015), rational choice (Gill, Marchment, Corner, & Bouhana, 2020; Mandala & Freilich, 2017; Perry & Hasisi, 2015), deterrence (Argomaniz & Vidai-Diez, 2015), and general strain theory (Agnew, 2010; Nivette, Eisner, & Ribeaud, 2017). Taken together, terrorism is a growing research area in the field of criminology and criminological theories are well suited to better understand the complexities of terrorism.

Crime-terror continuum

Initially conceptualized by Makarenko (2004), the crime-terror continuum describes an underlying nexus between ideologically motivated terrorism and profit-oriented organized crime. The crime-terror continuum supports the idea that crime and terrorism are not distinct concepts, and the relationships, goals, and tactics of organized crime groups and terrorists are not fixed. Instead, the organized crime-terrorism relationship is transformational and based on a hybrid of economic and ideological motives in a rapidly evolving global market (Makarenko, 2004; Perri & Brody, 2011; Phillips & Kamen, 2014). At one end of the continuum are organized crime groups who seek to maximize profits while avoiding scrutiny. At the other end of the continuum are terrorist organizations that pursue ideological goals through violent or threatening means. In the middle of the continuum are theoretical possibilities where one organization, organized crime or terrorist, adopts the methods of the other to accomplish its goal (Valasik & Phillips, 2017). For example, terrorist groups such as the Islamic State embrace traditional organized crimes such as extortion, kidnapping, and drug trafficking to raise funds (Bastug & Guler, 2018). Likewise, Flanigan (2012) highlights how drug

cartels have increasingly used “ghastly” acts of violence, typically reserved for terrorist groups, to intimidate public officials and create a sense of fear among the Mexican population. In one potent example, Flanigan (2012) describes how members of La Familia Michoaca[’]n first gained notoriety by dumping five severed heads onto the dance floor of a nightclub.

Gang-terror continuum

Much of the conceptualization of the crime-terror continuum has focused on terrorism as it relates to traditional organized crime and vice-versa. More recently, however, several scholars have highlighted ways in which the street gang literature can inform terrorism studies (Curry, 2011; Decker & Pyrooz, 2011, 2015a, 2015b; Valasik & Phillips, 2017; Vishnevetsky, 2009). Curry (2011) notes that comparing street gangs and terrorist organizations is more promising than initially thought. This is likely because despite the relative newness of terrorism studies the study of street gangs date back “nearly 100 years, with thousands of empirical studies” (Valasik & Phillips, 2017, p. 194). Furthermore, terrorist groups, like street gangs, are a difficult to reach population consisting of mostly young males that engage in public violence (Decker & Pyrooz, 2011).

Another illustration of the gang-terror continuum centers on the organization of street gangs compared to terrorist groups. For example, both street gangs and terrorist groups widely vary in their level of organization (Valasik & Phillips, 2017). In gang research, this is best exemplified by Decker and Van Winkle’s (1995) description of the instrumental-rational compared to informal-diffused perspectives of gang organization. The instrumental-rational perspective holds that street gangs are well organized with a

hierarchical structure and shared goals among its members (Decker & Curry, 2000). In contrast, the informal-diffused perspective views street gangs as disorganized and comprised of self-interested aggregates of individuals (Decker & Curry, 2000). Research on the organization of terrorist groups follows a similar pattern. Some terrorist groups are structured like traditional organizations characterized by a hierarchical command-and-control structure, organizational boundaries, and rules (Ligon et al., 2013; Hoffman, 2008; Shapiro, 2013). Other terrorist groups follow a decentralized “leaderless resistance” model, which emphasizes the ability of individuals or autonomous cells to execute terror attacks (Carson et al., 2012; Loadenthal, 2017). Despite the conceptual overlap, few studies have examined if, and how, gang organization research can inform terrorism studies. To overcome this limitation, I examine the organization of terrorist groups through the theoretical lens typically applied to street gangs.

Level of Analysis

In this dissertation, I am interested in examining the variation in levels of organization between terrorist groups at the group level of analysis. My focus on the group level of analysis does not discount other existing explanations and any holistic perspective on violent extremism accounting for individual level or contextual level variation. For example, important individual level differences include the role of adverse life experiences such as war-related trauma (e.g., Bhui, Warfa & Jones, 2014), discrimination (e.g., De Waele & Pauwels, 2014; Pauwels & Schils, 2016), perception of state-level injustice (Hafez & Mullins, 2015; Piazza, 2011), childhood trauma (Simi et al. 2016; Speckhard & Akhmedova, 2005) and violent extremism. Contextual level factors such as country of origin’s rate of deprivation, economic inequality, or social

disorganization, each of which have been consistently linked to terrorism (Coggins, 2015; Fahey & LaFree, 2015; Gurr, 1970; Lia, 2007; Piazza, 2006, 2007, 2008; Sandler, 2014). Despite the importance of these individual and contextual factors, exploring their relative contribution to violence is beyond the scope of this dissertation.

Group level factors and terrorism

The group level of analysis, also referred to as the unit or organizational level of analysis, examines the effect of variation in group dynamics and processes on acts of terrorism. Put another way, research operating at this level argue, “much of what terrorists do on the outside can only be understood by looking inside the group itself. A terrorist organization is not a black box but a living system, subject to a range of influences that may be only tangentially related to its stated strategic objectives” (McCormick, 2003, p. 486). At the group level, theoretical frameworks have examined the role of ideology (Drake, 1998), leadership (Abrahms & Potter, 2015; Hermann & Sakiev, 2011), competition (Bloom, 2005), organizational capabilities and resources (Asal & Rethemeyer, 2008; Horowitz, 2010), and terrorist group behavior. For example, ideology provides the moral boundaries of the organization and a basis for expectations on the appropriateness of targets (Drake, 1998; Crenshaw, 1988; Hoffman, 2006). Terrorist groups motivated by religion are deadlier because their violence is unconstrained. For these groups, violence serves a supernatural purpose and is justified by scripture (Asal & Rethemeyer 2008; Gressang IV, 2001). Likewise, terrorist organizations motivated by ethnonationalist concerns are more lethal since they excel at creating a dividing line between members and the “other” (Juergensmeyer, 2003; Pape,

2005; Tilly, 2003). By creating this boundary, there is little reason to discriminate when killing since nearly all out-group members are legitimate targets.

Terrorist leaders influence organizational decisions (for a comprehensive review, see Hofmann, 2017). For instance, Abrahms and Potter's (2015) suggest that when terrorist organizations undergo periods of weak leadership or "leadership deficiencies," they are more likely to attack soft targets (e.g., private civilians). During period of weak leadership, tactical decisions are relinquished to lower level members who are incentivized to attack soft targets given their lack of combat experience, resources, and stake in the organization (Abrahms, Beauchamp, & Mroszczyk, 2017; Abrahms, Ward, & Kennedy, 2018). In contrast, strong terrorist leaders with high levels of charisma, or charismatic authority, have a profound influence on their organization and have shown a superior ability to recruit and radicalize follower (Hofmann & Dawson, 2014; Ingram, 2013; Ligon, Logan, & Derrick, 2020; Nesser, 2011; Post, 2006). Terrorist decapitation also impacts the tactics of terrorist groups (Carson, 2017; Cronin, 2009; Freeman, 2014; Johnston, 2012; Jordan, 2009; Langdon, Sarapu, & Wells, 2003; Price, 2012). The evidence on the effectiveness of leadership decapitation is largely mixed with some studies showing that leadership decapitation accelerates the mortality rate of terrorist groups in some cases (Price, 2012), while others argue that it is counterproductive and results in escalating rates of retaliatory violence (Jordan, 2009). Despite mixed conclusions, this literature demonstrates that leaders play a pivotal role in the behavior of terrorist groups.

Next, researchers have also shown that competition influences organizational decision-making. This includes competition between terrorist organizations as well as

between terrorist organizations and law enforcement. Most notably, Bloom's (2005) outbidding hypothesis argues that internal competition for influence incentivizes oppressed groups to seize the marketplace by "outbidding" one another by demonstrating higher levels of commitment to the cause. This explains why some extremist groups adopted suicide bombings – the ultimate signal of an intense commitment to one's cause – while others do not. Cropley, Kaufman, and Cropley (2008) posit that competition is one of the main drivers of malevolent creativity in terrorist organizations (also see Gill, Horgan, Hunter, & Cushenbery, 2013). To ensure their survival, terrorist organizations must develop creative methods to overcome one another, the same as businesses attempt to gain a competitive advantage over rivals (Cropley & Cropley, 2011; Logan, Ligon, & Derrick, 2019).

Finally, terrorism scholars have emphasized the link between the capabilities and resources of terrorist groups and their behaviors. For example, Asal and Rethemeyer (2008) found that large terrorist organizations are more lethal than smaller ones.⁴ Terrorist organizations with robust membership have greater resources including members who are skilled with a high degree of tactical expertise, capable of raising funds, and who have access to restricted information, places, and material (Asal et al., 2015; Bloom, 2017; Hunter, Shortland, Crayne, & Ligon, 2017; Windisch, Logan, & Ligon, 2018). Horowitz's (2010) adaptation capacity theory also empathizes the necessity of organizational capital and financial intensity of terrorist groups seeking to innovate. Without the proper tangible (e.g., revenue) and intangible (e.g., expertise) capital, terrorist groups are at risk of failing irrespective of their ideological beliefs.

⁴ While organizational size is also considered an indicator or element of organizational structure, it is most often portrayed as a resource or capacity in existing terrorism studies.

As illustrated above, several factors influence terrorist groups' behavior and decision-making. In this dissertation, I am interested in the degree of terrorist group organization and its influence on violent outcomes. To understand this relationship, the next section focuses on why, and how, terrorist groups organize.

The Terrorist Dilemma and the Role of Organization

Terrorist groups face an inherent dilemma while trying to reach their collective objectives. On the one hand, terrorist groups must organize, coordinate, and control the behavior of their members in order to achieve their strategic and operational goals (Shapiro, 2013). In other words, terrorist groups must also overcome fundamental organizational issues such as resource pooling and allocation, limiting member discretion, and recruitment and retention (Volders, 2016). On the other hand, terrorist groups operate in secrecy to avoid infiltration from law enforcement or competitors (De la Calle et al., 2006; Jackson, 2006; Shapiro, 2013). The need for both efficiency and secrecy in operations created a paradox in terrorist groups known as the "terrorist dilemma" (Shapiro, 2013; see also, Berman, 2009). The terrorist dilemma stresses the critical tradeoff between two organizational goals: (1) the need to maintain operational effectiveness and control in order to achieve ideological goals, and (2) the need to operate in secrecy to secure the organization's survival.

The issue for terrorist groups is that the organizational mechanisms used to coordinate, and control members' behaviors creates operational vulnerabilities. Put another way, as operational efficiency increases, levels of security decrease and vice-versa. For example, communication between leaders and foot soldiers helps ensure that any actions are consistent with the strategic goals of the group. However, communication

between leaders and foot soldiers also highlights internal linkages in the movement that law enforcement can exploit – placing the organization’s survival at risk. In contrast, terrorist groups with lower degrees of organization are more secure and less likely to be infiltrated since there are fewer communication and coordination mechanisms. The drawback of prioritizing security over effectiveness is that control over members diminishes. Thus, members have increased autonomy and are at risk of engaging in tactics that are counterproductive to the organization’s long-term strategic goals.

Terrorist groups’ balance of the need for efficiency and security has implications for decision-making and organizational behavior. For example, Volders (2016) argues that the nature and impact of the terrorist dilemma is a key factor in the organizational design of terrorist groups. Terrorist groups such as the Animal Liberation Front or Earth Liberation Front prioritize secrecy over efficiency and are characterized by having “no discernible leadership, are not centrally controlled, and have no functional differentiation” (Kilberg, 2012, p. 814; see also Shapiro, 2005). These less organized terrorist groups are structured in a manner that is difficult to infiltrate, but their lack of coordination also makes it difficult to achieve strategic goals (Shapiro, 2013). In contrast, terrorist organizations such as Hezbollah and the Lord’s Resistance Army prioritize efficiency and are characterized by having leadership, central command-and-control, and specialization. These more organized, hierarchal terrorist groups are more lethal, more likely to sustain violence over time, and more likely to attack hard targets compared to non-hierarchal groups (Heger et al. 2012; Kilberg, 2012). While these groups are structured in a way that facilitates intra-group coordination and resource allocation, they are also at increased risk of infiltration from law enforcement.

As first discussed in the limitations, the primary issue with the existing research on terrorist group organization is that it is theoretical (e.g., Arquilla & Ronfeldt, 2001; Volder, 2016) or relies on case studies (Ligon et al., 2013; Shapiro, 2005). In addition, the few quantitative studies that have examined the relationship between the organization of terrorist groups and violence rely on broad classification schemas (e.g., hierarchal/non-hierarchal; Heger et al. 2012; Kilberg, 2013). This study is of the first to provide a data-driven approach to classify terrorist groups based on indicators of organization derived from gang research and supported by organizational theory.

Conclusions

In a short research note, Decker and Pyrooz (2015b) laid out twelve “lessons learned” from gang research that can provide insight in terrorism studies. The third lesson highlighted by the authors reads as follow:

“The study of gangs has taught us time and again that the group is more powerful than the individual. Because groups motivate individuals to act in ways they would not otherwise do, it therefore is critical to understand the collective features of the group and how it relates to crime and deviance. Group structure differs from gang to gang and is not monolithic, which is why it is equally important to understand the role of group process within the group. Focusing on group process naturally leads to asking questions about the catalysts for actions of various sorts. Identifying the steps in engaging in violence, whether in the gang or terror context is important. Both individual and group motivations are important. Understanding the role of group process and organizational structure in recruitment, adopting group norms and engaging in violence are key issues in understanding both gang and terror groups... It is important not to squabble over generalizing whether extremist groups are hierarchical, decentralized, or leaderless, but instead to determine how each of the organizational structures relate to different group processes and accordingly different collective and per capita rates of crime and deviance.

In line with Decker and Pyrooz (2015b), this dissertation uses a criminological lens typically found in research on street gang organization to understand levels of organization in terrorist groups and their effects on group level violence. While there is

no shortage of group level explanations of violent extremism, few studies have drawn on the over 100 years of gang research.

The remainder of this dissertation is divided into five main sections. Chapter 2 examines the prior research on gang organization. This chapter also integrates insights from organizational theory and prior research on terrorist group structures. Chapter 3 highlights the methodology and analytical techniques used in this research. Chapter 4 presents the results in three sections. I examine how the underlying structure of terrorist group organization using factor analysis. Then, I examine the relationship between degrees of organization and violence (i.e., lethality and hard target selection) in terrorist groups. Third, I use cluster analysis to provide a data-driven approach to classifying structural typologies of terrorist groups. In the final chapter, Chapter 5, I offer theoretical and practical conclusions, discuss limitations, and suggest potential avenues for future research.

CHAPTER 2

LITERATURE REVIEW

Pioneered by the work of Thrasher (1927), research on gang organization focuses on the degree to which a gang effectively and efficiently coordinates and carries out activities (see Pyrooz et al., 2012, p. 86).⁵ After over 100-years of research, the degree to which gang organization varies is best characterized by two competing views. First, research from scholars such as Mieczkowski (1986), Padilla (1992), Skolnick, Correl, Navarro, and Rabb (1988), Skolnick (1990), Sanchez-Jankowski (1991), Taylor (1990), Venkatesh (1997), and Venkatesh and Levitt (2000) suggest that gangs exhibit similar features of formal organizations with a leadership structure, diversity of roles, rules, and control over members. This view of gang organization is termed the *instrumental-rational perspective* (Decker & Van Winkle, 1995). More specially, Decker and Curry (2000, p. 474) describe the instrumental-rational perspective as one where gangs “have a vertical structure, enforce discipline among their members, and are quite successful in defining and achieving group values” (also see Decker et al., 1998).

In contrast to the instrumental-rational perspective, research from scholars such as Esbensen and Huizinga (1993), Decker and Curry (2000), Decker and colleagues (2008), Decker and Van Winkle (1995), Hagedorn (1994), Klein, Maxson, and Cunningham (1991), McGloin (2005), and Waldorf (1993) suggest that gangs are loosely confederated groups with little organization or cohesion. This view of gang organization is termed the *informal-diffused perspective* (Decker & Van Winkle, 1995). More specially, Decker and

⁵ This is very similar to term organizational structure, which refers to the formal configuration between individuals and groups regarding the allocation of tasks, responsibilities, and authority within the organization (Greenberg, 2011).

Curry (2000) describe the informal-diffused perspective as one where gangs “are diffused” and comprised of “self-interested and self-motivated aggregates of individuals” (also see Decker et al., 1998). The following sections describe previous studies in the instrumental-rational and informal-diffused perspectives in more detail.

Instrumental-Rational Perspective

Drawing from interviews with 39 inmates and 43 criminal justice officials, Skolnick and colleagues (1988) and Skolnick (1990) highlight the instrumental-rational view by concluding that gang involvement in drug distribution was well organized and offered rational advantages to youth interested in selling drugs. Furthermore, many members of entrepreneurial gangs perceive themselves as “organized criminals.” Mieczkowski’s (1986) study of 15 members of the Young Boys Incorporated -- a black street gang in Detroit – found gang members operated in a bureaucratic structure coordinated by a leader who enforced the rules of the gang and differential roles for members in drug distribution operations. Padilla (1992) reached a similar conclusion and found that members of Puerto Rican street gangs in Chicago had different criminal roles in the gang, with street dealing considered the most prestigious.

Fagan (1989) developed four gang typologies based on members’ patterns of drug involvement and other criminal activities including social, party, serious delinquent and organized gangs. The latter two types, serious delinquent and organized gangs, reported higher levels of organization sophistication such as having a leader, specific rules and codes, division of labor, and a hierarchy based on age. Taylor (1990) identified a corporate gang structure among gangs located in Detroit. Corporate gangs functioned like a business and had evolved from a relative disorganized group into an organized structure

with effective leadership and shared goals. After 10-years of fieldwork involving 37 different gangs across three cities, Sanchez-Jankowski (1991) described gangs as highly structured organizations with a leadership structure, diversity of roles, and rules. Organized gangs were more likely to be involved in acts of organized violence as opposed to individual violence given their ability to control and coordinate the activities of its members. More recently, Densley (2012) examined gang organization in a cross-national content. Utilizing interviews with gang members and associates from 12 different gangs across London, Densley concluded that each of the 12 gangs were well organized with a hierarchical structure with multiple levels of power, an “elder” leadership group, rules of conduct, and punishments. Many gang members also reported the presence of age-graded roles and an incentive system in the gang.

Informal-Diffused Perspective

Hagedorn (1994) examined the organizational characteristics of gangs in Milwaukee and found that drug sales were consistent with the informal-diffused model. More specifically, many gang members were more of individual entrepreneurs as opposed to part of a well-organized group. Utilizing arrest records from five Los Angeles police departments, Klein, Maxson, and Cunningham (1991) explored differences in crack sales between gang members and nongang members. The authors found that gangs were not well organized, lacked permanent membership or roles, and did not have shared goals. Esbensen and Huizinga (1993) examined involvement in criminal activities for the gang and nongang members over time using the Denver Youth Survey. The authors described the gangs in their sample as informal organizations lacking structure, and for many gang members, their membership in the gang was relatively short, lasting

approximately a year. Waldorf (1993) found that few gangs in Southern California did not have the organization nor skills to establish new drug markets. Taken together, these studies suggest that gangs who focus on drug sales generally have lower degrees of organization.

Using data collected as part of a three-year field study in St. Louis, Decker, and Van Winkle (1995) explored the role of gangs and gang members in drug sales. To determine how gangs organized drug sales, the authors examined several interrelated questions about the presence of organizational roles and leadership in the gang. Of the 99 active gang members interviewed, the authors found that the majority of gang members (58 percent) could not identify any roles related to drug sales in the gang. Decker and Van Winkle (1995) conclude that their results “unequivocally support the conclusion that the involvement of gangs in drug sales does not affect recruitment, lacks organization, and fails to produce a commitment to a central goal” (p. 601). Decker, Bynum, and Weisel (1998) examined the extent to which gangs were transitioning into organized crime groups using a sample of gang members in San Diego, an emerging gang city and Chicago, an established gang city. The authors found that each gang with the exception of the Gangster Disciples in Chicago showed low levels of organization. Decker and Curry (2000) interviewed 96 current, associate, and former gang members about their perceived levels of gang organization. The authors concluded that there was no substantial evidence that the gangs described in their study were well organized nor controlled or influenced the behavior of individual members. This supports Decker and Curry’s (2002) research which found that gang organization was linked to *intragang* as opposed to *intergang* violence due to the loose structure and lack of control of gang members.

Drawing from social network analysis, McGloin (2005) found that street gangs in Newark were disconnected subgroups of associations. Furthermore, she concluded that the overall street gangs were organized in a “very loose fashion” despite the presence of more cohesive cliques or subgroups within the street gangs. Decker and colleagues (2008) found that levels of gang organization were rather low for both current and former gang members. Using a seven-item gang organization index, the authors found that while levels of organization were higher among gangs associated with former gang members as opposed to current members, the organizational sophistication of gangs as a whole, was rather low. Finally, Spindler and Bouchard (2011) examined how gang typologies emerge across a sample of 44 self-identified gang members and 171 delinquent group members. Results from a cluster analysis using measures of organization suggest that produced four gang typologies: low organization, honor-based, location-based, and highly organized. The low organization type, characterized by few organizational features, was the largest group, while the highly organized type characterized by the most organizational features, was the smallest group.



Figure 1. Gang Organization Continuum

In sum, there are two important conclusions from the existing research on gang organization. First, as initially pointed out by Thrasher (1927), “no two gangs are alike,” and levels of gang organization vary from gang to gang (Cohen, 1977; Coughlin &

Venkatesh, 2003; Klein & Maxson, 2006). Second, gang organization is primarily a *descriptor* rather than a *definer* of groups (Densley, 2012; Fagan, 1989; Klein & Maxson, 2006). While prior research has shown that support for the informal-diffused perspective of gangs outweighs that of the instrumental-rational view, the key point is that gangs vary across the continuum. From this perspective, gang organization is best conceptualized on a continuum with informal-diffused on one end and instrument-rational on the other end (see Figure 1; Decker & Pyrooz, 2015a). In the next section, I review prior research on the relationship between gang organization and criminological outcomes.

Gang Organization and Criminological Outcomes

To date, a number of studies have directly or indirectly examined the relationship between gang organization and delinquent or criminal behaviors (Bjerregaard, 2002; Bouchard & Spindler, 2010; Decker et al., 2008; Esbensen et al., 2001; Pyrooz et al., 2012; Scott & Maxson, 2016; Sheley et al. 1995). For example, using a sample of 373 male juveniles incarcerated in a maximum-security facility, Sheley and colleagues (1995) found that members of structured gangs were significantly more likely to engage in drug sales, burglary, robbery, and gun-carrying than members of unstructured gangs. Esbensen and colleagues (2001) and Bjerregaard (2002) both indirectly examined gang organization in their research on self-nomination techniques of gang membership. Drawing on a sample of 5,935 eighth-grade public school students representing 42 schools across 11 cities, Esbensen and colleagues (2001) found that members of organized gangs were more likely to engage in state offenses, minor offenses, property offenses, personal offenses, drug sales, and drug use compared to all other gang members whose gang did not meet the definition of organized gangs. Next, Bjerregaard (2002)

found that organized gangs were significantly more likely to have committed a robbery, participated in a break-in, stolen a car, committed an assault, and fought rival gangs compared to the other groups. A similar pattern existed with regard to the individual gang member's delinquent behavior.

Decker and colleagues (2008) examined the relationship between levels of gang organization and gang members' involvement in violent crime, drug sales, and violent victimization using a sample of approximately 250 self-nominated juvenile gang members. The authors found that their seven-item gang organization index was significantly correlated with indices of violent victimization, drug sales, and violent offending for both current and former gang members. In other words, current and former members of more organized gangs reported higher levels of violent offending, gang sales of different kinds of drugs, and violent victimization compared to members of less organized gangs. Bouchard and Spindler (2010) examined whether levels of gang organization influenced drug dealing, violent offending, and property offending among 523 self-reported delinquent youth in the Canadian province of Quebec. Using a nine-item organization index, the authors found that gangs were more organized than delinquent groups. They also found that levels of organization were associated with increases in drug dealing and violent offending, but not property offending.

Pyrooz and colleagues (2012) examined the relationship between gang organization, patterns of delinquency, and victimization using a cross-national sample of current juvenile gang members from three different data sources. These data sources included the Gang Resistance Education and Training (GREAT) project, the Trinidad and Tobago Youth Survey (TTYYS), and the Arrestee Drug Abuse Monitoring (ADAM). The

authors found that gang organization had a significant, positive correlation with measures of delinquency and victimization across the three samples. However, the individual items used to create the organization scale were “checked with weak, modest, moderate, and strong coefficients, ranging from 0.05 to 0.58.... [and] the mean inter-item correlations across the studies are not as large as one would expect to inspire confidence in the latent construct of gang organizational structure” (p. 95-96).

Finally, Scott and Maxson (2016) examined if there was a link between levels of gang organization and institutional violence in youth correctional facilities. Scott and Maxson (2016) found that levels of perceived gang organization had no effect on institutional violence at three time points. However, interviews with the incarcerated youth suggested that the transgression of rules that govern respect for the group, and to a lesser extent, violence regulated by leaders serve as a catalyst for institutional violence. This suggests that some aspects of gang organization may play a role in explaining violence between incarcerated youth.

As illustrated above, the majority of studies on gang organization have examined the effects of organization on measures of criminal offending, delinquency, and to a lesser extent, victimization. That said, a few studies have also explored the relationship between gang organization and other deviant outcomes. For example, Mourle Jr. and colleagues (2014) examined the degree to which gang organization influences the online presence and behavior of gangs. Drawing from a sample of 418 current and former gang members from five large cities across the United States, the authors found that gang organization was positively and significantly related to a number of online behaviors, including having a website, posting videos online, and recruiting online. More recently,

Leverso and Matsueda (2019) examined the effects of perceived gang organization on the length of time an individual spends in a gang. The authors found that perceived gang organization was inversely related to leaving the gang. Put another way, individuals who perceive their gang as more organized are more likely to stay in their respective gang longer than those who perceive their gang as less organized.

In sum, prior research has illustrated two important points regarding the nature of gang organization. First, there is a clear relationship between degrees of gang organization and criminal offending. Members of more organized gangs report higher levels of violence and criminal offending compared to members of less organized gangs. Second, gang organization affects individual and group behaviors outside of criminal offending such as the length of time an individual spends in a gang, victimization, and online group behaviors. This suggests that gang organization influence a range of criminological outcomes.

Structural indicators of gang organization

The previous section illustrated that levels of organization vary across gangs, and members of gangs with higher levels of organization, typically report more engagement in violence and criminal offending. What remains unknown is how gang organization is measured across studies. For example, while developing a gang organization index, Decker and colleagues (2008) included an item measuring whether gang members “give money to the gang”, while Bouchard and Spindler (2010) did not. Likewise, Sheley and colleagues (1995) argue that having an identifiable group name is an indicator of organization, while Pyrooz and colleagues (2012) do not.

To address this, Table 1 summarizes twenty studies that have examined, to some degree, the structural indicators of gang organization. Table 1 was constructed using both quantitative articles that have directly measured gang organization (e.g., Bouchard & Spindler, 2010; Decker et al., 2008) as well as qualitative, ethnographic works that unpacked indicators of gang organization (e.g., Thrasher, 1927; Sanchez-Jankowski, 1991). The articles were searched for using a keyword such as “gang organization”, “gang typologies”, and “criminal gang structure” in Google Scholar and similar internet-based search engines (e.g., *Lexis Nexis*, *JSTOR*). This search was augmented by reviewing the bibliographies of related articles. The primary inclusion criteria for Table 1 was that the article was theoretically or methodologically related to gang organization and/or gang structure. In other words, the article had to theorize the dimensions of gang organization or discuss ways to measure it. I only counted articles by the same author(s) as one entry if they used the same measures to assess gang organization across different articles. For example, Bouchard and Spindler (2010) and Spindler and Bouchard (2011) use the same items to measure gang organization so only one article was included on Table 1. This helped reduce overweighting items published by a specific research team.

Table 1. Summary of the Structural Indicators Based on Twenty Studies on Gang Organization

Authors	Structural Features
Bjerregaard (2002)	<ul style="list-style-type: none"> • Size, Group Name, Group Leader, Regular Meetings, Designated Clothing, Claim Territory, Gun Stash
Bouchard & Spindler (2010)	<ul style="list-style-type: none"> • Group Name, Group Leader, Hierarchy, Meeting Location, Distinctive Signs/Codes, Rules, Initiation, Protect Territory, Defend Honor/Reputation
Decker (2001)	<ul style="list-style-type: none"> • Levels of Membership, Leaders, Meetings, Rules, Discipline, Post Gang Groups
Decker & Curry (2000)	<ul style="list-style-type: none"> • Age-Graded Groups, Leaders, Meetings, Rules
Decker & Van Winkle (1995)	<ul style="list-style-type: none"> • Roles in Selling Drugs, Leaders, Leader Duties, Leader Influence
Decker et al. (1998)	<ul style="list-style-type: none"> • Levels of Membership, Leaders, Meetings, Rules, Pay Dues, Political Activities, Legitimate Business, Consequences for Leaving
Decker et al. (2008)	<ul style="list-style-type: none"> • Group Leader, Regular Meetings, Rules, Punishment for Rule Breaking, Distinctive Signs/Codes, Responsibilities to the Gang, Give Money to the Gang
Densley (2012)	<ul style="list-style-type: none"> • Size, Hierarchy and Rules, Leadership, Incentives and Organizational Mobility, Rules, Punishments
Esbensen et al. (2001)	<ul style="list-style-type: none"> • Initiation, Group Leader, Colors/Symbols
Fagan (1989)	<ul style="list-style-type: none"> • Join Before Age 13, Initiation, Leaders, Meetings, Rules/Codes, Roles, Age-Graded Roles, Symbols/Colors, Roles for Girls
Hagedorn (1994)	<ul style="list-style-type: none"> • Ethnicity, Division of Labor, Centralization, Relationship of Drug Organization to Gang, Junior Groups, Adult Involvement
Leverso & Matsueda (2019)	<ul style="list-style-type: none"> • Group Leader, Regular Meetings, Rules/Codes, Specific Roles, Age-Graded Group, Roles for Females, Colors/Symbols
Maxson & Klein (1995)	<ul style="list-style-type: none"> • Size, Age of Members, Duration of Existence, Subgroupings, Territory, Crime Versatility
Moule et al. (2014)	<ul style="list-style-type: none"> • Group Leader, Shot Callers, Regular Meetings, Rules, Punishment for Rule Breaking, Responsibilities to the Gang, Give Money to the Gang, New Recruits, Claim Territory
Pyrooz et al. (2012)	<ul style="list-style-type: none"> • Group Leader, Regular Meetings, Rules, Insignia
Sanchez-Jankowski (1991)	<ul style="list-style-type: none"> • Leadership Structure, Roles/Duties, Codes
Scott & Maxson (2016)	<ul style="list-style-type: none"> • Group Leader, Distinct Symbols/Styles, Entry Rituals, Claim Area, Do Illegal Things Together, Illegal Drug Use
Sheley et al. (1995)	<ul style="list-style-type: none"> • Group Name, Group Leader, Regular Meetings, Designated Clothing, Protect Territory
Thrasher (1927)	<ul style="list-style-type: none"> • Leaders, Meetings, Roles, Rules/Codes, Punishments, Territory, Size
Yablonsky (1959)	<ul style="list-style-type: none"> • Hierarchy, Size, Roles
Valdez (2003)	<ul style="list-style-type: none"> • Leadership Structure, Hierarchy, Rules

Next, on Table 2, I categorized the indicators of gang organization found in prior research under common organizational themes. For instance, reports of gangs having different roles, age-graded groups, roles of girls, or responsibilities are suggestive of a division of labor within the gang. Likewise, reports of females having levels of membership, centralization, shot callers, or organizational mobility is indicative of a hierarchy within the gang (see Moule Jr. et al., 2014 for a similar approach). Furthermore, I only developed organizational themes in which an indicator was used in more than one study. For example, Scott and Maxson (2016) assessed if incarcerated youth “did illegal things together” as a marker of organization. Since this was the only study to use this measure, and it did not fit in any other related theme, it was not included on Table 2.

Table 2 also shows the number of times (and relative percentage) that a theme was documented across the twenty articles. For example, Decker and Curry (2000) examined age-graded groups, leaders, meetings, and rules as indicators of gang organization. These characteristics were counted once under the following themes: division of labor (age-graded groups), leadership (leaders), meetings (meetings), and rules (rules). If an article noted multiple structural characteristics representing the same theme – that theme only counted once. For example, Decker and Van Winkle (1995) examined the presence of leaders as well as leadership influence (of those who sold drugs). Both characteristics counted as one entry under the leadership theme since they were drawn from the same study.

Table 2 shows that leadership (90 percent), rules (65 percent), and meetings (60 percent) were the only themes to exist in more than half of the twenty articles. These

appear to be the most important structural themes when examining degrees of gang organization. Next, insignia (46 percent), division of labor (45 percent), and hierarchy (40 percent) were themes that appeared in over one-third of the articles on gang organization. Territory (30 percent) and punishment (30 percent) appeared in just under one-third of articles, while size (25 percent) and resources or incentives were in a quarter of studies. Finally, initiation (20 percent), group name (15 percent), subgroupings (15 percent), and age of members (15 percent) were rarely used as indicators of gang organization across the twenty articles.

Table 2. Structural Themes of Gang Organization

Theme	Example Structural Feature	n	%
Leadership	• Presence of Leaders; Leadership Structure; Leader Influence	18	90%
Rules	• Written Rules; Codes	13	65%
Meetings	• Regular Meetings; Meeting Location	12	60%
Insignia	• Distinct Signs or Codes; Designated Clothing; Symbols or Colors	9	45%
Division of Labor	• Roles; Age-Graded Groups; Age-Graded Roles; Roles for Girls; Duties; Leader Duties; Responsibilities; Role in Drug Selling	9	45%
Hierarchy	• Levels of Membership; Centralization; Shot Callers; Organizational Mobility	8	40%
Territory	• Claim Territory; Protect Territory; Claim Area	6	30%
Punishments	• Discipline; Consequences for Leaving; Punishments for Rule Breaking	6	30%
Size	• Size	5	25%
Resources and Incentives	• Give Money to the Gang; Pay Dues; Incentives; Gun Stash	5	25%
Initiation	• Entry Rituals	4	20%
Group Name	• Group Name	3	15%
Subgroupings	• Junior Groups; Post Gang Groups	3	15%
Age of Members	• Join Before 13; Adult Involvement	3	15%

Of the fifteen structural themes presented on Table 2, the top eight, including leadership, rules, meetings, insignia, division of labor, hierarchy, territory, and punishments were selected as the most important themes for measuring organization for two primary reasons. First, the eight themes were represented in thirty percent or more of studies, which highlights their relative importance in gang organization research. Second, the eight structural themes overlap with seminal (Sanchez-Janlowski, 1991) and recent (Moule Jr. et al., 2014) theoretical developments on gang organization.

In the previous section, I identified the most commonly used indicators to measure gang organization and mapped them onto overarching organizational constructs. In the next section, I draw on organizational theory to explore the underlying organizational dimensions related to the gang organization themes.

Gang Organization Themes and Organizational Dimensions

Table 3 illustrates how the eight structural themes found in the previous section underline four core organizational dimensions including centralization, formalization, complexity, and interconnectedness. Building on theoretical insights from criminology (e.g., Decker et al., 2008; Moule Jr. et al., 2014; Sanchez-Janlowski, 1991) and organizational theory (e.g., Mintzberg, 1979; Pugh et al., 1968; Rogers, 2003), these organizational dimensions help explain the linkage between organization and group behavior.⁶

⁶ Moule Jr. and colleagues (2014) argued that five organizational dimensions underline gang organization after reviewing theories of organizational behavior and innovation. The five dimensions included centrality, formalization, complexity, interconnectedness, and organizational slack. Unlike Moule Jr and colleagues (2014), I did not find that indicators of organizational slack, or the capability to commit resources back into the organization, were frequently accounted for in prior gang organization research. As such, I did not include it as a core organizational dimension.

Organizational theory is particularly insightful given its focus on how organizational features influence performance. For example, organizational theory researchers have examined how organizational features affect the growth and decline of organizations as well as their capacity to innovate (e.g., Rogers, 2003). In the sections below, I highlight each organizational dimension.

Centralization

Centralization refers to the concentration of power and decision-making in the organization (Fredrickson, 1986; O’Neill, Beauvais, & Scholl, 2016). In organizations, centralization is ensured by designating one or more individuals with formal authority to keep actions in line with goals and objectives. A highly centralized organization typically has designated authority figures such as executives, managers, and supervisors who direct the behavior of lower level members. When there are functionally different units in an

Table 3. Organizational Dimensions and Structural Themes in Gangs

Organizational Dimensions	Centralization	Formalization	Interconnectedness	Complexity
Structural Themes	Leadership	Insignia	Territory	Division of Labor
	Hierarchy	Rules Punishment	Meetings	

organization, centralizations safeguards coordination within and across units (Bolman & Deal, 2008). Without the presence of a central figure, such coordination is unlikely. The benefit of centralization, such as the presence of authority figures and a clear chain of command, is that organizations are more efficient in their decision-making, resolving internal conflicts, and distributing rewards and punishments.

In gang organization studies, structural indicators of centralization include the presence of leaders, levels of membership, or a group hierarchy. Decker and colleagues (1998) in particular, illustrated high levels of centralization in their analysis of the

Gangster Disciplines and Latin Kings in Chicago. In an interview with one member of the Gangster Disciplines, the subject identified eight levels of membership in the hierarchy of the gang including foot soldiers, first coordinator, second coordinator, literature coordinator, exercise coordinator, regents, governor, and board members (p. 403). Likewise, Densley (2012) observed internal hierarchical structures in London street gangs consisting of approximately seven members who shared equal authority over all other members. Similar to conventional organizations, centralization in gangs promotes efficient decision-making, member accountability, and shared goals.

Formalization

Formalization refers to the rules, regulations, and procedures used to govern the behaviors of members of the organization (Fredrickson, 1986; Palmer & Biggart, 2002). High degrees of formalization in an organization limits individual discretion and ensures predictable and consistent behaviors of group members. In other words, high degrees of formalization specify standard ways of completing a task, handling internal problems, and relating to key individuals outside the organization (Bolman & Deal, 2008). When rules and policies are in place, it is less likely that members of the organizations make decisions based on their own personal whims or pressures. This ensures that the actions of group members are consistent with the organizational goals.

Indicators of gang formalization include the presence of gang insignia, rules, and punishments. For example, Decker and colleagues (1998) illustrate how members of the Gangster Disciples in Chicago are governed by values of secrecy and silence. Furthermore, some Gangster Disciple members referred to the “sixteen laws” that each member had to study and learn by heart (p. 407). Insignia, or distinctive colors or codes,

are also indicators of formalization. Distinctive colors, hand signs, or tattoos help overcome “asymmetries of information” between gang members and between gang members and those outside the gang (Decker & Van Winkle, 1996). For instance, specific displays of colors or symbols signal authority or status to other members in the same gang. Specific displays of colors or symbols also signal gang membership to community members and rival gangs (Leverso & Matsueda, 2019). In sum, formalization in gangs helps regulate the behavior of members and reduce uncertainty through efficient and predictable decision-making.

Interconnectedness

Interconnectedness refers to the degree to which units in a social system are linked by interpersonal networks (Rodgers, 2003). In general, a high degree of network interconnectedness is important for knowledge transfer in organizations. An organizational unit’s capacity to contribute to the organization's performance depends on its connectedness to other units. If one is not well-connected, their contributions to knowledge transfer and the innovation process are limited (Granovetter, 1973; Hansen, 1999). Techniques to secure horizontal coordination and interconnectedness include formal and informal meetings, task forces, coordinating roles, matrix structures, and networks (Bolman & Deal, 2008).

Structural indicators of interconnectedness in gangs range from claiming and protecting a specific territory to regular meetings between members. For instance, Decker and colleagues (1998) showed members of both the Gangster Disciples and Latin Kings in Chicago hold regular, mostly informal, meetings. For gangs, these meetings were used to discuss internal disputes, collect dues, and discuss community concerns. Decker and

Curry (2000) note that gang meetings are used to accomplish several gang functions, including enhancing group cohesion, communicating responsibilities, and disseminating information. Territoriality is often a defining characteristic of street gangs (Miller, 1975) and an indicator of interconnectedness (Moule Jr. et al., 2014). In territories where gangs claim ownership, there are typically set spaces where gang members congregate and perform gang activities. In other words, a gang set space is defined as “the actual area within the neighborhood where gang members come together as a gang” (Tita, Cohen, & Engberg, 2005, p.280). These set spaces are vital resources for gangs attempting to coordinate their efforts with little risk of interference (Taylor & Brower, 1985). In sum, interconnectedness in gangs facilitates consistency in action and reduces redundancy of effort, enhances the dissemination of knowledge, and allows for efficient planning and resource management.

Complexity

Complexity is the organizational dimension linked to differentiation in organizations. More specially, complexity refers to the background characteristics of members and the specialization of roles within the organization (Yang & Ng, 2015). In this definition, there are two forms of organizational complexity. First, organizational complexity includes the expertise and specialization of individual members in the organization. Second, organizational complexity includes the functional differentiation of units within the organization. Both forms of complexity are interrelated since specialized organizational units are often formed around the knowledge or skills of individuals (Mintzberg, 1979). The benefit of organizational complexity in businesses is that it ensures predictability, uniformity, and reliability (Bolman & Deal, 2008). Furthermore,

organizations with high levels of expertise are better equipped to develop innovative products (Mumford, Scott, Gaddis, & Strange, 2002).

In gangs, structural indicators of complexity include a task-based division of labor, age-graded roles, and roles for females. For instance, prior studies have shown that identified specific roles for females in gangs, such as infiltrating and spying on rival gangs and carrying weapons or messages (Campbell, 1984; Thrasher, 1927). These roles are strategic and help protect male gang members from arrest. Decker and Van Winkle (1995) illustrated differential roles in drug sales played by members of the gang. For instance, several gang members indicated that roles such as record keepers, salesmen, and pistol packers existing in drug selling gangs. In sum, complexity in gangs facilitates the development of expertise and reduces redundancy of effort through the specialization of roles.

Summary

In sum, the most important indicators of gang organization focus on the presence of leadership, rules, meetings, insignia, a division of labor, hierarchy, territory, and punishment. These eight themes underline four organization dimensions including centralization, formalization, interconnectedness, and complexity. In gangs, centralization and formalization are beneficial in that they forge consensus, increase discipline, reduces uncertainty, and ensures the gang's reputation on the street (Decker & Van Winkle, 1996). Interconnectedness enhances horizontal coordination and is beneficial for gangs in that it facilitates group cohesion and knowledge transfer (Decker & Curry, 2000). Finally, complexity ensures differentiation and is beneficial in gangs by increasing the efficiency

and success of gang activities, reducing uncertainty among members, and enhancing the salience of one's gang identity (Leverso & Matsueda, 2019).

In the next section, I examine how the organizational dimensions previously discussed appear in terrorism studies.

Organization in Terrorist Groups

To date, several terrorism scholars have examined the structural features and organizational dimensions of terrorist groups (e.g., Arquilla & Ronfeldt, 2001; Jackson, 2006; Kilberg, 2012; Ligon et al., 2013; Shapiro, 2005). Arquilla and Ronfeldt (2001) developed the “network, netwars” perspective to emphasize the how technology and the information revolution influence networks (i.e., interconnectedness) during conflict. In short, Arquilla and Ronfeldt (2001) posit that terrorist networks come in three topologies: the chain or line network, the hub, star, or wheel network, and the all-channel network.⁷ The authors argue that these flat, networked structures are better suited for technological advancements and information dissemination compared to a hierarchical organizational structure.

Building on Arquilla and Ronfeldt (2001), Kilberg (2012) argues that there are three structural characteristics of terrorist organizations including the presence of a clear leader or leadership structure (centralization), functional differentiation (complexity), and centralized command and control (centralization/interconnectedness). Based on those features, there are four basic types of terrorist organizations including bureaucratic, hub-and-spoke, all-channel, and market. The bureaucratic structure is the most organized and includes clear departmental boundaries, lines of authority, and formal decision-making

⁷ Arquilla and Ronfeldt (2001) also note that possibility of hierarchical forms of organization, although the authors doubt its utility in the context of asymmetric warfare.

procedures (Kilberg, 2012). The market structure is the least organized with no leadership, functional differentiation, nor command-and-control (Kilberg, 2012).

Mishal and Rosenthal (2005) argue that there are four key structural characteristics of terrorist organizations including the communication structure within the organization (interconnectedness), the level of specialization and division of labor (complexity), the chain of command-and-control (centralization), and the organization's time definitions for implementing planned actions. Based on these features, terrorist organizations come in one of five basic forms including hierarchical, network hub, network chain, network multi-channel, and dune. Next, Shapiro (2005) suggests that there are three dimensions of organizational design in covert organizations: interconnectedness, hierarchy (centralization), and specialization (complexity). The benefit of a hierarchical structure is that the leadership has influence over the organization's resources and operation; thus, all activities coordinated and in line with the leadership's strategy and vision. The drawback of a centralized structure is that these organizations are easily infiltrated since they rely on a direct line of communication (Shapiro, 2005). Furthermore, high degrees of interconnectedness ensure that there is a direct link between leaders and foot soldiers so that all actions are in the interest of the organization as a whole. The downside is that the organization is less secure from infiltration, given the direct coordination between leaders and low level members.

Next, Jackson (2006) distinguishes between extremist groups, networks, and movements by examining the nature of the authority exerted among group members. For Jackson (2006), authority refers to the formal control relationships (centralization/interconnectedness) and the informal influence exerted in the organization

at the tactical, operational, and strategic level. By focusing on the functional characteristics of the organization and the authority relations at each level, Jackson (2006) describes three canonical classes including *tightly coupled groups*, *coupled networks*, and *loosely coupled movements*. Zelinsky and Shubik (2009) developed a framework of categorizing terrorist groups by comparing their operational characteristics to business firms. Similar to Shapiro (2005), Zelinsky and Shubik (2009) focused on two organizational dimensions: centralization of resources and centralization of operations. By combining these two dimensions, there are four types of terrorist group structures, including hierarchy, venture capital, franchise, and brand.

Ligon, Simi, Harms, and Harris (2013) drew from organizational theory to differentiate terrorist organizations from other types of collectives (e.g., groups) as well as describe the attributes of organizations. By definition, organizations refer to collections of human systems of cooperation and coordination assembled within identifiable boundaries to pursue shared performance goals or objectives (Hodge, Anthony, & Gales, 2003). Based on this definition, Ligon and colleagues (2013) hold that there are three characteristics that are unique to organizations compared to other collectives, including 1) coordination between members (interconnectedness); 2) identifiable boundaries (formalization); and 3) adherence to shared performance goals or objectives (centralization). More importantly, Ligon and colleagues (2013) also hold that organizations that meet those three criteria can be described in terms of two attributes: structure and design. Structure refers to “the total amount of ways in which work and people can be divided and organized to accomplish organizational goals” (p. 112). With regard to structure, organization typically differ on degrees of hierarchy (centralization),

the chain of command (centralization/interconnectedness), and reason for labor division (complexity). Next, organizational design consists of two normative processes, including formalization and communication (interconnectedness).

Finally, drawing from organizational theory, Volders (2016) argues that there are four key parameters that differentiate terrorist groups: membership, operational time and space, formalization, and centralization. Using these four design parameters, Volders (2016) describes four ideal-types of organizational designs in relation to their ability to complete strategically successful attacks and their operational security (see Figure 2). Quadrant 1 groups characterize terrorist organizations with limited operational time and space, few well-trained members, a decentralized structure, and little formal rules or procedures that control member's behaviors. Quadrant 1 terror groups are the least organized. Quadrant 2 groups have rising centralization and formalization although lacking specialized membership or operational time or space. With increasing centralization and formalization from Quadrant 1 to Quadrant 2, groups have more control over members' behaviors and group goals; however, the risk of infiltration from security threats also rises.

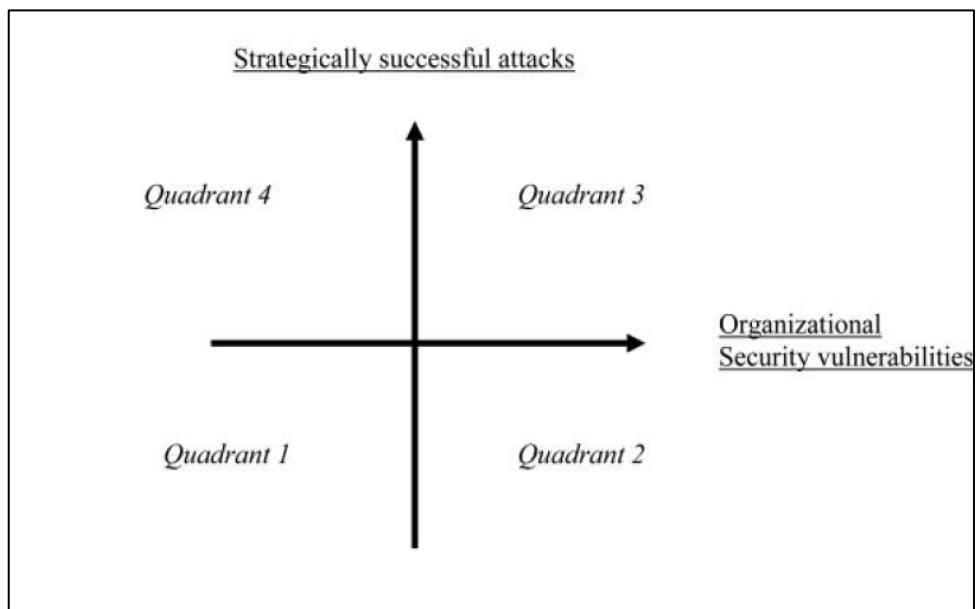


Figure 2. Organizational Types Relative to Tactical Efficiency and Operational Security (adopted from Volder, 2016)

Quadrant 3 characterizes groups with senior leadership positions held by well-trained individuals, formal rules or procedures, and control of physical territory to train and coordinate their attacks. Quadrant 3 groups have increased functional specialization, accountability, and institutional memory (Volders, 2016, p. 119). Quadrant 3 groups have the highest levels of organization of the four types. Finally, Quadrant 4 characterizes the “ideal” terrorist group. These groups have specialized members and the necessary operational space to “carry out complex operations and/or prolonged terrorist campaigns in line with the group’s strategic political goals and their organizational objectives” (Volder, 2016, p. 119). However, these groups lack centralization and formalization to minimize the risk of infiltration from security threats. The drawback of the Quadrant 4 design is that without structuring tools to guide members' behaviors (i.e., centralization and formalization), organizational control is increasingly at risk. In other words, members

have increased autonomy over their actions since there are fewer controls and coordination mechanisms in place.

In sum, like gangs, no two terrorist groups are alike. For instance, terrorist groups vary in several organizational dimensions commonly found in gang research such as their interconnectedness (Arquilla & Ronfeldt, 2001; Kilberg, 2012; Ligon et al., 2013; Mishal & Rosenthal, 2005; Shapiro, 2005), centralization (Jackson, 2006; Kilberg, 2012; Shapiro, 2005; Volder, 2016; Zelinsky & Shubik, 2009), complexity (Kilberg, 2012; Mishal & Rosenthal, 2005), and formalization (Ligon et al., 2013; Volder 2016). The primary limitation is that many of these studies are theoretical in nature (e.g., Arquilla & Ronfeldt, 2001; Volder, 2016) or rely on case studies (Ligon et al., 2013; Shapiro, 2005) to examine the organization dimensions of terrorist groups. Subsequently, few studies have used a quantitative approach to examine how these organizational dimensions manifest in terrorist group and their relationship with violence (for exception see; Kilberg, 2012). This dissertation seeks to overcome this by using a data-driven approach to classify the organization of terrorist groups and its relationship to violence.

Organizational Dimensions and Theoretical Mechanism

Recall that the second research question in this dissertation is: *Do terrorist groups that are more highly organized engage in more group level violence than less organized terrorist groups?* For this dissertation, two types of violence are examined: lethality and hard target selection. Hard targets are of particular importance in this study since they require a considerable amount of planning and coordination to successful attack (Asal et al., 2015; Berman & Latin, 2008). Hard targets such as the military or police are well-guarded targets that are difficult to access, have a small window of opportunity to attack,

and offer little chance of escape (Nilsson, 2018). When successful, attacks on hard targets are strategically important for violent extremist organizations for projecting an image of strength and “underscore[ing] its credentials as a meaningful force, establishing a benchmark of power that it has then used to build morale among existing members and attract new recruits” (Libicki, Chalk, & Sisson, 2007, p. 63).

In general, hard targets require expertise and coordination to successfully attack. Given the novelty of measuring organization in terrorist groups, I do not offer formal hypotheses as to the relationship between the underlying organizational dimensions in terrorist groups and violence. However, I do expect that terrorist groups with higher degrees of organization are more violent and have the operational and tactical capacity to successfully attack hard targets for three reasons (See Figure 3). First, there is *greater levels of control and accountability* in organized terrorist groups (Heger et al., 2012; Shapiro, 2013). In particular, centralization and hierarchical authority roles limit the amount of discretion afforded to individual members. Given the risk associated with attacking hard targets, centralized terrorist groups are also able to hold members accountable for their actions, which reducing the chances of negligent acts and rewards successful attacks (Abrahms & Potter, 2015; Shapiro, 2015). Formalization also helps regulate the behavior of members. More specifically, formalization mechanisms, such as rules and punishments, allow for greater obedience and compliance from members (Ligon et al., 2013; Shapiro, 2013; Volders, 2016). Members of highly formalized organizations are more likely to use organizational resources toward organizational goals as opposed to personal needs or for settling individual grievances (Ligon et al., 2013, p.113). Formalization also limits the discretion of members by safeguarding efficient and

predictable decision-making. When formalization mechanisms such as training in organization rules and procedures are in place, lower level members know who has decision-making authority in situations of uncertainty. From this view, formalization serves as a “substitute” for day-to-day leadership decision-making (Keller, 2006). As such, high levels of formalization connote member compliance through established norms.

Second, there is a greater *agenda setting capacity* in well-organized terrorist groups (Heger et al., 2012). Clear agenda setting ensures that there are few alternative sources to distort or challenge the tactics of that specific attack or the larger operational goals of the organization. Centralization improves the agenda setting capacity of terrorist groups as leaders set the strategic agenda for the group and communication goals unidirectional down the chain of command. Although the goals of leaders and foot soldiers are not always perfectly aligned (Shapiro, 2013), research has shown that a lack of leadership is especially detrimental. For example, Abrahms and Potter (2015) illustrate that foot soldiers are incentivized to attack soft targets, which are not in line with the higher-order goals of the group, during period of leadership deficiencies. During these periods of instability, limited centralization reduces the ability of the group to regulate members behavior and limits goal congruence among members. Interconnectedness improves the agenda-setting capacity in terrorist groups. In highly interconnected organizations, face-to-face meetings between members help establish the strategic and operational goals of the organization. These meetings also help establish trust among members, ensuring that there is a clear strategic agenda for the organization. While agenda setting and decision-making in interconnected organizations are time-consuming,

it facilitates consistency in action and reduces redundancy of effort (Ligon et al., 2013). Finally, formalization improves the agenda setting capacity of groups through an established institutional memory. In particular, training in ideological rules and organization procedures develop explicit knowledge related to group goals and acceptable means to achieve those goals.

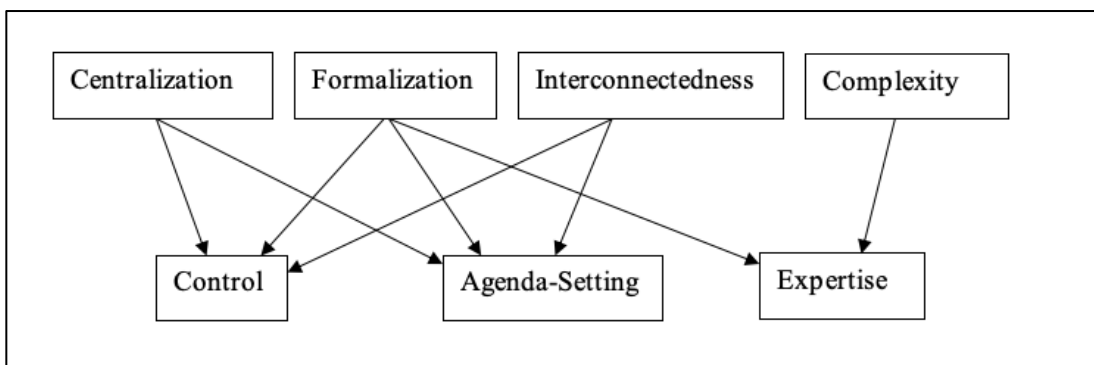


Figure 3. Theoretical Linkages Between Organizational Theory Constructs and Mechanisms for Violence

Third, there *is greater expertise* in well-organized terrorist groups. Complexity ensures the development of group level expertise through a defined division of labor allowing members to develop specialized task skills. For example, complex terrorist groups provide members with specialized combat training. This training provides members with greater tactical expertise in developing and deploying sophisticated weapon systems to strike hard targets (Asal et al., 2015; Logan et al., 2019). Formalization also enhances the development and management of expertise. For example, training in organizational rules, policies, and procedures provides members with superior knowledge of the operation of the group. Formalization also enhances the institutional memory of groups allowing for more efficient information management and transfer. Similarly, centralization and interconnected improve the means in which

expertise is managed and allocated in the group. Centralization allows for better-equipped, highly executed attacks through the pooling and distribution of resources based on collective as opposed to individual goals (Ligon et al., 2013). Thus, expertise is used in the “right place at the right time.” In interconnected organizations, expertise and knowledge are transferred – whether vertically in centralized organizations or horizontally in decentralized groups – to other members through interactions. Interconnected terrorist groups who hold territory also have the operational space to develop expertise and coordinate activities. Without such space, terrorist groups are scattered with no central organizing space to train and develop expertise without constant threats from law enforcement or competing terrorist groups. In addition, territorial control allows terrorist groups move at their own pace and utilize this space for planning complex operations (Volders, 2016). In sum, the complexity dimension is linked to the development of expertise, while the other three dimensions are related to coordinating and managing expertise.

In the next chapter, I describe the methods used to assess the centralization, formalization, interconnectedness, and complexity dimensions of organization in terrorist groups. I also describe the ways I measured the two violent outcomes of interest: lethality and hard target selection.

CHAPTER 3

METHODOLOGY

Data for this dissertation come from two datasets. First, measures of organization and group characteristics were derived from the Leadership for the Extreme and Dangerous for Innovative Results (LEADIR) dataset. Second, measures of violence were drawn from the Global Terrorism Database (GTD). To examine the relationship between the organization of terrorist groups and attack outcomes, I connected the LEADIR data with attributed measures of violence collected for the GTD. In the sections below, I describe both the datasets in more detail.

Global Terrorism Database

The GTD is an unclassified, open-source database on domestic and international terrorist events from 1970 through 2018 maintained by the National Consortium for the Study of Terrorism and Responses to Terrorism (START) at the University of Maryland (START, 2020). Terror events are included in the GTD if they have a political, social, religious, or economic motive, are intended to coerce, intimidate, or publicize the cause, and/or if they violate international humanitarian law. The GTD excludes all acts of state terrorism. While recognizing the complexities in defining terrorism, the GTD's inclusion criteria are generally agreed on by most scholars and experts (LaFree et al. 2014). Each attack included in the GTD is coded for information including, but not limited to, the number of fatalities, the number of casualties, weapons used, target type, and the perpetrator group name. Given the scope and detail of the GTD, it is recognized as the most comprehensive database on terrorist attacks and commonly used in terrorist studies

(e.g., Carson et al., 2012; Hsu & McDowall, 2017; Mroszczyk, 2019; Santifort, Sandler, & Brandt, 2013).

Leadership for the Extreme and Dangerous for Innovative Results

The LEADIR dataset contains organizational and leadership information on 280 terrorist groups active between 2008 and 2017.⁸ To reach the final sample of 280 terrorist groups, LEADIR uses a three-stage process (see Figure 4). It is important to note that, to develop the final sample of terrorist groups, the GTD was used as the starting point. In the first stage, all attack cases in the GTD outside the years 2008 through 2017 were removed.⁹ Attack cases in which (1) there was doubt in whether or not the incident qualified as an act of terrorism and (2) there was uncertainty whether or not the perpetrator group was involved were also removed. The remaining dataset included 73,013 terrorist attacks between 2008 and 2017. In the second stage, the terrorist attacks were aggregated to the group level based on the “perpetrator group name” variable. Then all perpetrator group name entries with less than five attacks attributed to them were removed. In total, 640 perpetrator group name entries were removed at this stage.

⁸ The sample of terrorist groups is international, and groups were located in 50 different countries. This is an important distinct since much of the gang organization literature focuses on US based gangs.

⁹ This timeframe was selected for three reasons. First, using a more current date range ensures that sufficient and reliable information could be collected and coded for each terrorist group. Second, at the time of data collection, the GTD included attack data up until 2017. Thus, 2008 to 2017 creates a practical 10-year date range to examine. This 10-year time frame is consistent with other datasets on violent extremist organizations. For example, the Big, Allied, and Dangerous Dataset (BADD) collected information on terrorist groups active in an 8-year period from 1998 to 2005. Third, the most recent GTD collection period began in 2008. By using 2008 as our starting period, we do not have to account for different collection methods utilized by the GTD (LaFree & Dugan, 2007; LaFree, Dugan, & Miller, 2014).

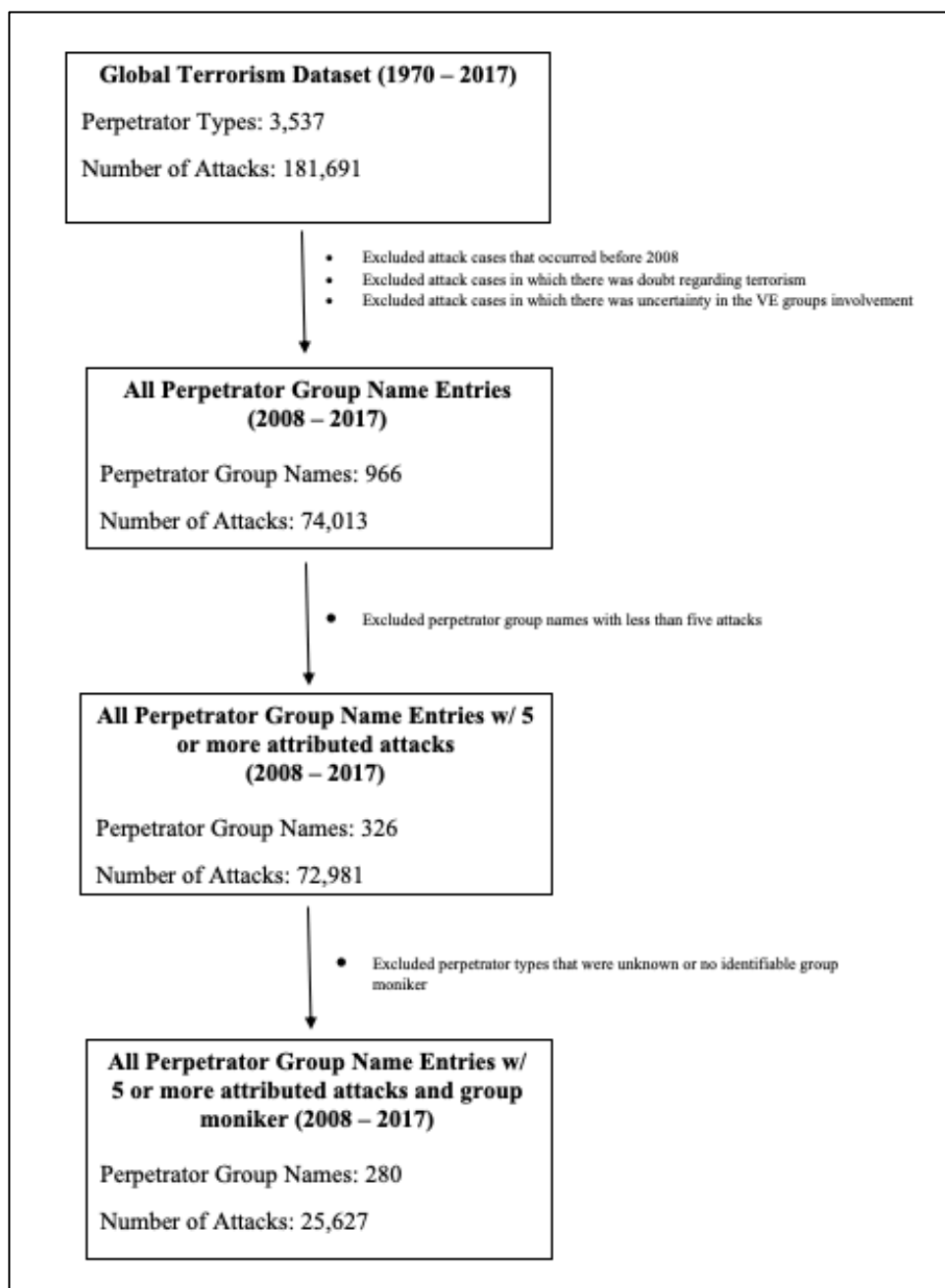


Figure 4. Process for Determining LEADIR Sample

Five attacks were selected as the threshold for inclusion for two reasons. First, committing five attacks during this ten-year period displayed a minimal commitment to violence on the part of the perpetrator. A sustained commitment to violence is often a principal in defining criminal organizations (Finckenauer, 2005). Second, five attacks are

a mid-point of what other similar data collection efforts use. For example, the Big, Allied, and Dangerous Dataset (BADD) collected information on 395 terrorist groups with at least one act of terrorism between 1998 to 2005 (Asal & Rethemeyer, 2008), while Kilberg (2012) coded the organizational structure of 246 terrorist groups with ten or more attacks between 1970 and 2007.

In the final stage, all perpetrator group name entries that did not have identifiable group boundaries. The clearest example of group boundaries was the presence of a group name or moniker. Thus, I removed all perpetrator group name entries coded as “unknown” or those highlighting lone actors, social movements, or a generic reference (e.g., “Maoists,” “Separatists,” and “White Extremists”). In total, 46 perpetrator group name entries were removed (see Table 4). The remaining dataset included 25,627 terror incidents nested with 280 terrorist groups.¹⁰ *The LEADIR project consists of organizational and leadership information collected for these 280 terrorist groups.*

Table 4. Perpetrator Group Name Entries Removed

Perpetrator Type	Number of Attacks	Perpetrator Type	Number of Attacks
Unknown	43977	Anti-Government extremists	15
Maoists	1206	FARC dissidents	14
Fulani extremists	405	Neo-Nazi extremists	13
Muslim extremists	360	Loyalists	13
Palestinian Extremists	237	Anti-Semitic extremists	13
Separatists	198	Chechen Rebels	11
Jihadi-inspired extremists	90	Pro-Russia Militia	10
Tribesmen	87	Gbagbo Loyalists	9
Gunmen	84	Buddhist Monks	9
Pro Hartal Activists	79	Rohingya extremists	8
Dissident Republicans	71	Ijaw extremists	7
Anarchists	65	Hindu extremists	7
Anti-Muslim extremists	61	Anti-Nuclear extremists	7

¹⁰There were 45,860 incidents in which the perpetrator group was coded as unknown. This was the cause for the large drop in the number of cases between the second and third stage.

Militants	34	Anti-Immigrant extremists	7
Uighur Separatists	29	Anti-Abortion extremists	7
Israeli settlers	28	Tuareg extremists	6
Murle Tribe	26	Qaddafi loyalists	6
Israeli extremists	24	Left-wing extremists	6
Algerian Islamic Extremists	24	Corsican Nationalists	6
Right-wing extremists	21	Bedouin tribesmen	6
Muslim Separatists	20	Ukrainian nationalists	5
White extremists	17	Anti-White extremists	5
Mapuche activists	16	Abbala extremists	5

Historiometric approach

LEADIR uses a historiometric approach to collect and code organizational information. Historiometry is an organizational research method in which nomothetic hypotheses about human behavior are tested by applying quantitative analyses to historical information (Simonton, 1990; 1999). In other words, historiometric analysis allows researchers to convert historical information into numeric data that are appropriate for complex statistical analysis and modeling (Crayne & Hunter, 2018). Historiometry is commonly used in personality studies and social psychology (Simonton, 2008) as well as industrial and organizational (I/O) psychology to assess leaders (Ligon et al., 2012; Mumford, 2006).¹¹ Historiometric analysis is particularly advantageous for this study given the rarity and inability to access and directly observe our population of interest (i.e., terrorist groups). Similar research has applied historiometric analysis to examine destructive leader behavior (O'Connor et al., 1995) and leader assassination (Yammarino et al., 2013).

¹¹ Criminologist terrorism scholars using comparable open-source information are also using data that is representative of the larger universe they are interested in, according to Chermak, Freilich, Parkin, and Lynch (2012).

In accordance with best practice with historiometry, a psychometric content coding scheme was developed for both organizational and leadership measures. This psychometric content-coding scheme included the use of behaviorally anchored rating scales (BARS) and objective indices related to measures of organizational centralization, interconnectedness, and complexity. Constructs coded as BARS were measured on 5-point Likert-type scales with benchmark exemplars for what would be considered low, medium, and high on that particular construct in the sample at hand (see Figure 5). Other organizational measures, such as the presence of territorial control, training, and uniform were measured on dichotomous scales with descriptions of each construct.

Figure 5. Example Behaviorally Anchored Rating Scale for Organizational Centralization

1	2	3	4	5
There is no clear command structure; the group is anonymously cell-based.		Some command structure, but still ambiguous in terms of who is given commands/leader.	The structure of an organization is highly centralized and hierarchical with a clear chain of command.	
Pagan Sect of the Mountain and other modern anarchist groups operate in autonomous cells		Caucasus Emirate has central leadership, but it is difficult to identify who has operational control during periods in the group's history	ISIL has a hierarchical command structure featuring a central leader (Baghdadi) who sets the strategic and operational objectives for the group	

LEADIR data were collected and coded five raters who worked in an interdisciplinary, collaborative research center located at a large Midwestern University.¹² Each rater was trained in theories underlying terrorist organizations as well as best practices in utilizing open-source information to prevent common method bias

¹² Each of the five raters were graduate students including one doctoral student in criminology and criminal justice, three master's students in criminology and criminal justice, and one master's student in political science.

and ensure data were gathered from reputable sources. Each rater also individually coded 10 percent of the terrorist groups in LEADIR and met to discuss their evaluations to ensure a shared cognitive framework and reach a better understanding of the group characteristics. During this time, interrater reliability was calculated across coders for the Likert-style organizational constructs. Cronbach's alpha score for each measure was greater than .80, suggesting adequate levels of interrater reliability (Shrout & Fleiss, 1979).

Data collection and source credibility

To account for source credibility, LEADIR utilized a three-tier source credibility system to help direct raters to the more "trusted" source when conflicting information was present (see Freilich, Chermak, & Belli, 2014 for similar credibility system). Tier 1 sources -- the most credible sources of information about terrorist groups -- included academic publications and databases on terrorism (e.g., BAAD; Mapping Militant Organization, South Asia Terrorism Portal) and government sources (e.g., Department of Justice, United Nations). The next source credibility tier -- Tier 2 sources -- included media reports (e.g., *Wall Street Journal*, *Al Jazeera*, *New York Times*) and information from watch-dog organizations (e.g., Council on Foreign Relations, Counter Extremist Project). Finally, the lowest source credibility tier -- Tier 3 sources -- consisted of information abstracted from blogs or extremist affiliated websites.

Table 5 shows the average number of sources per tier for each of the 280 terrorist groups. On average, there were slightly over one Tier-1 and three Tier-2 sources per terrorist group in the dataset. In addition, Tier-3 sources were used very little for the

groups in LEADIR. This suggests that raters were able to find relatively credible information.

Table 5. Source Credibility

Tier Source	Mean (SD)	Min	Max
Tier 1	1.49 (1.55)	0	11
Tier 2	3.66 (2.06)	0	14
Tier 3	0.69 (1.16)	0	7

n = 280

Missing data

Missing data is a frequent problem in research using open source information, and researchers have employed a host of methods and statistical techniques to resolve such issues (see LaFree et al., 2018; Safer-Lichtenstein, LaFree, & Loughran, 2017). For this dissertation, I used listwise deletion for missing data on the measures of organization. In total, 21 terrorist groups in the final sample had missing information on a core measure of organization (see below) and were removed from the final analysis. *The remainder of this dissertation focuses on the 259 terrorist groups with sufficient organizational information* (see Appendix A for full sample).

Measures of Organization

All of the measures of organization were derived from the LEADIR dataset. Table 6 includes each measure of organization, their operational definitions, and their relationship to the gang organization literature. In order to address centralization dimensions of organization three items were employed: leadership, centralization, and uniforms. *Leadership* was a dichotomous measure assessing whether the terrorist group were governed by a single leader or ruling council as opposed to a decentralized structure or fractured leadership. *Centralization* measured the degree to which each terrorist group were centralized with a top-down chain of command and multiple levels

of hierarchy as opposed to decentralized using a five-point Likert scale (1 = highly decentralized; 2 = somewhat decentralized; 3 = balanced; 4 = somewhat centralized; 5 = highly centralized). Finally, *Uniforms* was a dichotomous measure assessing whether members of the terrorist group wore uniforms to denote status or tenure. Table 6 suggests that the majority of terrorist groups in our sample had central leadership (78 percent) and were relatively centralized ($m = 3.25$, $SD = 1.20$), while slightly more than half had members wear uniforms to denote status or tenure (53 percent).

Three items also assessed the formalization dimension of organization including organizational, ideological, and combat training. First, *organization training* was a dichotomous measured assessing whether the terrorist group engaged in organizational training (e.g., leadership succession planning; internal memos; financial reports).¹³ Second, *ideological training* was a dichotomous measured assessing whether the terrorist group engaged in ideological training (e.g., religious camps; mandatory reading of ideological texts). Third, *combat training* was a dichotomous measured assessing whether the terrorist group engaged in combat training (e.g., weapons usage, physical tests). Similar to written rules and punishments in gangs, these types of training socialize members to the formal and informal codes of the organization. Table 6 illustrates that slightly over half of the groups in LEADIR engaged in combat training (54 percent) while less than one-third engaged in organizational (29 percent) or ideological (27 percent) training.

¹³ Although the indicators of organizational training such as internal memos and financial reports are not direct evidence of organizational training, they suggest that the group adopted standardized procedures and policies that would only be learned in the organization.

Two items were used to examine the interconnectedness dimension of organization including autonomy and territorial control. *Connectedness* measured the degree to which each terrorist group and its subunits were interconnected as opposed to autonomous using a five-point Likert scale (1 = fully autonomous; 2 = somewhat autonomous; 3 = balanced; 4 = somewhat interconnected; 5 = highly interconnected). *Territorial Control* was a dichotomous measure assessing whether the terrorist group held a sizeable amount of territory for a substantive amount of time from 2008 through 2017. Table 6 indicates that, on average, the terrorist groups in LEADIR preferred operational autonomy ($m = 2.54$, $SD = .90$) and roughly one-third had territorial control (32 percent).

Finally, I used three items to assess the complexity dimension of organization including departmentalization, deep-level diversity, and services. *Departmentalization* measured the degree to which each terrorist group had multiple task-specific branches or units in the organization using a five-point Likert scale (1 = no unit specialization; 2 = some unit specialization; 3 = moderate unit specialization; 4 = high unit specialization; 5 = maximum unit specialization). *Deep-Level Diversity* measured the degree to which each terrorist group had members with specialized skills such as medical professionals, military officers, professors (1 = no member expertise; 2 = some member expertise; 3 = moderate member expertise; 4 = high member expertise; 5 = maximum member expertise). Finally, *services* was a dichotomous measure assessing whether the terrorist group provided community services to their target community. Table 6 indicates that on average, the terrorist groups in LEADIR were not highly specialized at either the

organizational ($m = 2.64$, $SD = 1.16$) nor individual ($m = 2.22$, $SD = 1.1$) level.

Furthermore, few groups provided social services to the larger community (23 percent).

Table 6. Descriptive Statistics for Measures of Organization

Variable	Operational Definition	Mean (SD)	Min	Max	Example Indicator of Gang Organization
<i>Centralization</i>					
Leadership	“The terrorist group was governed by a single leader or ruling council”	.78 (.41)	0	1	Presence of Leaders
Centralization	“The degree to which the terrorist group was centralized”	3.25 (1.20)	1	5	Shot Callers
Uniforms	“There is evidence that members of the terrorist group wore uniforms”	.54 (.50)	0	1	Levels of Membership
<i>Formalization</i>					
Organizational Training	“There is evidence that the terrorist group engaged in organizational training”	.29 (.46)	0	1	Rules/Punishments
Ideological Training	“There is evidence that the terrorist group engaged in ideological training”	.27 (.44)	0	1	Rules/Punishments
Combat Training	“There is evidence that the terrorist group engaged in combat training”	.54 (.50)	0	1	Rules/ Punishments
<i>Interconnectedness</i>					
Connectedness	“The degree to which cells or units in the terrorist group operate independently”	2.54 (.90)	1	5	Regular Meetings
Territorial Control	“There is evidence that the terrorist group had control over territory”	.32 (.47)	0	1	Claim or Protect Territory
<i>Complexity</i>					
Departmentalization	“The degree to which the terrorist group delineates tasks to specific cells or units”	2.64 (1.16)	1	5	Age-Graded Groups or Roles
Deep-Level Diversity	“The degree to which the terrorist group’s membership is diverse on deep-level characteristics such as educational background, wealth, or specialized skills”	2.22 (1.10)	1	5	Specialized Roles
Services	“There is evidence that the terrorist group provided community services”	.24 (.43)	0	1	Community Responsibilities

Violent Outcomes

Each of the measures of violent comes from the GTD. There are five primary outcomes for this dissertation including *Lethality*, *Hard Target Lethality*, *Attacks on Hard Targets*, *Successful Attacks on Hard Targets*, and *Highly Successful Attacks on Hard Targets*. As previously discussed, the five outcomes were designed around two central measures of violence: lethality and hard target selection. Regarding lethality, I included both a direct measure of group level lethality as well as a measure of lethality

against hard targets. Concerning hard target selection, I included measure of both the number of attacks on hard targets and measures of success when attacking hard targets.

First, *Lethality* measured the total number of victims killed by each terrorist group between 2008 and 2017. The GTD provides the total number of fatalities as well as the total number of perpetrator fatalities per attack. Thus, I subtracted the total number of perpetrator fatalities from the total number of fatalities to capture the total number of victim-only fatalities per attack. For example, if 15 individuals were killed in a suicide bombing including 5 perpetrators and 10 civilians, the number of victims killed is 10.

The second outcome, the *Hard Target Lethality*, measured the total number of hard targets killed by each terrorist group between 2008 and 2017. Hard targets include four of the twenty-two different target types collected by the GTD including government-general, government-personnel, police, and military targets (Asal et al. 2015; Conrad & Greene, 2015). Similar to the process of capturing victim-only fatalities, I subtracted the total number of perpetrator fatalities from the total number of fatalities in attacks on hard target to arrive at the number of hard targets killed. For example, if 10 individuals were killed in an armed assault including 8 perpetrators and 2 police officers, the number of hard targets killed is 2.

Next, the *Attacks on Hard Targets* measured the total number of attacks on hard targets for each terrorist group between 2008 and 2017. The fourth outcome, *Successful Attacks on Hard Targets*, measured the number of attacks in which the number of hard targets killed was greater than the number of perpetrators. For example, if 12 members of Boko Haram died during an attack that killed 15 police officers, this would qualify as a successful attack. The number of hard targets killed (15) was greater than the number

perpetrators killed (12). In the same example, if 12 members of Boko Haram were killed during an attack that killed 11 police officers; this would not qualify as a successful attack since the number of hard target deaths did not exceed the number of perpetrator deaths.

Finally, *Highly Successful Attacks on Hard Targets* measured the number of incidents in which the number of hard targets killed related to the number of perpetrators killed was greater than 10. For example, if 5 members of al-Shabaab died during an attack that killed 15 military members, this would qualify as a highly successful attack. The number of hard targets killed (15) relative to the number perpetrators killed (5) was greater than 10. In the same example, if 14 police officers and 5 perpetrators had died, this would not qualify as a highly successful attack.

Table 7 includes the mean, standard deviation, minimum value, and maximum value for each of the five outcome variables. After examining the descriptive statistics and visual diagnostics for each outcome, there were clear outliers in the data. Thus, in order to control for these outliers and create more meaningful variation in the distribution of each outcome, I top-coded (also referred to as capped) the distribution of each outcome at the upper 99th percentile.¹⁴ More specifically, *Lethality* was capped at 4,051, *Hard Target Lethality* was capped at 1,408, *Attacks on Hard Targets* was capped at 344, *Successful Attacks on Hard Targets* was capped at 253, and *Highly Successful Attacks on Hard Targets* was capped at 37. Moving forward, the top-coded measures are the variables of interest.¹⁵

¹⁴ In other words, 99 percent or more of the respective distributions fell below the value selected to represent the high end of the scale.

¹⁵ The results using the raw data illustrated that there were no substantive differences in the key variables of interest between the raw and capped data.

Table 7. Descriptive Statistics for Key Outcome Variables

Variable	Mean (SD)	Min	Max
<i>Lethality (raw)</i>	285.22 (1634.60)	0	20339
Lethality (99%)	166.83 (576.27)	0	4051
<i>Hard Target Lethality (raw)</i>	105.45 (612.57)	0	7386
Hard Target Lethality (99%)	63.78 (215.32)	0	1408
<i>Attacks on Hard Targets (raw)</i>	38.25 (218.89)	0	3216
Attacks on Hard Targets (99%)	22.86 (60.65)	0	344
<i>Successful Attacks on Hard Targets (raw)</i>	21.88 (139.44)	0	2072
Successful Attacks on Hard Targets (99%)	12.60 (38.97)	0	253
<i>Highly Successful Attacks on Hard Targets (raw)</i>	2.30 (12.65)	0	139
Highly Successful Attacks on Hard Targets (raw)	1.53 (5.66)	0	37

Additional Group Level Variables

Although the focus on this dissertation is on indicators of organization, I controlled for several important variables found to influence extremist organizations' capacity for violence. This included ideology, goals, size, age, state sponsorship, alliance funding, drug trafficking, and power. First, LEADIR collects information on three ideological categories: religious, ethnonationalist, and left-wing. These categories were not exclusive, and terrorist groups could fall into multiple ideological categories (see Asal & Rethemyer, 2008 for similar schema). *Religious* was a dichotomous measure (1 = religious) of whether the terrorist group was guided by some form of religious principles. *Ethnonationalist* was a dichotomous measure (1 = ethnonationalist) of whether the terrorist group advocates for the territorial autonomy or independence of a specific ethnic group. *Left-Wing* was a dichotomous measure (1 = left-wing) of whether the terrorist group promotes economic or social left-wing policies such as communism and its variants (e.g., Marxist, Leninist, Maoists). Finally, *Other* was a dichotomous measure (1 = Other) of all other ideological motives, including right-wing, anarchists, supremacists,

and environmentalists. As shown on Table 8, approximately 50 percent of the terrorist groups had religious motivations, 49 percent had ethnonationalist motivations, 10 percent had left-wing motivations, and 10 percent had other motives.

Next, I also controlled for the goals of each terrorist group. In LEADIR, group goals are assessed using the six category-coding schema developed by Jones and Libicki (2008). The six categories include policy change, status quo, territory change, regime change, social revolution, and empire. Next, following Koehler-Derrick and Milton (2019), I collapsed the six categories into a smaller set of three categories. First, *Anti-System Expansive* is a dichotomous measure of groups that seek to establish an empire or create a social revolution. These groups are anti-system in that they want to impose a new governing order; however, they are also expansive because they wish for global as opposed to local or regional change. Next, *Anti-System Limited* is a dichotomous measure of groups whose goal is territorial control or regime change. These groups want to impose a new governing order locally as opposed to globally. Finally, *Within-System* a dichotomous measure of groups whose goal is to maintain the status quo or seek a shift in policy. These groups seek to influence change inside a state but do not want to overthrow the existing regime nor establish a new political order. Table 8 shows that the majority of terrorist groups had anti-system limited goals (69 percent) followed by anti-system expansive goals (23 percent) and within-system goals (8 percent).

Table 8. Descriptive Statistics for Group Control Variables

Variable	Mean (SD)	Min	Max
<i>Ideology</i>			
Religious	.50 (.50)	0	1
Ethnonationalist	.49 (.50)	0	1
Left-Wing	.10 (.32)	0	1
Other	.10 (.30)	0	1
<i>Goals</i>			
Anti-System Expansive	.23 (.42)	0	1
Anti-System Limited	.69 (.47)	0	1
Within-System	.08 (.29)	0	1
Organizational Size	1.42 (1.27)	0	4
Organizational Age	15.93 (15.71)	1	59
State Sponsorship	.22 (.42)	0	1
Alliance Funding	.38 (.49)	0	1
Drug Trafficking	.14 (.35)	0	1
Power	7.22 (3.11)	1	10

Organizational Size was a 5-point ordinal measure of the estimated peak number of members in the organization (0 = 0-99 or low confidence; 1 = 100-999; 2 = 1,000-4,999; 3 = 5,000-9,999; 4 = 10,000 or more).¹⁶ This approach to examining organization size is similar to that of Jones and Libicki (2008) and Asal and Rethemeyer (2008). Table 9 shows that the average organizational size for the terrorist groups in LEADIR was 1.42, suggesting that most groups are relatively small with between 100 to 999 members.

Organizational Age was a continuous variable measuring the number of years each terrorist group had been in existence. For terrorist groups that are still active, 2017 was coded as their most recent year. For instance, the New People's Army was founded in 1969 and is still active today, making their organizational age is 49 years. There were four outliers including the Karen National Union and the militant wings of the Awami League, Rashtriya Swayamsevak Sangh, and the Muslim Brotherhood. These historically

¹⁶ Low confidence suggests that there was limited evidence regarding the group's size. When information does not exist regarding the number of members in a group, they are typically small.

political organizations were founded in the 1920s but have had individuals commit acts of terrorism on their behalf in recent years. To account for these four groups, I top-coded organizational age at the upper 99 percentile (59 years). Table 8 indicates that the average age of the terrorist groups in LEADIR is approximately 16 years old.

Next, *State Sponsorship* was a dichotomous measure (1 = had state sponsorship) of whether the terrorist group received funding by a state actor between 2008 and 2017. Table 8 indicates that 22 percent of terrorist groups in LEADIR had a state sponsor.

Alliance Funding was a dichotomous measure (1 = had alliance funding) of whether the terrorist group received funding from another terrorist group between 2008 and 2017. In total, 38 percent of the terrorist groups in LEADIR received alliance funding.

Drug Trafficking was a dichotomous measure (1 = engaged in drug trafficking) of whether the terrorist group engaged in drug trafficking as a source of fundraising. Only 14 percent of the terrorist groups had evidence that they engaged in drug trafficking. Finally, I also controlled for the length of time groups existed during the study period. In other words, the variable, *Power*, measures the number of years each terrorist group existed between 2008 and 2017 (see Asal & Rethemeyer, 2008). Given the timeframe, each group could have been exposed for one year to ten years. Table 8 indicates that the average exposure for each group was around 7 years.

Analytical Techniques

There were three main analytical techniques used in this dissertation: exploratory factor analysis, hierarchical regression modeling, and cluster analysis. In the sections below, I describe each technique and how they related to the research questions and goals of this dissertation (see Table 9).

Table 9. Summary of Research Questions in Relation to Analytical Techniques

Research Question	Analytical Technique
RQ1: <i>Which indicators of gang organization can be applied to terrorist groups to develop a classification schema of terrorist group structure?</i>	1a) Exploratory Factor Analysis 1b) Cluster Analysis
RQ2: <i>Do terrorist groups that are more highly organized engage in more group level violence than less organized terrorist groups?</i>	2) Hierarchical Poisson Modeling

Exploratory factor analysis

In the first stage of my analysis, I used exploratory factor analysis (EFA) to explore the underlying dimensions of organization using the observed measures of centralization, formalization, interconnectedness, and complexity. EFA is an unstructured, data-driven approach used to determine the appropriate number of factors, and to examine which measured variables are reasonable indicators of those latent dimensions (Brown, 2015, p. 11). The goal of EFA is to reduce the total number of variables into a smaller number of factors composed of highly related variables (Baglin, 2014). EFA is the most appropriate technique since I do not have a priori hypotheses as to the structure of the relationship between the dimensions of organization as they manifest in terrorist groups.¹⁷

In order to examine the underlying structure of the data, I use the PC software package FACTOR (Ferrando & Lorenzo-Seva, 2017; Lorenzo-Seva & Ferrando, 2006). Given that the measures of organization used on this study are either ordinal or binary, FACTOR is useful in that the EFA procedure can be based on polychoric correlations (Timmerman & Lorenzo-Seva, 2011). Polychoric correlation is an extension of the

¹⁷ In contrast, Principle Components Analysis is not well suited for my analysis since it does not attempt to explain the underlying factor structure of the data nor is Confirmatory Factor Analysis, which is typically used to validate existing factor structures.

tetrachoric correlation and estimates the correlation between two variables measured on an ordinal scale (Baglin, 2014). Large datasets (> 200 cases) are typically necessary when using polychoric correlations since it is calculated from the contingency table between the scores of two items, and the more response categories, the greater the number of cells that need to be filled (Ferrando & Lorenzo-Seva, 2014, p. 1171). Standard software packages (e.g., SPSS) estimate these relationships using the Pearson correlation matrix, which assumed that the variables are continuous and that a linear relationship exists between the variables. Researchers have shown that Pearson correlations underestimate the strength of the relationship between two ordinal variables and leads to biased factor loadings (Bernstein & Teng, 1989; Olsson, 1979).

In order to perform the EFA, the minimum rank factor analysis (MRFA) procedure was employed. The MRFA is beneficial in that it estimates the percentage of common variance and unique variance explained by the EFA model (Shapiro & ten Berge, 2002; ten Berge & Kiers, 1991). MRFA minimized the common variance that is ignored when only some factors are maintained (Lorenzo-Seva & Ferrando, 2006, p.89). In order to simplify the factor structure, an oblique rotation (i.e., direct oblimin) was performed. Following Tabachnick and Fidell (2007), an oblique rotation is preferred when the underlying factors produced by the EFA are correlated. More specifically, if the underlying factors are correlated at .32 or above, this means that there is 10 percent or more overlap in the variance among factors and oblique rotation (Tabachnick & Fidell, 2007). Results from the unrotated EFA indicated that the factors were correlated above .32, suggesting that the use of an oblique rotation procedure was appropriate.

Cluster analysis

Cluster analysis was used to classify units of analysis (i.e., terrorist groups) based in their similarity with respect to a set of variables (i.e., measures of organization). The goal of cluster analysis is to assess similarity based on a set of theoretically relevant variables.¹⁸ The benefit of cluster analysis is that it develops classification schemas and typologies that offer a unique form of theory building by organizing complex webs of cause-effect relationships into coherent accounts (Doty & Glick, 1994; Fiss, 2011). In order to develop the clusters, a two-stage clustering strategy was used (see Govender & Sivkumar, 2020 for review). First, I used Hierarchical cluster analysis using Ward's clustering method to search for latent behavioral clusters among the terrorist groups. Hierarchical cluster analysis is an agglomerative clustering approach where each data point starts in its own cluster before merging with similar pairs of clusters resulting in a hierarchy. In other words, hierarchical cluster analysis is a bottom-up approach to clustering. The Ward's minimum variance method is one of the mostly frequently used method for hierarchal clustering and is defined as the smallest increase in the within-cluster sum of squares after merging of two clusters (Jolliffe & Philipp, 2010; Ward, 1963). The primary benefit of the hierarchical cluster analysis is that it produced a dendrogram and an agglomeration schedule that can be used to define the optimal number of clusters (Govender & Sivkumar, 2020; Yim & Ramdeen, 2015). More specifically, dendrogram is two-dimensional tree-like structure depicting the sequence of nested clusters (Dubes & Jain, 1976). The distance between each division in the

¹⁸ The general goal of cluster analysis is to group (i.e., cluster) a set of objects based in share similarities whereas the goal of factor analysis is for data reduction purposes. In other words, factor analysis is concerned with grouping variables as opposed to objects. Thus, while factor analysis and cluster analysis are similar in some respects, clustering is the preferred method to classify terrorist groups.

dendrogram can be examined to determine the optimal number of clusters. In addition, the agglomeration schedule identifies which point two clusters being combined are too dissimilar to form a homogeneous group. This is evident by the first large increase in the coefficient values and suggests the ideal stop point in the clustering process (Yim & Ramdeen, 2015).

In the second phase of the two-stage clustering strategy, *k*-means clustering is used to determine cluster assignments. *K*-means clustering is a partitional clustering method used to determine the initial cluster center based on the nearest centroid sorting method. After the centers are determined, the *k*-means procedure assigned cases (i.e., terrorist groups) to each cluster based on an estimation of the closest distance between that case and the center of the cluster's centroid (Norusis, 1990). A cluster's centroid is a compilation of a combined mean score across all variables clustered (for review and application in criminal justice research, see Terrill, Paoline III, & Manning, 2003). For this dissertation, each terrorist group's combined scores on the measures of organization are compared with every other group, and those terrorist groups who are most similar are sorted into the same grouping or cluster. Terrorist groups do not have to be identical to one another in each cluster, but they are more like the organizations in their cluster compared to other clusters.

As illustrated by Govender and Sivkumar (2020), a two-stage clustering strategy is preferred since it utilizes the strengths of both clustering methods. First, hierarchical cluster analysis was used to determine the appropriate number of clusters. Second, *k*-means clustering produces a flat clustering structure that is simple and efficient (Jain, 2010). It is important to note that, although the factor analysis precedes the cluster

analysis in this study, I used individual items as opposed to factor scores when performing the cluster analysis. Previous research has shown that individual items outperforms factor scores when using cluster analysis (Fiedler & McDonald, 1993). Before the two-stage cluster approach, each measure of organization was transformed into standardized z-scores to control for the unequal scaling of variables. Prior research has shown that the use of z-score is more effective and efficient compared to other methods when using k-mean cluster analysis (Mohamad & Usman, 2013).

As a supplemental analysis, I also examined the relationship between each cluster typology and the other group characteristics using Spearman Rank-Order Correlation. Spearman Rank-Order Correlation has been shown to improve power and limit error when using nonnormal data (Bishara & Hittner, 2012; Zimmerman & Zumbo, 1993).

Hierarchical Poisson regression

Finally, in order to examine the relationship between the dimensions of organization produced from the EFA and violence, I used Hierarchical Poisson models in the HLM 7.03 (Raudenbush, Bryk, Cheong, Congdon, & du Toit, 2011). Hierarchical Linear Modeling (HLM) is a complex form of multiple regression used to analyze variance in an outcome variable with predictors existing at different levels of analysis (Raudenbush & Bryk, 2002). HLM is beneficial since it accounts for the shared variance in level-1 predictors (i.e., terrorist groups) across higher-order contexts. The higher-order contexts for this dissertation is the country in which each terrorist group operates. There is a large body of literature suggesting the country level effects influence violence (e.g, Fahey & LaFree, 2015; Gurr, 1970; Piazza, 2008; Sandler, 2014). In total, the 259 terrorist groups operated across 50 different countries. Statistical procedures that do not

account for the nested nature of data also risk inflating statistical power by failing to adjust the degrees of freedom to the appropriate sample size. HLM corrects standard errors by accounting for the nested nature of the data – producing a unique effect for each group (Raudenbush & Bryk, 2002). HLM also corrects standard errors by accounting for the clustered nature of these data and adjusting significance tests to reflect appropriate degrees of freedom.

CHAPTER 4

RESULTS

The results of this dissertation are divided in three main sections. First, I examined the underlying dimensions of organization using the observed measures of centralization, formalization, interconnectedness, and complexity using exploratory factor analysis. Second, I employ cluster analysis to classify terrorist groups based on the dimensions of organization found from the EFA. Finally, I utilized Hierarchical Poisson models to examine the relationship between the dimensions of organization and violence.

EFA Findings

EFA is an unstructured, data-driven approach used to reduce the total number of variables into a smaller number of latent factors composed of highly correlated variables (Baglin, 2014). In relation to this study, EFA is appropriate to examine how the dimensions of organization manifest in terrorist groups since I do not have a priori hypotheses as to the structure of the relationship between variables. The results presented below were analyzed in PC software package FACTOR (see Ferrando & Lorenzo-Seva, 2017; Lorenzo-Seva & Ferrando, 2006) and the use of polychoric correlations to estimate the correlation between two variables.

Table 10 includes the results of the EFA including the factor loading for each dimension of organization, eigenvalues for each retained factor, and the percent of variation explained by each factor identified. Prior to analysis, significant results on a Bartlett's test ($p < .001$) and a Kaiser-Meyer-Olkin score of .70 suggest that the data are suitable for factor analysis. Table 9 indicates that nine of the eleven measures of organization loaded onto two factors (eigenvalue > 1). Two measures,

departmentalization and services, cross-loaded on both factors and were removed from the analysis for factor parsimony and simplicity. The two-factor solution explained approximately 70 percent of the variation in the level of organization in terrorist groups. Both factors had Generalized H-Latent Index and Generalized H-Observed Index at or greater than .80, suggesting that the items represent a well-defined latent variable that is likely to be stable across studies (Ferrando & Lorenzo-Seva, 2018).

Table 10. Results from Exploratory Factor Analysis

Variable	Structuring of Activities	Concentration of Authority
Deep-Level Diversity	.59	.15
Organizational Training	.90	.11
Combat Training	.92	.01
Ideological Training	.94	-.11
Territorial Control	.14	.55
Leadership	-.11	.94
Centralization	.01	.94
Connectedness	.25	.69
Uniforms	.08	.48
<i>Eigenvalue</i>	4.83	1.47
<i>% Variation Explained</i>	53.6%	16.3%

The first factor shown on Table 10 was comprised of four items including deep-level diversity (i.e., membership expertise), organizational training, combat training, and ideological training and explained 53.6 percent of the variation in organization. Based on the items retained, this factor was labeled: *Structuring of Activities*. Structuring of activities refers to the degree to which an organization has specialized sections (e.g., training) and formal procedures, and encompassed two organizational dimensions, formalization and complexity (Pugh, Hickson, Hinings, & Turner, 1968; Pugh & Hickson, 2007). The second factor illustrated on Table 10 was comprised of five items including territorial control, leadership, centralization, interconnectedness, and uniforms

and explained 16.3 percent of the variation in organization. Based on the items retained, this factor was labeled: *Concentration of Authority*. Concentration of authority refers to the degree to which an organization has a hierarchical decision-making structure with limited unit autonomy, and encompassed two organizational dimensions, centralization and interconnectedness (Pugh et al., 1968; Pugh & Hickson, 2007).

Next, Table 11 shows the descriptive statistics for both structuring of activities and concentration of authority dimension of organization. The values on Table 11 are based on the factor scores assigned to each terrorist group based on the results on the EFA. Each terrorist group's factor score indicates their relative standing on that latent factor. For example, a factor score of 1.83 on the Structuring of Activities indicates a high level of structuring relative to other terrorist groups, while a score of -.20 would indicate a less than average level of structuring relative to other terrorist groups. An important finding is Structuring of Activities is significantly correlated with Concentration of Authority ($r = .35$, $p < .001$). This relationship indicates that terrorist groups with high degrees of training and member expertise (i.e., structuring of activities) are significantly more likely to have centralized top-down command-and-control, leadership, and interconnectivity (i.e., concentration of authority).

Table 11. Descriptive Statistics for Structuring and Authority

Variable	Mean (SD)	Min	Max	r
Structuring of Activities	.00 (.89)	-1.13	1.83	---
Concentration of Authority	.01 (.98)	-2.06	1.97	.35***

*** $p < .001$

There are two primary reasons why the structuring of activities and concentration of authority are positively correlated. First, both the structuring of activities and concentration of authority dimensions are “structuring” characteristics of organizations as opposed to “structural” characteristics (Campbell, Bownas, Peterson, & Dunnette, 1974; Dalton, Todor, Spendolini, et al., 1980). In other words, both dimensions are related to the “policies and activities occurring within the organization that prescribe or restrict the behavior of organizational members” (Dalton et al., 1980, p. 51). Second, although there is debate on the relationship between structuring of activities and concentration of authority in organizational science (Child, 1972; Greenwood & Hinings, 1976; Pugh et al., 1968), both dimensions are necessary for survival in a malevolent context. Terrorist organizations with concentrated authority are typically more visible and subject to increased law enforcement actions. Subsequently, these organizations are more likely to have formalized training and rules to secure the loyalty and secrecy from its members (Shapiro, 2013; also see Best & Luckenbill, 1980 for application in criminal organizations).

Structuring, authority, and group characteristics

To provide a more nuanced understanding of structuring of activities and concentration of authority dimensions, Table 12 illustrates the zero-order correlation between both dimensions and other group characteristics. Beginning with the structuring of activities dimension, Table 11 suggests that terrorist groups with high degrees of structuring were significantly more likely to be religious ($\rho = .26, p < .001$), large in size ($\rho = .46, p < .001$), older ($\rho = .30, p < .001$), have a state sponsor ($\rho = .14, p < .05$), receive

funding from a non-state ally ($\rho = .16, p < .01$), and engage in drug trafficking ($\rho = .14, p < .05$).

Table 12. Zero-Order Correlations Between Organizational Dimensions and Additional Group Level Characteristics

Variable	Structuring of Activities	Concentration of Authority
Organizational Size	.46***	.41***
Organizational Age	.30***	.25***
Religious	.26***	.05
Ethnonationalist	-.07	.10
Left-Wing	.01	.02
Other	-.17***	-.23***
Anti-System Expansive	-.02	-.10
Anti-System Limited	.03	.16***
Within-System	-.02	-.11
State Sponsorship	.14*	.29***
Alliance Funding	.16**	.20***
Drug Trafficking	.14*	.14*

*** $p < .001$; ** $p < .01$; * $p < .05$

Next, terrorist groups high in concentration of authority were significantly more likely to have anti-system limited goals ($\rho = .16, p < .001$), be large in size ($\rho = .41, p < .001$), be older ($\rho = .25, p < .001$), have a state sponsor ($\rho = .29, p < .001$), receive funding from a non-state ally ($\rho = .20, p < .001$), and engage in drug trafficking ($\rho = .14, p < .05$); however, they were less likely to adhere to other ideologies ($\rho = -.23, p < .001$). Finally, terrorist groups high in structuring were also significantly less likely to adhere to other ideologies including but not limited to anti-globalization, right-wing extremism, anarchism, and animal liberation ($\rho = -.17, p < .001$).

Summary of findings: Structuring of activities and concertation of authority

There are two underlying dimensions of organization in terrorist groups: structuring of activities and concertation of authority. These dimensions have theoretical implications for organizational theory and the terrorism literature. Importantly, overlap

exists between the dimensions of organization in terrorist groups as found in this study and research on conventional organizations. More specifically, using scales representing the centralization, formalization, standardization, specialization, and configuration dimensions of organizational structure, seminal researchers from the Aston Group research program found that two core dimensions of organizational structure were the structuring of activities and concentration of authority (Hinings, Pugh, Hickson, & Turner, 1967; Pugh et al., 1968; Pugh, Hickson, Hinings, & Turner, 1969; Pugh & Hickson, 2007). The structuring of activities consisted of variables related to standardization, specialization, and formalization whereas concentration of authority consisted of variables related centralization and autonomy (Pugh et al. 1968). Findings from this analysis indicate that similar underlying organizational behaviors -- structuring of activities and concentration of authority – also manifest in terrorist groups. Thus, despite the desire for secrecy, terrorist groups share common processes and characteristics in common with conventional organizations (Ligon et al., 2013; Shapiro, 2013; Shapiro & Siegel, 2012; Volders, 2016). This commonality underscores the applicability of theories from organizational behavior (Jung & Lee, 2015) and industrial and organizational psychology (Hunter et al., 2017) are well suited to study terrorism. Although not explicitly discussed, there is evidence of these dimensions in existing terrorism studies. For example, Shapiro (2005) suggests that terrorist groups can be differentiated based on their centralization and interconnectedness – the two structural dimensions of concentration of authority. Likewise, Ligon and colleagues (2013) discuss how centralization and communication patterns (i.e., interconnectedness) vary together in terrorist organizations. Mechanistic terrorist organizations feature high levels of

centralization and a highly connected communication structure based on hierarchy, whereas organic terrorist organizations have low levels of centralization and unpredictable communication patterns based on the task.

The organizational components underlying the structuring of activities dimension, formalization and complexity, have also been discussed in the literature (Ligon et al., 2013; Volders, 2016). However, few scholars have examined them together nor elaborated on why they would underlie a single dimension. One reason why formalization and complexity vary together is that, as complexity increased, the need for improved communication through mechanisms of formalization such as policies and rules is needed (Basol & Dogerlioglu, 2014). As organizational complexity increased, the risk that some individuals or units became the sole proprietors of knowledge also increased. In turn, formalization is needed to improve organizational cooperation and collaboration, facilitate explicit and codified knowledge, and reduce ambiguity (Cohendet, Creplet, Diani, Dupouët, Schenk, 2004; Cordon-Pozo, García-Morales, Aragón-Correa, 2006; Pertusa-Ortega, Zaragoza-Sáez, Claver-Cortés, 2010). As such, the structuring of activities dimension reflects the need for formalization as organizational complexity increases.

Next, results from the bivariate correlations analysis suggest that terrorist groups high in both structuring of activities and concentration of authority are more likely to be older, large in size, receive state sponsorship, receive funding from a non-state ally, and engage in drug trafficking. Similar to the life cycle of conventional organizations, terrorist groups become increasingly complex as they age and grow in size. In turn, there is a greater need for formal training, rules, and procedures as well as bureaucratic control

mechanisms as both size and age increase (Lester, Parnell, Carraher, 2003; Quinn & Cameron, 1983). Both state sponsorship (e.g., Byman, 2005; Carter, 2012; Hoffman, 2006) as well as alliances with other non-state actors (e.g., Asal & Rethemeyer, 2008; Asal, Ackerman, & Rethemeyer, 2012; Horowitz & Potter, 2014) offer terrorist groups access to additional tangible (e.g., weaponry) and intangible (e.g., knowledge) resources. Thus, the need for structuring of activities increases as terrorist groups acquire specialization and as the labor pool available to the group grows. Concentration of authority is also necessary to efficiently and effectively redistribute resources such as weapons or funds within the group (Shapiro, 2013). Last, drug trafficking is a complex operation requiring multiple actors within the supply chain (Benson & Decker, 2010; Morselli, 2001; Zaitch, 2002). In turn, concentration of authority is higher as the need for coordination and collaboration is greater for terrorist groups involved in drug trafficking. The structuring of activities is also greater in terrorist groups who engage in drug trafficking since a task-based division of labor is necessary to move drugs across the supply chain.

One key difference at the bivariate level was that terrorist groups high in structuring were significantly more likely to adhere to religious motivations, whereas there was no significant relationship between concentration of authority and having a religious ideology. This likely reflects the processes by which many modern religious terrorist groups construct expertise (Bloom, 2017). For instance, some modern religious groups (e.g., al-Qaeda) have a large pool of recruits to draw from and develop expertise through on the job training, while others (e.g., the Islamic State) engage in “talent spotting” and recruit specific types of expertise (Bloom, 2017; Hunter et al., 2017;

Windisch et al., 2018). Additionally, religious terrorist groups tend to have a built-in theological hierarchy and a global as opposed to geographically centered focus, which helps explain why religious groups are not significantly related to the concentration of authority dimensions (Kilberg, 2012).

In addition, the bivariate results indicate that terrorist groups high in concentration of authority were significantly more likely to have anti-system limited goals, while there was no significant link between the structuring of activities and such goals. Terrorist groups with anti-system limited goals (i.e., regime change, territorial control) need public support to survive and achieve their goals (Berman, 2003; Siqueira & Sandler, 2006). To maintain public support and not alienate potential supporters, terrorist groups must show self-restraint and limit acts of indiscriminate violence (Sánchez-Cuenca, 2007). To do so, high levels of concentration of authority are necessary to ensure accountability and a shared vision among group members (Heger et al., 2012). Without a concentration of authority, units or individuals within the group are incentivized to act in their own interests as opposed to the collective goals (Abrahms & Potter, 2015; Shapiro, 2013; Shapiro & Siegel, 2007).

While the previous results revealed the dimensions of organization that vary in terrorist groups, it did not tell us how such dimensions can be used to classify terrorist groups. Thus, the next section examines how the concentration of authority and structuring of activities dimensions of organization are related to unique terrorist structure typologies.

Cluster Analysis Findings

A second goal of this dissertation was to develop structural typologies of terrorist groups using the indicators of organization. To do so, a two-stage cluster approach was

employed. In the first stage, the individual items underlying the structuring of activities and concentration of authority factors were standardized into z-score and a hierarchical cluster analysis was used to determine the approach number of clusters. Recall that I used the individual items underlying both dimensions as opposed to the factor scores themselves since this approach is more effective at differentiating clusters (Fiedler & McDonald, 1993). The results of the dendrogram and agglomeration schedule were used to determine how many clusters should be used in the *k*-mean cluster analysis. The results from both the dendrogram and agglomeration schedule indicated that a five-cluster solution was appropriate (see Appendix B). Next, the number of clusters set at five and a *k*-means cluster analysis was performed. *K*-means clustering is a partitional clustering method and was used to assigned cases (i.e., terrorist groups) to specific clusters based on their structural similarities.

In the sections below, I describe the characteristics of each of the five terrorist group typologies (Tables 13-15). More specifically, Table 13 presents the results of the *k*-means cluster analysis including the average cluster score for each measure of organization. Table 13 also shows specific differences between clusters on measures of organization based on post-hoc results from an analysis of variance. Table 14 shows descriptive statistics for the additional group characteristics (e.g., size, age, ideology) across the five clusters. Finally, Table 15 shows the zero-order relationships between the group characteristics and terrorist group clusters.

Cluster 1: Informal-diffused

The first cluster shown on Table 13 was labeled: *informal-diffused*. In total, 59 terrorist groups (23 percent) fell into the informal-diffused cluster including the Animal

Liberation Front, the Baloch Liberation Army, the Conspiracy Cells of Fire, the Earth Liberation Front, the Indian Mujahedeen, the Movement for the Emancipation of the Niger Delta, and the Sindu Liberation Army.¹⁹ Terrorist groups in the informal diffused typology were the least organized – particularly in terms of their concentration of authority. Informal-diffused groups were the least likely of the five clusters to hold territory, have leadership, follow a top-down command and control structure, maintain connections between members, seek expertise, or engage in organizational or combat training. In other word, informal-diffused groups are highly decentralized and cell-based.

Informal-diffused groups were significantly more likely to be small in size, younger, have “other” ideological motivations such as earth and animal liberation, far-right, or anti-globalization, and have within-system goals (i.e., policy change, status quo). On average, informal-diffused groups had less than 100 members and were approximately 12 years old. Of the 59 informal-diffused groups, 29 percent had “other” ideological motivations, while 15 percent had within-system goals. Informal-diffused groups were also significantly less likely to have religious ideological motives, receive state sponsorship, or receive funding from another non-state ally. For instance, only 29 percent of informal-diffused groups were religiously motivated, 5 percent received state sponsorship, and 14 received alliance funding.

¹⁹ In addition, several of the Mai Mai militia groups also fit into the informal-diffused typology. We suspect that this is because many of these militia groups are village-specific and do not coordinate across locations.

Table 13. Results from K-Means Cluster Analysis

Variables	Informal-Diffused (1)	Simple Structure (2)	Divisional Structure (3)	Formal-Professional (4)	Instrumental-Rational (5)	Stat. Sig (p <.05) Mean Diff (ANOVA)
Deep-Level Diversity	-.64	-.37	.49	.45	.95	1:3; 1:4; 1:5; 2:3; 2:4; 2:5
Organizational Training	-.64	-.64	.25	1.14	1.23	1:3; 1:4; 1:5; 2:3; 2:4; 2:5; 3:4; 3:5
Combat Training	-.72	-.53	.70	.85	.91	1:3; 1:4; 1:5; 2:3; 2:4; 2:5
Ideological Training	-.56	-.58	.74	1.09	.55	1:3; 1:4; 1:5; 2:3; 2:4; 2:5
Territorial Control	-.61	.04	-.56	-.21	1.47	1:2; 1:5; 2:3; 2:5; 3:5; 4:5
Leadership	-1.28	.52	.46	-.23	.47	1:2; 1:3; 1:4; 1:5; 2:4; 3:4; 4:5
Centralization	-1.35	.32	.24	.16	.91	1:2; 1:3; 1:4; 1:5; 2:5; 3:5; 4:5
Connectedness	-1.11	-.02	.68	.00	1.03	1:2; 1:3; 1:4; 1:5; 2:3; 2:5; 3:4; 4:5
Uniforms	-.74	.30	-.76	.80	.48	1:2; 1:4; 1:5; 2:3; 2:4; 3:4; 3:5
Structuring of Activities	-.65 (.22)	-.66 (.24)	.56 (.65)	1.10 (.53)	1.03 (.63)	1:3; 1:4; 1:5; 2:3; 2:4; 2:5; 3:4; 3:5
Concentration of Authority	-1.37 (.60)	.33 (.54)	.24 (.59)	.10 (.66)	1.03 (.50)	1:2; 1:3; 1:4; 1:5; 2:5; 3:5; 4:5
<i>n</i>	59	90	37	32	41	259

The mean for all z-scored items is 0 and the standard deviation is 1.

Note: Games-Howell Post-Hoc Test used to examine specific differences between clusters.

Cluster 2: Simple structure

The second cluster shown on Table 13 was labeled: *simple structure*. In total, 90 terrorist groups (35 percent) fell into the simple structure cluster including the Al-Qaida in the Islamic Maghreb, the Anti-Balaka Milita, Ansar al-Dine (Mali), the Caucasus Emirate, Jahba East Africa, M23, the Popular Front for the Liberation of Palestine, the New Irish Republican Army, Seleka, and the Sinai Province of the Islamic State.

Compared to the informal-diffused cluster, terrorist groups in the simple structure cluster had relatively similar levels of organizational capital but significantly higher levels of cohesion. For example, terrorist groups with the simple structure cluster had significantly higher degrees of territorial control, leadership, centralization, interconnectedness, and uniforms compared to the informal-diffused cluster.

When examining the group characteristics on Tables 14-15, the results suggest that terrorist groups in the simple structure cluster were significantly more likely to be smaller and younger. On average, simple structure terrorist groups had approximately 100 to 500 members and were around 12 years old. Regarding ideology, simple structure terrorist groups were significantly less likely to have neither religious motives nor motives captured in the “other” ideological category. Of the 90 groups in the simple structure cluster, only 46 percent were religiously motivated while 4 percent had other ideological motives. It is important to note that a large proportion of groups in the simple structure cluster had ethnonationalist motives (52 percent) and anti-system limited goals (73 percent).

Cluster 3: Divisional structure

The third cluster shown on Table 13 was labeled: *divisional structure*. Of the 259 terrorist groups, 37 (14 percent) fell into the divisional structure cluster including the Abdullah Azzam Brigades, the Baloch Republican Army, the Haqqani Network, Lashkar-e-Taiba, Palestinian Islamic Jihad, and the Afghan Taliban. Compared to the informal-diffused cluster, divisional structure terrorist groups had significantly higher levels of structuring of activities and concentration of authority. Compared to the simple structure cluster, groups in the divisional structure had significantly greater levels of structuring but relative similar degrees of authority. For example, divisional structure terrorist groups had significantly higher degrees of deep-level diversity, organizational training, combat training, and ideological training compared to those in the simple structure cluster. In addition, divisional structure terrorist groups had higher levels in interconnectedness, but

significantly lower levels of territorial control and uniform usage compared to those in the simple structure cluster.

Tables 15 indicates that divisional structure terrorist groups are significantly more likely to be older and religiously motivated. The average age of divisional structure groups was approximately 21 years old while 65 percent of the groups in this cluster were religious. None of the other group characteristics were significantly correlated with the divisional structure at the bi-variate level.

Table 14. Descriptive Statistics for Group Characteristics by Cluster Type

Variables	Informal-Diffused	Simple Structure	Divisional Structure	Formal-Professional	Instrumental-Rational
	<i>M</i> (<i>SD</i>)	<i>M</i> (<i>SD</i>)	<i>M</i> (<i>SD</i>)	<i>M</i> (<i>SD</i>)	<i>M</i> (<i>SD</i>)
Organizational Size	.66 (.90)	1.17 (1.17)	1.59 (1.32)	1.87 (1.13)	2.68 (.88)
Organizational Age	11.83 (15.01)	12.22 (13.27)	20.57 (15.31)	21.75 (16.54)	21.27 (17.89)
Religious	.29 (.46)	.46 (.50)	.65 (.48)	.72 (.46)	.54 (.51)
Ethnonationalist	.41 (.50)	.52 (.50)	.32 (.48)	.44 (.50)	.41 (.50)
Left-Wing	.08 (.28)	.13 (.34)	.14 (.35)	.09 (.30)	.12 (.33)
Other	.29 (.46)	.04 (.21)	.03 (.16)	.03 (.18)	.05 (.22)
Anti-System Expansive	.31 (.46)	.21 (.41)	.22 (.41)	.22 (.42)	.17 (.38)
Anti-System Limited	.54 (.50)	.73 (.45)	.68 (.48)	.66 (.48)	.78 (.42)
Within-System	.15 (.36)	.06 (.23)	.11 (.32)	.13 (.34)	.05 (.22)
State Sponsorship	.05 (.22)	.27 (.45)	.16 (.37)	.22 (.42)	.41 (.50)
Alliance Funding	.14 (.35)	.40 (.49)	.41 (.50)	.53 (.51)	.54 (.51)
Drug Trafficking	.12 (.33)	.11 (.32)	.11 (.32)	.19 (.40)	.24 (.44)

Cluster 4: Formal-professional

The fourth cluster shown on Table 13 was labeled: *formal-professional*. A total of 32 terrorist groups (12 percent) fell into the formal-professional cluster including the Allied Democratic Forces, Boko Haram, Kata'ib Hezbollah, the Lord's Resistance Army, the New People's Army, the Real Irish Republican Army, Tehrik e-Taliban Pakistan, and the Sudan People's Liberation Movement in Opposition. Terrorist groups in the formal-

professional cluster had significantly higher rates of organizational capital relative to those in the informal-diffused, simple structure, and divisional structure cluster. For instance, those in the formal professional cluster had significantly higher use of organizational training compared to the other three clusters. Formal-professional terrorist groups also had significantly higher levels of deep-level diversity, combat training, and ideological training compared to informal-diffused or simple structure groups. However, there were no significant difference in deep-level diversity, combat training, and ideological training for formal-professional groups relative to those in the divisional structure cluster. Thus, the key difference between the formal-professional and divisional structure clusters regarding organizational capital was the degree of organizational training.

Formal-professional terrorist groups were significantly more cohesive than groups in the informal-diffused cluster. However, there was no significant differences in cohesion levels between groups in the formal-professional cluster relative to the simple structure or divisional structure clusters. In fact, formal-profession terrorist groups were significantly less likely to have central leadership compared to the simple structure or divisional structure groups. Formal-profession terrorist groups were significantly more likely to use uniforms relative to the simple structure or divisional structure clusters. When examining the zero-order correlations, the results suggest that formal-professional terrorist groups were significant more likely to be large, older, and religious. Groups in the formal-professional clusters had, on average, 100 to 500 members with estimates closer to the upper end. Terrorist groups in this cluster were also an average on 22 years old. Finally, of the 32 formal-professional terrorist groups, 72 percent were religiously

motivated. None of the other group characteristics were significantly correlated with the formal-professional typology at the bi-variate level.

Table 15. Zero-Order Correlations Between Cluster Types and Group Characteristics

Variables	Informal-Diffused	Simple Structure	Divisional Structure	Formal-Professional	Instrumental-Rational
Organizational Size	-.35***	-.16**	.05	.14*	.43***
Organizational Age	-.20***	-.16**	.15*	.17***	.15*
Religious	-.22***	-.05	.13*	.17***	.04
Ethnonationalist	-.04	.12	-.10	-.01	-.02
Left-Wing	-.05	.04	.03	-.03	.01
Other	.35***	-.13*	-.01	-.03	-.07
Anti-System Expansive	.10	-.03	-.01	-.01	-.06
Anti-System Limited	-.16	.08	-.03	.04	.09
Within-System	.11 ⁺	-.09	.02	.04	-.07
State Sponsorship	-.22***	.08	-.06	-.01	.20***
Alliance Funding	-.27***	.03	.02	.12	.14*
Drug Trafficking	-.04	-.07	-.04	.05	.13*

*** p < .001; ** p < .01; * p < .05; + p < .10

Note: Results of Spearman's Rho Order Correlation

Cluster 5: Instrumental-rational

The final cluster shown on Table 13 was labeled: *instrumental-rational*. Of the 259 terrorist groups, 41 (16 percent) fit into the instrumental-rational cluster such as Al-Qaida in the Arabian Peninsula. Al-Nusrah Front, Al-Shabbab, the Badr Brigades, the Islamic State of Iraq and the Levant, Hezbollah, the Houthis, the Kurdistan Workers' Party, and the Moro Islamic Liberation Front. Terrorist groups in the instrumental-rational cluster were the most organized of the five clusters. Instrumental-rational terrorist groups had significantly higher levels of cohesion than each other cluster type and significantly higher degrees of organizational capital relative to all but the formal-professional cluster. In terms of cohesion, instrumental-rational terrorist groups were

significantly more likely to hold territory and follow a centralized command structure compared to all other cluster types. Instrumental-rational terrorist groups were also more likely to have central leadership relative to the informal-diffused and formal-professional clusters, more likely to be interconnected than informal-diffused, simple structure, and formal-professional clusters, and more likely to use uniforms relative to the informal-diffused and divisional structure clusters.

Regarding organizational capital, instrumental-rational terrorist groups were relatively similar to groups in the formal-professional cluster. In other words, there were no significant differences between the instrumental-rational groups and formal-professional groups on deep-level diversity, organizational training, combat training, and ideological training. Instrumental-rational terrorist groups were also relatively similar to divisional structure groups on indicators of organizational capital with the exception of organizational training. Instrumental-rational terrorist groups had significantly higher levels of organizational training relative to divisional structure groups. However, terrorist groups in the instrumental-rational cluster had significantly higher rates of deep-level diversity, organizational training, combat training, and ideological training relative to informal-diffused or simple structure groups.

Tables 15 indicates that instrumental-rational groups were significantly more likely to be large, older, have a state sponsor, receive alliance funding, and engage in drug trafficking. On average, terrorist groups in the instrumental-rational cluster were approximately 21 years old and included roughly 1,000 members. Of the 41 groups in the instrumental-rational cluster, 41 percent received state sponsorship, 54 percent receive funding from a non-state ally, and 24 percent engaged on drug trafficking.

Summary of findings: Structural types of terrorist groups

There are two main findings regarding the structural types of terrorist groups. First, results from the two-stage cluster analysis indicated that there are five basic structural types of terrorist groups: informal-diffused, simple structure, divisional structure, formal-professional, and instrumental-rational. When organization is conceptualized on a continuum, the informal-diffused structure is the least organized and represent one end of the continuum. Terrorist groups in the informal-diffused typology are decentralized, lack leadership, and have very little functional differentiation nor formalization. In turn, these groups sacrifice operational efficiency in order to maximize security. The informal-diffused typology is similar to the brand (Zelinsky & Shubik, 2009), or market (Kilberg, 2012) structure found in prior terrorism research. Next on the organization continuum is the simple structure typology. Terrorist groups in the simple structure typology have are hierarchically structured with centralized leadership but lack functional differentiation and formalization. The presence of leaders to articulate a group vision, ensure accountability, and secure and distribute resources are a notable characteristics of simple structure groups. The simple structure typology has commonalities with the all-channel (Kilberg, 2012), tightly coupled groups (Jackson, 2006), and simple organization structure (Ligon et al., 2013) described in the existing terrorist literature.

In the middle of the organization continuum are divisional structure groups. Groups in the divisional structure typology are moderately centralized, highly connected, and invest in some types of training. Based on these characteristics, divisional structure groups are similar to the hub-and-spoke structure described by Arquilla and Ronfeldt

(2001) and Kilberg (2012). In divisional structured groups, actors communicate and coordinate via a central node. These groups have a leader and functional differentiation between members but lack a hierarchical command-and-control structure. In the next position on the organization continuum is the formal-professional typology. Formal-professional terrorist groups lack direct leadership and centralization but account for this through high levels of training and formalization. These groups share similar characteristics of organic organizations described by Ligon and colleagues (2013). Formal-professional groups are characterized by their mutual accountability and decision-making, knowledge and skills-based specialization, low degrees of centralization, and expertise-based patterns of communication. The key strengths for organic organizations are their diverse pool of resources and ability to develop creative and innovative strategies that come with having highly skilled members with few organizational restrictions.

Finally, the instrumental-rational typology is the most organized and represents on the end of the organization continuum. Instrumental-rational terrorist groups have high levels of concentration of authority and structuring of activities. These groups share similar characteristics of mechanistic organizations (Ligon et al., 2013), hierarchical organizations (Mishal & Rosenthal, 2005; Zelinsky & Shubik, 2009), and the bureaucratic structure (Kilberg, 2012). Instrumental-rational groups are characterized by their top-down decision-making structure, function-based specialization, high degrees of formalization and centralization, and hierarchy-based patterns of communication. The key strengths of these groups are their expertise and human capital, efficient decision-making, and resource allocation strategies.

While the previous results revealed the dimensions of organization that vary in terrorist groups and such dimensions can be used to classify distinct typologies, it did not tell us how such dimensions nor typologies are related to violence. Thus, the next section examines the relationship between the dimensions of organization, the structural typologies, and violence.

Terrorist Group Organization and Violent Outcomes

Tables 16-21 presents the results of Hierarchical Poisson models (with the correction for overdispersion available in the HLM 7.03 software) (Raudenbush et al., 2011). The Poisson-based regression model with the HLM overdispersion parameter is the “HLM equivalent to negative binomial regression” (LaFree & Bersani, 2014, p. 466), and models with the overdispersion parameter produce more accurate significance tests compared to standard models (Osgood, 2000). It should be noted that, although the multi-level data set was created to adjust for problem resulting from the hierarchical data structure, the models presented in this dissertation are technically single level models since they only include measures at the group-level of analysis. I considered examining country level effects but results of the unconditional models discussed below in conjunction with my theoretical focus on group level effect did not warrant such an analysis (see Steiner & Wooldredge, 2014 for a similar approach).

The analysis proceeded in several stages. First, I estimated unconditional models to reveal if there was significant variance ($p \leq .10$) in each outcome at level- 1 (within countries) and level-2 (between countries). These models revealed non-significant between-country variance in the number of attacks on hard targets and the number of successful attacks on successful hard targets. In contrast, there was significant between-

country variance for the number of victims killed, the number of hard targets killed, and the number of highly successful attacks on hard targets (see Table 16). It could be argued that the use of HLM is not warranted for the two outcomes with non-significant between-country variance and another approach for analyzing clustered data (e.g., fixed effects for clusters, cluster-corrected robust standard errors) could be employed. However, Johnson (2012) argues that HLM is still the preferred method for examined clustered data since it clearly differentiated level 1 and level 2 effects, properly adjusts standard errors and level 2 significant tests, and disaggregates the total variance in outcomes among levels of analysis (p 171-172).²⁰

Table 16. HLM Estimates of Variance within and between Countries

Variable	Variance Component	X ²	df	p-value
Lethality				
Groups overdispersion	712.05			
Country means	.84	97.09	49	<.001
Reliability (.35)				
Hard Target Lethality				
Groups overdispersion	343.79			
Country means	.74	72.29	49	.02
Reliability (.35)				
Attacks on Hard Targets				
Groups overdispersion	104.10			
Country means	.41	54.73	49	.27
Reliability (.26)				
Successful Attacks on Hard Targets				
Groups overdispersion	57.52			
Country means	.54	60.41	49	.13
Reliability (.29)				
Highly Successful Attacks on Hard Targets				
Groups overdispersion	9.36			
Country means	.94	77.62	49	<.001
Reliability (.30)				

²⁰ It should be noted that, in hierarchical linear models, the unconditional model also produces estimates of the relative amount of variation occurring at level 1 compared to level 2. However, the Poisson HLM model does not incorporate a level 1 variance component in the usual sense, so it is not possible to divide the total variance between level 1 and level 2 units (Osgood & Anderson, 2004, p. 535).

Each model was estimated using fixed effects for the group level measures.²¹ I explored random coefficient models, but none of the level 1 slopes for key variables of interest significantly varied between countries in the full model for each outcome.²² This is likely due to the relatively small sample of terrorist groups ($n = 259$) resulting in the average cluster size of roughly 5 terrorist groups per country. Although past research has shown that the number of level 2 units is a more important factor in determining statistical power than the number of observations per cluster (Johnson, 2012; Raudenbush & Liu, 2000; Snijders, 2005), the small average cluster sizes limit the estimation of random slope variance. However, the relatively large number of level 2 units in this study ($n = 50$) limits the negative consequences for testing regression coefficients (i.e., fixed effects; Snijders, 2005). Furthermore, level 1 intercepts were kept as random to parse out the error variance in the outcomes that was attributable to between-country differences. Future research with a larger average cluster size samples are needed to better investigate the extent to which the characteristics of terrorist groups vary across country contexts.

Each measure was group mean-centered before being introduced into the model. Group-mean centering removes between-country variation in the measures of organization and group characteristics that might have corresponded with differences in levels of violence across countries. The benefit of group-mean centering is that it provides a more conservative test of level 1 effects (i.e., group level) by limiting the chance of finding spurious level 1 effects due to unmeasured level 2 effects that might be related to compositional differences in group characteristics across countries. The results

²¹ Models are also referred to as “random intercept models” when all level 1 variables are “fixed” in the model.

²² In addition, the magnitude of the coefficient for variables that did have significantly varying effects were similar to the magnitude of the fixed effects coefficients.

reported are based on population-average models using robust standard errors. Coefficients based on population average models are averaged across the entire sample with estimated predicted probabilities for the whole population. Population average models are advantageous since they are based on fewer assumptions compared to unit-specific models (Raudenbush et al., 2011). Finally, the use of robust standard errors limits misspecification of variance components by accounting for potential violations of model assumptions (Raudenbush & Bryk, 2002).

Findings from Hierarchical Poisson Models

Table 17 presents the hierarchical Poisson regression analysis predicting the number of victims killed for each terrorist group between 2008 and 2017. Results of the fixed effects model suggests that terrorist groups with higher levels of structuring of activities were more lethal relative to those with lower levels. The concentration of authority dimension in a terrorist group did not have a significant effect on the number victims killed. Terrorist groups who were large, had expansive anti-system goals, or engaged in drug trafficking were significantly more likely to kill a higher number of victims. In contrast, older terrorist groups as well as those with within-system goals, ethnonationalist motivations, or state sponsorship were significantly less lethal from 2008 through 2017. The effect of having a religious or left-wing ideology and alliance funding were not significant in the model. Taken together, the full model explained a considerable amount of the within-country variation for lethality (pseudo $R^2 = .79$).

Table 17. Fixed Effects Models Predicting Lethality

Variable	<i>b</i>	se	ERR
<i>Structuring of Activities</i>	.47***	.12	1.60
<i>Concentration of Authority</i>	.04	.13	1.04
Organizational Size	.40***	.10	1.48
Organizational Age	-.04***	.01	.96
Anti-System Expansive	.55*	.28	1.73
Within-System	-1.11***	.31	.33
Religious	-.32	.18	.76
Ethnonationalist	-1.20***	.24	.30
Left-Wing	.21	.18	1.23
State Sponsorship	-.98***	.34	.38
Alliance Funding	-.02	.25	.97
Drug Trafficking	.82***	.30	2.27
Power	.26***	.05	1.30
Intercept	4.35***	.19	77.23
Reliability	.57		
Proportion variation within countries explained	.79		

*** $p < .001$; ** $p < .01$; * $p < .05$

ERR = Event Rate Ratio

Note: Maximum likelihood coefficients (and robust standard errors) reported from hierarchical Poisson regression models

Table 18 presents the hierarchical Poisson regression analysis examining the number of hard targets killed. Results of the fixed effects model suggests that terrorist groups with higher levels of structuring of activities killed more hard targets between 2008 and 2017 compared to those with lower levels. The concentration of authority dimension did not have a significant effect on the number of hard targets killed. Terrorist groups who were large, had expansive anti-system goals, left-wing ideological motives, or engaged in drug trafficking killed a significantly higher number of hard targets. Terrorist groups who were older, had within-system goals, had ethnonationalist motives, or those with state sponsorship were significantly less likely to kill hard targets during the ten-year period from 2008 through 2017. Religious ideological motives and alliance funding were non-significant in the model. Finally, the full model explained a considerable amount of the within-country variation for lethality against hard targets (pseudo $R^2 = .82$).

Table 18. Fixed Effects Models Predicting Hard Targets Lethality

Variable	<i>b</i>	se	ERR
<i>Structuring of Activities</i>	.51***	.18	1.67
<i>Concentration of Authority</i>	.10	.11	1.11
Organizational Size	.32**	.12	1.38
Organizational Age	-.04***	.01	.96
Anti-System Expansive	.54**	.21	1.71
Within-System	-1.62***	.30	.20
Religious	-.43	.22	.65
Ethnonationalist	-1.28**	.30	.28
Left-Wing	.75***	.24	2.13
State Sponsorship	-1.18***	.34	.30
Alliance Funding	.03	.23	1.02
Drug Trafficking	.91***	.28	2.49
Power	.31***	.06	1.36
Intercept	3.24***	.19	25.61
Reliability	.55		
Proportion variation within countries explained	.82		

*** p < .001; ** p < .01; * p < .05

ERR = Event Rate Ratio

Note: Maximum likelihood coefficients (and robust standard errors) reported from hierarchical Poisson regression models

Table 19 presents the hierarchical Poisson regression analysis examining the number of attacks on hard targets. Results of the fixed effects model suggests that higher scores on the concentration of authority dimension were significantly linked to greater frequency of attacks on hard targets. The structuring of activities dimension had no significant influence the number of times terrorist groups attacked hard targets. Terrorist groups who were large, had left-wing ideological motives, received alliance funding, or engaged in drug trafficking had a significantly higher number of attacks on hard targets. Terrorist groups who were older or those with within-system goals were had a significantly lower number of attacks on hard targets. The effect of expansive anti-system goals, religious or ethnonationalist motives, or state sponsorship were non-significant in the model. The collection of covariates in the full model explained a considerable amount of the within-country variation for the number of attacks on hard targets (pseudo $R^2 = .79$).

Table 19. Fixed Effects Models Predicting Attacks on Hard Targets

Variable	<i>b</i>	se	ERR
<i>Structuring of Activities</i>	.05	.11	1.05
<i>Concentration of Authority</i>	.26*	.12	1.29
Organizational Size	.40***	.08	1.49
Organizational Age	-.04***	.01	.96
Anti-System Expansive	.52	.29	1.69
Within-System	-1.73***	.40	.18
Religious	-.23	.15	.79
Ethnonationalist	-.45	.32	.63
Left-Wing	1.50***	.40	4.48
State Sponsorship	-.43	.32	0.65
Alliance Funding	.42***	.14	1.52
Drug Trafficking	.72***	.31	2.04
Power	.19***	.05	1.21
Intercept	2.59***	.14	13.36
Reliability	.55		
Proportion variation within countries explained	.79		

*** $p < .001$; ** $p < .01$; * $p < .05$

ERR = Event Rate Ratio

Note: Maximum likelihood coefficients (and robust standard errors) reported from hierarchical Poisson regression models

Table 20 presents the hierarchical Poisson regression analysis examining the number of successful attacks on hard targets. Results of the fixed effects model suggests that higher degrees of concentration of authority were significantly related to a higher number of successful attacks on hard targets. The structuring of activities dimension was not significantly related to the number of successful attacks on hard targets. Terrorist groups who were large, had expansive anti-system goals, had left-wing ideological motives, received alliance funding, or engaged in drug trafficking had a significantly higher number of successful attacks on hard targets. Terrorist groups who were older, had within-system goals, or received state sponsorship had a significantly lower number of successful attacks on hard targets. The effect of religious or ethnonationalist motives were not significant in the model. The collection of covariates in the full model explained

a considerable amount of the within-country variation for the number of successful attacks on hard targets (pseudo $R^2 = .82$).

Table 20. Fixed Effects Models Predicting Successful Attacks on Hard Targets

Variable	<i>b</i>	se	ERR
<i>Structuring of Activities</i>	.20	.11	1.22
<i>Concentration of Authority</i>	.24*	.12	1.27
Organizational Size	.39***	.07	1.47
Organizational Age	-.04***	.01	.96
Anti-System Expansive	.61**	.24	1.88
Within-System	-1.56***	.34	.22
Religious	-.14	.17	.87
Ethnonationalist	-.57	.27	.56
Left-Wing	1.98***	.27	7.27
State Sponsorship	-.61*	.31	.55
Alliance Funding	.41***	.16	1.51
Drug Trafficking	.71***	.26	2.04
Power	.22***	.04	1.24
Intercept	1.77***	.15	5.88
Reliability	.59		
Proportion variation within countries explained	.81		

*** $p < .001$; ** $p < .01$; * $p < .05$

ERR = Event Rate Ratio

Note: Maximum likelihood coefficients (and robust standard errors) reported from hierarchical Poisson regression models

Table 21 presents the hierarchical Poisson regression analysis examining the number of highly successful attacks on hard targets. Results of the fixed effects model suggests that terrorist groups with higher levels of structuring of activities had a greater number of highly successful attacks on hard targets relative to those with less levels. The concentration of authority dimension had no significant effect on the number of highly successful attacks on hard targets. Terrorist groups who were large, had expansive anti-system goals, or engaged in drug trafficking had a significantly higher number of highly successful attacks on hard targets. Older terrorist groups as well as those with within-system goals, religious or ethnonationalist motives, or state sponsorship had a significantly lower number of highly successful attacks on hard targets. The effect of

having left-wing ideological motives or alliance funding was not significant in the model. Taken together, the full model explained approximately 81 percent of the within-country variation for the number of highly successful attacks on hard targets.

Table 21. Fixed Effects Models Predicting Highly Successful Attacks on Hard Target

Variable	<i>b</i>	se	ERR
<i>Structuring of Activities</i>	.57***	.18	1.76
<i>Concentration of Authority</i>	.07	.11	1.07
Organizational Size	.38**	.13	1.46
Organizational Age	-.06***	.01	.94
Anti-System Expansive	.79***	.24	2.20
Within-System	-1.42***	.35	.24
Religious	-.67***	.23	.50
Ethnonationalist	-.98***	.22	.37
Left-Wing	.31	.27	1.34
State Sponsorship	-1.22***	.28	.30
Alliance Funding	.01	.22	1.02
Drug Trafficking	.97***	.28	2.63
Power	.39***	.07	1.48
Intercept	-.63***	.21	.53
Reliability	.52		
Proportion variation within countries explained	.81		

*** p < .001; ** p < .01; * p < .05

ERR = Event Rate Ratio

Note: Maximum likelihood coefficients (and robust standard errors) reported from hierarchical Poisson regression models

Summary of findings: Terrorist group organization and violent outcomes

The primary goal of this section was to examine the relationship between the underlying dimensions of organization and violence in terrorist groups. Terrorist groups with more structuring of activities were more lethal in general, more lethal when attacking hard targets, and had a higher number of highly successful attacks on hard targets. However, the degree to which a terrorist group structured its activities had no effect on the number of attacks on hard targets nor the number of successful attacks on hard targets. Based on these findings, I suspect that the relationship between structuring

of activities dimension and violence is explained by enhanced expertise and human capital. Human capital at the group level is related to the training, experience, judgement, intelligence, relationship, and insights of individuals within the organization (Barney, 1991). Researchers have long understood that human capital such as education and training plays in organizational success (Andrews, 1965; Becker, 1983; Hambrick & Mason, 1984; Mincer, 1974). For instance, research has linked human capital to higher organizational commitment (Iles et al., 1990), innovative capacity (Selvarajan et al., 2007), and overall performance (Dooley, 2000) in conventional organizations.

In terrorist groups, human capital influences both the capacity to engage in complex actions and the efficiency of violence (Asal et al., 2015; Jackson, 2001, 2009). For example, terrorist groups with higher degree of human capital may have people with the technical skills to construct sophisticated explosives (Jackson, 2009). In turn, these terrorist groups are generally more lethal since they have the capacity to develop weapons that are highly destructive. There is also evidence that human capital influences the effectiveness of violence against hard targets (Asal et al., 2015). From this perspective, human capital has little influence of the frequency of attacks on hard targets. However, terrorist groups with high levels of human capital have a greater destructive capacity when attacking hard targets compared to those with limited capital.

The accumulation of organization-specific knowledge that is typically codified and generated within the organization also increases intra-group cooperation and collaboration (Atkeson & Kehoe, 2005; Carmona-Lavado, Cuevas-Rodriguez & Cabello-Medina, 2010; Tushman & Rosenkopf, 1992; Subramaniam & Youndt, 2005). This type of knowledge, often referred to as organizational capital, is the knowledge that remains

when people go home at night (Youndt et al., 2004). In terrorist groups, training through indoctrination processes and relationship building exercises maximize group cohesion, solidarity, and loyalty (Hegghammer, 2006; Jung & Lee, 2015). In turn, group-specific training improves accountability and the agenda setting capacity of the group.

Next, terrorist groups with greater concentration of authority had a higher number of attacks on hard targets and a higher number of success on hard targets. However, concentration of authority had no significant effect on the number of victims killed, the number of hard targets killed, nor the number of highly successful attacks on hard targets. Based on these findings, I suspect that there are two mechanisms that explain the relationship between structuring of activities dimension and violence. First, terrorist groups with more concentrated authority have increased membership accountability (Heger et al., 2012). In other words, hierarchical terrorist groups have a system of rewards and punishments in place to minimize neglectful member behaviors. This is closely tied to Shapiro's (2013) work on the necessity of bureaucratic control mechanisms in terrorist organization. Drawing on internal documents collected from Al Qaeda in Iraq, Shapiro shows that bureaucracy is necessary in terrorist groups to reduce the agency afforded to lower level members. Accountability is especially important for terrorist groups seeking to attack hard targets since there is a greater risk of direct confrontation and operational failure (Asal et al., 2015; Koehler-Derrick & Milton, 2019). Without the rewards and punishments associated with hierarchically structured groups, members are likely to act in their own interests when faced with adversity and lessen the degree of operational success (Abrahms & Potter, 2015; Shapiro, 2013).

Second, terrorist groups with strong concentration of authority have a strong agenda-setting capacity. In other words, “there is a clear point at which the flow of information and the agenda originate, with few (or no) legitimate alternative sources to distort or challenge the right to articulate the operational goals of the organization” (Heger et al., 2012, p. 747). Clear and unidirectional agenda-setting creates tighter, more cohesive relationships between the leadership and followers within a group. This is especially important given the internal agency issues faced by many terrorist groups (Abrahms & Potter, 2015; Shapiro, 2013). Members of terrorist groups vary in both levels of commitment and goals. Without such a strong agenda-setting capacity, low level members are incentivized to act in their own interests as opposed to the collective group goals (Abrahms & Potter, 2015; Shapiro, 2013). Leader’s ability to set the group’s agenda and articulate a strategic vision provides members with a distinctive and clearly defined identity with behavioral prescriptions in times of uncertainty (Hogg 2014) as well as a shared understanding of the ideal end state relative to the current problem (Mumford, 2006, Mumford & Connelly, 1991). Reducing uncertainty and motivating followers to sacrifice personally for the strategic goals of the organization are especially important considering the elevated risk of failure when attacking hard targets.

Summary of findings: Additional group characteristics and violent outcomes

While the dimensions of organization were the focus of my analysis, findings from the group level control variables also offer implications for terrorism research. Below, I discuss six central findings. First, organizational size and drug trafficking were significantly related to violence across all five models. In relation to organizational size, large terrorist groups are more violent for two reasons. First, large terrorist groups have

the human capital (i.e., knowledge, skills, experience, and training possessed both individually and collectively by group members) to sustain violent campaigns and the necessary expertise to successfully attack hard targets compared to smaller groups (Asal & Rethmeyer, 2008; Pearson et al., 2017). Second, large terrorist groups are less risk averse given their sheer manpower and ability to absorb the losses of engaging in large scale attacks especially on harden targets. For example, Koehler-Derrick and Milton (2019) found that, the larger the terrorist group, the more likely they are to use firearms as opposed to explosives in their attack portfolio. To be effective, firearms require a close proximity between the perpetrator and the intended victim increasing the risk of direct confrontation between both actors. Large terrorist groups have a higher tolerance for the risk associated with attacks using firearms since they can replace fallen members at a lower cost (Koehler-Derrick & Milton, 2019, p. 914).

Concerning drug trafficking, terrorist groups who traffic drugs are more violence across all five outcomes. There are both direct and indirect effects that involvement in illicit drug markets have on terrorist groups (for review see Omelicheva & Markowitz, 2019; Piazza, 2012). For example, drug trafficking generates enormous revenue for terrorist groups. Recent estimates by the United Nations Office on Drugs and Crime (2017) indicates that armed groups raised roughly \$150 million in 2016 from the Afghan illicit opiate trade. This revenue is then available for terrorist groups to purchase weapons and pay for training, ultimately increasing their tactical sophistication and destructive capacity. Another direct effect occurs when terrorist groups use violence to protect their illicit drug markets against uncooperative government officials. Drug trafficking is a lucrative business and terrorist groups are more likely to dedicate resources and

manpower to protect their drug markets. In terms of indirect effects, the presence of illicit drug markets weakens the state and their ability to conduct counterterrorism operations. Drug trafficking enables other illicit markets (e.g., weapons, money laundering, human trafficking) and places additional burden on state security and law enforcement. Since terrorism often occurs in socially disadvantaged states with weak domestic security (Piazza, 2008), drug trafficking increases the scope of criminal activities and limits the resources that could be used to combat terrorism (Omelicheva & Markowitz, 2019; Piazza, 2012).

The second key finding is that organizational age was significant and negative across each of the five violent outcome models. Past research on the effects of organizational age and violence have largely been mixed. While some scholars argue that older organizations are more violent because they learn from past experiences and acquire knowledge that increases chances of successful violent performances (Asal et al., 2012; Chermak, Freilich, & Suttmoeller, 2013; Ranger-Moore, 1997), other researchers have found that organizational age does not have an effect or has an inverse effect on violence (Asal & Rethemeyer 2008). I suspect older terrorist organizations are less violent in general and less violent against hard targets for two reasons. First, older terrorist groups and their leadership do not want to face the “strategic fallout” from highly lethal attacks (Abrahms & Potter, 2015, p. 316). Second, older terrorist groups are more likely to conserve and not utilize the resources they have developed across their life course. In other words, as organizations age, they become more risk-averse and do not want to risk the resources and human capital necessary to sustain violence.

Next, the third finding is that terrorist groups who receive state sponsorship are less lethal when attacking hard targets. This finding is consistent with prior research showing that state sponsored terrorist groups are generally less violent (Asal & Rethemeyer, 2008; Simon & Benjamin, 2001). Although state sponsorship provides terrorist groups with increased firepower, funding, and training, state sponsorship also creates a “state restraint” effect for terrorist groups. Through this lens, state sponsors restrict the activity of terrorist groups to avoid retaliation (Simon & Benjamin, 2001). The state restraint effect is likely even greater for terrorist groups attacking hard targets since targets such as police or military are a direct representation of the state (Gibbs, 2013). Violence against hard targets might exacerbate direct interstate conflict compared to other target types.

Fourth, terrorist group goals had a profound influence on violence. This is consistent with Crenshaw’s (1981) argument that terrorist groups serve a variety of goals, which are often linked to the group’s strategy. More specifically, I found that terrorist group’s that had within-system goals were negatively related to each of the five violence indicators, while groups with expansive anti-system goals were generally more lethal, more lethal when attacking hard targets, and more successful at attacking hard targets. The relationship between within-system goals and violence is straightforward. For example, several terrorist groups with goals of policy change did not endorse interpersonal violence (e.g., Animal Liberation Front, Earth Liberation Front). Similarly, others such as the Niger Delta Avengers and Movement for the Emancipation of the Niger Delta preferred economic damage compared to interpersonal violence. In addition, terrorist groups with goals of protecting the status quo had an established relationship

with the existing government such as Ranvir Sena, the Right Sector (Ukraine), and Vishwa Hindu Parishad. For these groups, there is little reason to attack targets affiliated with the state (e.g., police, military) since they support the same interests, and indiscriminate violence would be counterproductive as it would bring increased pressure on the government in which they support.

In contrast, violence in general and against hard targets were greater for terrorist groups with expansive anti-system goals. Similar to Piazza (2009a) labeling of “universal/abstract groups,” terrorist groups in this category sought to establish an empire such as the Islamic State, Al Qaeda, and their affiliates as well as groups seeking a social revolution such as the Conspiracy Cells of Fire, Informal Anarchist Federation, and Pagan Sect of the Mountain. On a surface level, terrorist groups with empire and social revolutionary goals are very different. The key commonality is both goal structures are highly abstract and complex posing few limits on the types of violence groups can engage in against a variety of targets. Violence committed by terrorist groups with expansive anti-system goals is often communicative as opposed to instrumental and viewed as a form of signaling (Hoffman & McCormick, 2004; Loadenthal, 2017; Piazza, 2009a). In turn, highly lethal attacks are an important tool for terrorist groups with expansive anti-system goals to grab media attention and communicate their message to a large audience. Attacks on hard targets are also important for terrorist groups with expansive goals. For example, hard targets represent apostate regimes and foreign occupants of Muslim lands for terrorist groups with expansive goals of establishing a Caliphate (Piazza, 2009a). Hard targets also reflect the oppression caused by dominant social institutions and their

interests (e.g., capitalism, globalization) for terrorist groups with expansive goals of creating a social revolution (Loadenthal, 2017).

Fifth, ideology had little effect on violence in ways that are typically theorized. More specifically, we did not find that religious or ethnonationist terrorist groups were more lethal in general nor against hard targets (Asal & Rethemeyer, 2008; Juergensmeyer, 2003; Tilly, 2003). I suspect this finding is due to the influence of goal structure as opposed to ideology on lethality. For example, Piazza (2009a) found that Islamic terrorist groups were no more likely than non-Islamic groups to commit high casualty attacks after controlling for groups' affiliation with al-Qaeda (p. 72). In addition, Piazza (2009a) found that the inclusion of a measure of universal/abstract goals reduced the effect size of Islamic terrorist group on high casualty attacks. Both the affiliation with al-Qaeda measure and the universal/abstract goals measure are similar to the anti-system expansive goals variables presented here, offering a potential explanation of why I did not find a significant effect for religiously motivated groups.

One caveat of the relationship between ideology and violence is the finding that left-wing groups killed more hard targets, attacked hard targets at a higher rate, and did so successfully. There are two reasons that explain this relationship. First, the underlying ideology of far-left groups (e.g., Marxist-Leninist, Maoist) is framed around a utopian or egalitarian future with the current regime being the primary obstacle to reaching such goals (Forrest, 2019, p.162). In turn, violence committed by left-wing groups is often directed at hard targets such as police and other actors in the criminal justice system, military personnel and installations, and politicians. By attacking hard targets, the goal is to provoke the state into using indiscriminate violence that would further highlight their

cause and mobilize the population. Second, many of the most effect and long-standing far-left terrorist groups such as the New People's Army, the Revolutionary Armed Forces of Columbia, and the Communist Party of India-Maoist provide services to underserved communities often located in stateless areas (Piazza, 2009b). In turn, these groups can establish a territorial network to launch attacks on police and military patrols in these stateless communities.

Finally, terrorist groups who received funding from a non-state ally were significantly more likely to attack hard targets and do so successfully. Terrorist groups who receive support from a non-state ally have improved resources and operational capabilities compared to those who do not receive support (Asal & Rethemeyer, 2008; Horowitz & Potter, 2014). In other words, terrorist groups who receive alliance funding have access to better tactical information and weaponry. Collaborations between groups also provides the opportunity to develop new skills and transmit knowledge and expertise (see Horowitz & Potter, 2014 for review across conventional and malevolent organizations). Access to enhanced resources would not only allow terrorist groups to attack hard targets more often but also do so more effectively. Admittedly, the binary measure of alliance funding used in this study is not as direct nor elaborate of a measure of terrorist group alliances as used in other studies (Asal & Rethemeyer, 2008; Horowitz & Potter, 2014). Perhaps this is why I did not find a significant relationship between alliance funding and the lethality of terrorist groups. Based on the results of this study, future research should examine the relationship between terrorist group alliances and violence against hard targets using different measures of alliances.

Terrorist Group Types and Violent Outcomes

Finally, Table 22 presents the hierarchical Poisson regression analysis examined each of the five violent outcomes with the cluster types as the main predictor variables. The focus of this section is on the cluster type and their relationship to violence. The only difference between these models and the hierarchical Poisson regression models presented in previous section is that the key predictor variables are the cluster types as opposed to the dimension of organization. Given these marginal differences, I combined the models into a single table and my discussion focuses on the influence of each cluster type on violence. In other words, I do not discuss the group level controls since their relationship to the violence outcomes do not substantively change relative to the results previously discussed. Beginning with Model 1, the results suggest that simple structure, formal-professional, and instrumental-rational terrorist groups were significantly more lethal than informal-diffused groups. There were no significant differences in lethality between divisional structure groups and informal-diffused groups.

Model 2 indicates that formal-professional and instrumental-rational terrorist groups significantly killed a greater number of hard targets compared to informal-diffused groups. Simple structure and divisional structure groups had no significant effect on the number of hard targets killed relative to informal-diffused groups. The results from Model 3 suggest that simple structure, formal-professional, and instrumental-rational terrorist groups had a significantly higher number of attacks on hard targets compared to informal-diffused groups. The relationship between divisional structure groups and the number of attacks on hard targets was non-significant.

Table 22. Fixed Effects Models Predicting Violent Outcomes by Cluster Type

Variables	Model 1	Model 2	Model 3	Model 4	Model 5
	DV: Lethality	DV: HT Lethality	DV: Attacks on HT	DV: Successful Attacks on HT	DV: Highly Successful Attacks on HT
	<i>b</i> (se)	<i>b</i> (se)	<i>b</i> (se)	<i>b</i> (se)	<i>b</i> (se)
<i>Simple Structure</i> ¹	.67 (.27)**	.13 (.24)	.58 (.19)***	.46 (.21)*	.06 (.26)
<i>Divisional Structure</i>	.59 (.31)	.12 (.39)	.15 (.28)	.09 (.26)	.13 (.41)
<i>Formal-Professional</i>	.94 (.26)***	.64 (.28)*	.62 (.24)***	.57 (.20)***	.68 (.30)*
<i>Instrumental-Rational</i>	1.61 (.30)***	1.20 (.37)***	1.02 (.26)***	1.18 (.19)***	1.26 (.37)***
Organizational Size	.40 (.10)***	.35 (.09)***	.38 (.07)***	.37 (.07)***	.41 (.12)***
Organizational Age	-.03 (.01)***	-.03 (.01)***	-.03 (.01)***	-.04 (.01)***	-.05 (.01)***
Anti-System Expansive	.58 (.30)	.64 (.22)*	.62 (.23)***	.71 (.18)***	.89 (.32)***
Within-System	-.88 (.25)***	-1.36 (.29)***	-1.64 (.38)***	-1.34 (.31)***	-1.11 (.33)***
Religious	-.12 (.17)	-.29 (.22)	-.27 (.16)	-.06 (.16)	-.60 (.24)**
Ethnonationalist	-1.25 (.25)***	-1.38 (.30)***	-.49 (.32)	-.64 (.28)*	-1.14 (.25)***
Left-Wing	.17 (.22)	.73(.26)***	1.41 (.43)***	1.88 (.29)***	.36 (.28)
State Sponsorship	-.97 (.32)***	-1.17 (.35)***	-.35 (.31)	-.53 (.31)	-1.25 (.27)***
Alliance Funding	-.19 (.30)	-.10 (.33)	.36 (.19)	.34 (.20)	-.11 (.32)
Drug Trafficking	.92 (.28)***	.99 (.30)***	.79 (.35)*	.85 (.21)***	1.02 (.29)***
Power	.23 (.05)***	.28 (.05)***	.19 (.04)***	.21 (.04)***	.37 (.07)***
Intercept	4.32 (.19)***	3.26 (.20)***	2.45 (.14)***	1.77 (.16)***	-62 (.22)***
Reliability	.56	.52	.56	.57	.50
Proportion variation within countries explained	.79	.81	.79	.80	.81

*** $p < .001$; ** $p < .01$; * $p < .05$

1: Informal-Diffused is the reference category.

Note: Maximum likelihood coefficients (and robust standard errors) reported from hierarchical Poisson regression models

Next, Model 4 indicates that simple structure, formal-professional, and instrumental-rational terrorist groups had a significantly higher number of successful attacks on hard targets compared to informal-diffused groups. The relationship between divisional structure groups and the number of successful attacks on hard targets was non-significant. Finally, Model 5 suggests that formal-professional and instrumental-rational terrorist groups had a significantly higher number of highly successful attacks on hard targets compared to informal-diffused groups. Simple structure and divisional structure groups had no significant effect on the number of highly successful attacks on hard targets relative to informal-diffused groups.

Summary of findings: Terrorist group types and violent outcomes

The main finding from this section is that terrorist groups with higher degrees of organization (e.g., instrumental-rational, formal-professional) were more violent relative to those with lower levels of organization (e.g., informal diffused). As terrorist groups increase in structuring of activities and concentration of authority, their capacity for violence increases. This finding also supports previous research on gang organization and criminal offending (Bouchard & Spindler, 2011; Decker et al., 2008; Sheley et al. 1995). More organized terrorist groups have a greater capacity for lethal violence in general and against hard targets because they have the knowledge and skills to perpetrate highly sophisticated attacks relative to less organized groups. In addition, more organized terrorist groups have the control mechanisms in place (e.g., training in organization rules) to ensure accountability and commitment to tactical objectives (Shapiro, 2013).

There are two caveats in the relationships between terrorist group structure and violence. First, there was no significant difference in the number of hard targets killed nor the number of highly successful attacks between simple structure and informal-diffused groups. I suspect this result highlights the importance of the structuring of activities dimension as opposed to the concentration of authority in the capacity to effectiveness attack hard targets. Recall that simple structure groups have high degrees of concentration of authority but low degrees of structuring of activities. Thus, while the concentration of authority provides a shared vision and accountability to ensure that lower levels members follow through with their objectives, the lack of training and expertise in simple structure groups limits complexity of their attacks. This explains why

simple structure groups are more likely to perpetrate attacks on hard targets but are no more likely to kill a high number of hard targets nor have a greater number of high successful attacks relative to informal diffused groups.

The second caveat is that divisional structure terrorist groups were not significantly related to any of the violence measures. This is unexpected, especially given that the Afghan Taliban -- one of the most violent terrorist group in the past two decades -- fit this typology. One explanation is that divisional structure groups do not have the necessary training and expertise to make up for their general lack of concentration of authority. For example, formal--professional groups lack a concentration of authority as well but account for this through high levels of formalization and specialization. Despite the relatively high degrees of interconnectedness, divisional structure terrorist groups do not have additional control mechanisms in place to regulate the actions lower level members. Thus, members and units in the group focus on their own goals as opposed to the collective goals of the group. A second potential explanation is that divisional structure groups generally lack territorial control, limiting the degree to which they can plan and coordinate sophisticated acts of violence. For example, Volders (2016) emphasizes the importance of operational time and space in providing terrorist groups with the physical space to coordinate activities with relative security. Since many groups in the divisional structure typology lack territorial control, they are limited in the degree to which they can plan and coordinate highly destructive attacks.

CHAPTER 5

CONCLUSIONS

This dissertation sought to address two overarching research questions. First, *Which indicators of gang organization can be applied to terrorist groups to develop a classification schema of terrorist group structure?* Based on my review of the literature, I argued that the indicators of gang organization (e.g., presence of leadership, rules, division of labor) were linked to four core organizational dimensions including centralization, formalization, interconnectedness, and complexity. I used EFA to examine the underlying relationships between measures related to these four organizational dimensions in the context of terrorism. The results suggest that there are two higher-order organizational dimensions in terrorist groups. The first dimension, *structuring of activities*, encompassed indicators of both formalization (e.g., organizational training, ideological training) and complexity (e.g., background diversity of members). The second dimension, *concentration of authority*, encompassed indicators of both centralization (e.g., presence of leadership, uniforms) and interconnectedness (e.g., territorial control). These organizational dimensions are consistent with seminal research on conventional businesses (Pugh et al., 1968) suggesting these dimensions underlie both conventional organizations and criminal groups. This is important for two reasons. First, this finding supports the applicability of organizational theory to study terrorist groups. Second, it indicates the mechanisms that drive performance in conventional organizations also facilitates violence in terrorist groups.

In relation to the first research question, I also used measures underlying the structuring of activities and concentration of authority dimensions to develop structural

typologies of terrorist groups. Results from a two-stage cluster analysis indicated the presence of five basic structural typologies including informal-diffused, simple structure, divisional structure, formal-professional, and instrumental-rational. These findings support the idea that like gangs (Thrasher, 1927) and conventional organizations (Pugh et al., 1968; Mintzberg, 1979), no two terrorist groups are alike. As discussed in Chapter 4, considerable overlap existed in the structural typologies found here and those in existing terrorism research. For instance, the instrumental-rational typology is similar to the bureaucratic (Kilberg, 2012) or mechanistic (Ligon et al., 2013) structure whereas the informal-diffused typology shares characteristics with the market (Kilberg, 2012) or brand (Zelinsky & Shubik, 2009) structure. This overlap provides some degree of external validity as to the typologies developed in this study.

The second research question was: *Do terrorist groups that are more highly organized engage in more group level violence than less organized terrorist groups?* Results from Hierarchal Poisson models suggests that both the structuring of activities and concentration of authority dimensions were related to greater degrees of violence in different ways. Terrorist groups with greater degrees of structuring of activities were more lethal in general, more lethal when attack hard targets, and had a higher number of highly successful attacks on hard targets. Based on these results, I argue that the structuring of activities dimension is linked to human capital. Human capital, or the training, experience, judgement, intelligence, relationship, and insights of individuals within the organization, is developed through both training as well as recruitment of specialized individuals. Members of terrorist groups with high levels of human capital have increased tactical knowledge and adaptive expertise whereas the group has a greater

innovation capacity. Both types of capital are byproducts of the structuring of activities dimension, and they provide terrorist groups with the skills, knowledge, and abilities to successfully and efficiently carry out large scale acts of violence. In addition, members of terrorist groups with high levels training in internal organizational policies and rules have increased explicit knowledge, while the group has an enhanced organizational memory, cohesiveness, and intra-group cooperation.

A second finding was that terrorist groups with greater concentration of authority had a higher number of attacks on hard targets and a higher number of success on hard targets. Based on these findings, I argued that the concentration of authority dimension is related to the regulation of members' behaviors through accountability and agenda setting (Heger et al., 2012). Building on recent insights on principle-agent theory (Abrahms & Potter, 2015; Shapiro, 2013), high degrees of concentration of authority are necessary in terrorist groups to control and regulate member behaviors. Members of terrorist groups vary in both levels of commitment and goals. The bureaucratic mechanisms inherent to hierarchical groups, such as the presence of a command structure and organizational incentives and punishments, minimizes the agency afforded to members. In turn, these mechanisms also ensure that members are accountable for their actions. The presence of one or more central leaders with a strong agenda setting capacity is also an important function within the concentration of authority dimension. A strong agenda-setting capacity ensures tighter cohesiveness between the leadership and followers within a group, and it reduces uncertainty among members. Taken together, the presence of bureaucratic mechanisms that ensure accountability coupled with a strong agenda-setting

capacity increase the likelihood that the behaviors of group members are in the interest of the collective as opposed to the individual.

In relation to the second research question, I also examined the relationship between the typologies of terrorist groups and violence outcomes. The results provide support for the notion that more organized terrorist groups are also more violent in general and better equipped to attack hard targets. For instance, the two most organized typologies, the formal-professional and instrumental-rational structures, had significantly greater levels of violence across each outcome relative to the least organized typology, the informal-diffused structure. Even after controlling for group characteristics such as size, age, and ideology, these findings provide further evidence that group structure is an important correlate of violent outcomes.

Structuring of Activities and Concentration of Authority in Gangs

One of the main goals of this study was to use the gang organization research to inform how to measure organization in terrorist groups. However, what remains unknown is the degree to which the findings of this study relate back to the original gang organization literature. For instance, what evidence is there that the structuring of activities and concentration of authority dimensions exist in gangs? Relatedly, how can these dimensions be measured? Before moving forward, there are three key differences between this study and the research on gang organization to discuss including the dimensionality of organization, levels of measurement, and methods of data collection.

First, there is debate as to whether organization is a unidimensional or multidimensional concept. The vast majority of gang researchers have utilized an index to assess gang organization (Bouchard & Spindler, 2011; Decker et al., 2008). In doing

so, the assumption is that each item of gang organization is related to one another and measures a single construct. Pyrooz and colleagues (2012) is of the first to question this assumption and find evidence that organization is not a unidimensional concept. More specifically, Pyrooz and colleagues (2012) found that items commonly used to examine gang organization were weakly related to one another and to measures of delinquency and victimization across different datasets. For instance, the mean inter-item correlation coefficient between four measures of organization including the presence of a leader, regular meetings, rules, and insignia was .32, .35., and .40 across three datasets. Furthermore, the direction of each measure of organization was not positive in multivariate models predicting delinquency, suggestive that some characteristics of organization are not related to offending. In contrast, Laverso and Matsueda (2019) argue that gang organization is a unidimensional concept. Using confirmatory factory analysis, the authors found that eight binary measures of gang organization loaded on a one-factor model with standardized loading scores ranging from .44 to .92. My dissertation supports the idea that organization is a multidimension concept similar to findings from Pyrooz and colleagues (2012) and research on conventional organizations (Pugh et al., 1968), more research is needed to unpack the underlying structure of organization in gangs and terrorist groups.

Second, the level of measurement of the items used in this study were mixed (i.e., ordinal and dichotomous) while the gang organization literature relies solely on dichotomous measures. This is primarily a limitation of the existing gang organization research. As Pyrooz and colleagues (2012, p. 100) note “A limitation of this line of research more generally is that is relies on several dichotomous variables for information

on gang organizational structure. This constrains the variability in the construct of gang organizational structure, reducing the likelihood of identifying statistically significant findings or identifying a latent construct of gang organizational structure. We recommend that future survey development introduce ordinal variables to measure gang organizational structure.” Thus, the multidimensionality of terrorist group organization may be a function of increased variability in the measures of organization used in this study. Future studies on both gangs and terrorist groups should consider adopting ordinal level measures of organization.

Third, this study relied on secondary data sources coded by trained raters to examine the level of organization of terrorist groups. In contrast, research on gang organization typically relies on survey data collected from either former and active gang members (Decker et al., 2008) or law enforcement (Klein, 1971; Maxson & Klein, 1995). While data collected from active or former extremists would be optimal to examine the organization of terrorist groups, gaining access to extremists is an inherently difficult task (LaFree & Dugan, 2007). Furthermore, researchers have relied on survey data collected from law enforcement to examine the threat of domestic terrorist groups (e.g., Freilich, Chermak, & Simon Jr., 2009), however, this would be difficult in relation to the current study given that the majority of groups in LEADIR are international. The use of secondary sources comes with limitations that are important to consider. However, this approach is consistent with many of the existing data collection efforts seeking to sample from the total population of terrorist groups (see for example, Asal & Rethemeyer, 2008; Kilberg, 2012).

Structuring of activities in gangs

The structuring of activities dimension focuses on the extent to which terrorist groups have formal roles and procedures (i.e., formalization) and specialized sections (i.e., complexity). Unlike the concentration of authority dimension described below, the scalability of the items underlying the structuring of activities dimension in terrorist groups are limited in the context of gangs (see Table 23). For instance, there is limited evidence that gangs engage in combat training or have highly skilled members with specialized backgrounds. That said, there are both existing and new measures that could be employed to examine the structuring of activities dimension in gangs. For example, the presence of rules, norms, or codes with punishments for violators are important measures of formalization in gangs (Moule Jr. et al., 2014). Gang rules announce important organizational values and provide a means of forging consensus in gangs while a system of punishments increases discipline in the gang (Decker & Curry, 2000; Decker & Van Winkle, 1996; Thrasher, 1927). Gang rules and punishments are functionally similar to organizational and ideological training in terrorist groups.

In the future, a measure of whether gang members received combat or weapons training would be comparable to combat training in terrorist groups. Smith (2015) suggests there has been an increase in the number of military-trained gang members in the United States. The presence of military-trained members and the extent to which they share their expertise in military tactics or weaponry would be useful indicators of gang complexity. Finally, the presence of a division of labor or specialization of tasks in gangs serves as indicator of complexity within the structuring of activities dimension. For

example, specific roles in the gang related to handling finances, doling out punishment, or serving as a lookout would indicate a division of labor (Leverso & Matsueda, 2019).

Table 23. Potential Measures for both Dimension of Organization in Terrorist Groups and Gangs

Structuring of Activities		Concentration of Authority	
Terrorist Groups	Gangs	Terrorist Groups	Gangs
Organizational Training	Training in Group Roles	Leadership	Presence of Leader
Ideological Training	Training in Rules and Codes	Centralization	Levels of Membership
Combat Training	Weapons Training	Interconnectedness	Regular Meetings
Deep-Level Diversity	Division of Labor	Territorial Control	Territorial Control
		Uniforms	Insignia

Concentration of authority in gangs

The concentration of authority dimension emphasizes the degree to which terrorist groups have a hierarchical decision-making structuring (i.e., centralization) with limited unit or member autonomy (i.e., interconnectedness). Since much of the gang organization literature focuses on the degree of hierarchy in gangs, there are several available measures used in this study that also account for the concentration of authority dimension in gangs. For example, the presence of leadership or shot callers, the level of centralization, and territorial control are indicators of centralization commonly found in gang organization research (Bouchard and Spindler, 2011; Decker, 2001; Decker et al., 1998, Decker et al., 2008; Densley, 2012; Maxon & Klein, 1995; Pyrooz et al., 2012). Furthermore, the presence of regular meetings could be used to assess the interconnectedness of gangs (Moule Jr. et al., 2014) while the presence of insignia, designated clothing, or distinctive colors in gangs (Bjerregaard, 2002; Pyrooz et al., 2012; Sheley et al., 1995) is functionally similar to the use of uniforms in terrorist groups.

Theoretical Implications

Findings from this dissertation offer three theoretical implications for the intersection of criminology and terrorism studies. The first implication is that this study highlights the importance of control mechanisms to regulate members behaviors corresponding with well-organized groups. Drawing on Weber's (1946) theory of bureaucratic control, both the concentration of authority and structuring of activities dimension represent distinct yet interrelated organizational control mechanisms. Broadly speaking, Weber theorized that rational collective activities face two inherent problems: 1) to ensure that individuals officially designated to exercise control actually direct an organization's activities and 2) to ensure that decisions are made on the basis of the best possible information (Miller, 1970). To overcome these constraints, formal organizations become more bureaucratized and rely on administrative mechanisms for maintaining the organization and coordinating activities (Blau & Scott, 1962). Some of the prominent characteristics of bureaucracies are a hierarchy of positions and authority, a fixed division of labor, adherence to rules, expert training, administration based on written documents, and a full-time commitment to organizational activities (Weber, 1946; for review see).

Based on these characteristics, control in the concentration of authority dimension is ensured through the hierarchical structures of positions and authority. Hierarchical structures of positions increased control and coordination by restricting free flowing communication with structural competent of the organization (Blau & Scott, 1962). Bureaucracies also formalize systems of control through a hierarchical distribution of authority. Individuals in positions of authority are able to exercise control especially when they are viewed as legitimate. When a person occupying an authority position

issues a command, individuals under their influence are more likely to obey them since they have the “right” to exercise control (Miller, 1970). Taken together, the concentration of authority dimension enhances control through a strong agenda-setting capacity as well as accountability and obedience to an established executive order. This supports Heger and colleagues’ (2012) theorizing on why hierarchically structured terrorist groups are more violent as opposed to decentralized groups.

Next, control within the structuring of activities dimension is increased through a fixed division of labor, expert training, adherence to rules, and administration based on written documents. First, a division of labor within an organization is a marker of specialization (Pugh et al., 1968). As noted by Blau (1970), specialization improves control and coordination in an organization by limiting the scope of activities and broadening responsibilities of experts. Similarly, expert training ensures control as individuals gain superior knowledge about the organization or acquire specific skills, which limits the scope of activities in the organization. Finally, as organizations become increasingly specialized and differentiated, they are more likely to develop standardized rules, regulations, and procedures. These impersonal control mechanisms are often formalized (e.g., written and filed) and become substitutes for direct executive control (Blau, 1968).

The importance of these bureaucratic control mechanisms is closely in line with recent developments on principal-agent theory and terrorist organizations (Abrahms & Potter, 2015; Shapiro, 2013). More specifically, principal-agent theory examines the difficulties (e.g., information asymmetry, differing goals) associated with situations where a principal (i.e., leader) hires an agent (i.e., member) to accomplish a task. In

terrorist groups, principal-agent difficulties are problematic for three reasons. First, terrorist leaders and foot soldiers often have different preferences over targets reflecting different goals or different means to similar goals. Second, terrorist leaders and foot soldiers have access to different information regarding the political value of targets. Furthermore, communicating that information within the group is costly and a security risk for senior leaders. Finally, when either the first or second problems emerge, the conflict of interest over targets between principals and agents makes it difficult to credibly communicate which targets should be hit (Shapiro, 2008).

To mitigate these issues, terrorist groups employ bureaucratic control mechanisms to reduce the discretion afforded to lower level members. For example, Shapiro and Siegel (2012) show how Al Qaeda in Iraq used standardized forms for tracking weapons, group funds, and affiliate groups, demanded regular reports from lower level members, and sent regular memos and meeting agendas. Abrahms and Potter (2015) also show the importance of leadership as a control mechanism. More specifically, when terrorist groups experience a “leadership deficiency”, members are incentivized to commit violence in their own interests as opposed to the larger group goals. Thus, despite the increased security risk, terrorist groups rely on bureaucratic practices to reduce agency problems and protect their strategic goals.

Taken together, the results of this study support and build on Shapiro’s (2013) work in two ways. First, my findings suggest that the concentration of authority and structuring of activities dimensions reflect to interrelated but distinct bureaucratic control mechanism. At one level, control in the concentration of authority dimension is based on *direct executive control* where formal lines of reporting promote accountability and

strong agenda-setting. For example, leaders of the Sinjar organization frequently sent memos laying down administrative rules on how operative spent money (Shapiro & Siegel, 2012). Without such administrative controls in place, lower level operatives are incentivized to use group resources and perpetrate violence in their own interest as opposed to the collective interests of the group (Abrahms & Potter, 2015). At another level, control in the structuring of activities dimension is based on *impersonal control* where expertise and written rules, policies, and procedures guide members activities. For example, the Sinjar organization kept technical training manuals and ideological screeds to condition members to take favorable actions. There is also evidence that the organization required an application from members and kept track of foreign fighters to manage expertise and mitigate the actions of actors with an underlying preference for violence (Shapiro & Siegel, 2012).

In addition, this study builds on the principal-agent framework by suggesting that bureaucratic control mechanism, not only regulates members behaviors, but also provides coordinating systems for members to engage in sophisticated violence. The crux of Shapiro's (2013) argument is that bureaucratic control mechanisms limit the discretion afforded to lower levels members and subsequently limits actions that are counter to the group's goals. Another side of this perspective is that, when these mechanisms are in place, members are conditioned to take favorable actions and have the resources to successful to do so.

The second broad theoretical implication of this study is that it highlights the importance of human capital in terrorist groups. For example, the structuring of activities dimension is closely related to how terrorist groups acquire and maintain human capital

while the concentration of authority dimension relates to how terrorist groups manage human capital. In criminology, the concept of capital is not new as several researchers have advanced the concept of criminal capital (Loughran et al., 2013; McCarthy & Hagan, 1995, 2001). Drawing on ideas on human capital and social capital, *criminal capital* refers to the knowledge and skills that can facilitate successful criminal activity (McCarthy & Hagan, 2001). Researchers have generally found a positive, significant relationship between measures of criminal capital such as criminal experience, specialization, and tutelage and illicit earnings (Loughran et al., 2013; McCarthy & Hagan, 2001; Morselli et al., 2006; Uggen & Thompson, 2003). For example, Morselli and colleagues (2006) found that individuals who received tutelage from a criminal mentor had higher illicit earnings and lower chances of being incarcerated compared to those who did not receive tutelage. Uggen and Thompson (2003) found that criminal experience, measured by the total number of times an offender was arrested in a 36-month period, had a curvilinear relationship with total monthly illegal earnings, while Loughran and colleagues (2013) found that investment in criminal capital yielded greater illicit returns in a sample of serious offending adolescents.

Relatedly, research on criminal expertise has also shown that there are important cognitive benefits for offending when individuals invest in their criminality (Bennett & Wright, 1984; Nee & Meenaghan, 2006; Nee et al., 2019; Topalli, 2005; Topalli et al., 2015; Wright & Decker, 1994; Wright, Logie, & Decker, 1995). Experienced criminals are better at recognizing opportunities, responding to risk, and diagnosing environmental features that are conducive (or unfavorable) to crime compared to novices (see Nee & Ward, 2015 for review). For example, Wright, Logie, and Decker (1995) demonstrate

that, after viewing photos of residential buildings, active burglars were more likely to recall situational details about a building and its surroundings compared to a control group. Using standardized videos of short dyadic social interactions, Topalli (2005) illustrated that active street offenders focused on different perceptual cues related to victimization or target vulnerability compared to a control group. Nee and colleagues (2019) demonstrate that experienced burglars relied on “script-like knowledge” to locate high-value items relative to nonoffenders in a virtual environment. In sum, research on criminal capital and criminal expertise suggests that offenders acquire specific perceptual and procedural skills, which facilitate successful criminal activity when they invest in criminal training.

In the context of this study, the criminal capital and expertise frameworks are useful in explaining why some terrorist groups have the capacity to successfully attack hard target and other do not. For example, successfully attacking hard targets requires both perceptual skills to identify vulnerabilities as well as procedural skills to exploit those vulnerabilities (Berman & Latin, 2008). The problem is that, like ideas on human capital (Becker, 1962; Mincer, 1974; Schultz, 1981) the overwhelming majority of research on criminal capital operates at the individual level. Thus, little attention has been given to criminal capital as a group level concept. Recognizing this limitation, recent theoretical advancements in strategic management and human resources have argued that human capital also operates at the group - or organizational level (Fagan & Ployhart, 2015; Ployhart & Moliterno, 2011; Ployhart, Nyberg, Reilly, & Maltarich, 2014; Ployhart, Van Iddekinge, & MacKenzie Jr., 2011). More specifically, Ployhart and colleagues (2014) put forth the concept of *human capital resources* to describe “individual or unit level

capacities based on individual knowledge, skills, abilities, and other characteristics that are accessible for unit-relevant purposes” (p. 374). In other words, human capital resources focus on the accessibility of human capital for unit-relevant purposes and the capacities for producing outcomes whereas human capital focuses on the resources themselves. Consistent with the resource-based view, organizations rely on human capital resources to achieve a competitive advantage in a particular product market (Barney, 1991) or competitive parity relative to other competitors (Barney & Wright, 1998).

Based on these insights, there is reason to believe that criminal capital also exists at the group level. Building on the criminal capital literature in conjunction with ideas on human capital resources, I put forth the concept of criminal capital resources to refer to *unit level capacities based on individual knowledge, skills, abilities, and other characteristics that facilitate successful criminal activities*. There are two key differences between criminal capital resources and human capital resources. First, criminal capital resources are conceptualized as a collective construct while human capital resources operate at multiple levels of analysis. Second, criminal capital resources focus on criminal outcomes where human capital resources emphasize conventional markers of performance or productivity such as customer ratings of a unit’s hospitality, order, accuracy, product quality, and speed (Ployhart et al., 2011). In criminology and terrorism research, there are several unit level criminal outcomes worth examining, including but not limited to, lethal violence, target specialization or diversification, illicit earnings, and weapons usage. The point is that criminal capital resources are resources and capabilities that facilitate criminal outcomes.

Perhaps the best illustration of how to measure criminal capital resources and their influence on violence come from Asal and colleagues (2015). More specifically, the authors examined brigade level human capital in the Provisional Irish Republican Party using two proxies: the mean age of the subunits' members and the proportion of subunit members who possessed professional training relative to bomb making. Findings suggest that the percentage of members with professional training increased the likely that a brigade killed a nonzero number of people with an IED especially in attacks on high value targets, while the age of subunit members had no meaningful effects. Put another way, professional training provides brigades with the expertise to selectively kill "those people they wish to kill" as opposed to indiscriminate violence (Asal et al., 2015, p. 20). Taken together with the results of this study, training appears to be an indicator of criminal capital resources.

Last, the third theoretical implication is that this study provides insights into the ways in which criminal capital resources are developed or acquired. Drawing on Lepak and Snell's (1999) human resource framework, there are two internalization strategies used to build human capital in business firms. First, businesses develop human capital through internal development. Internal development strategies focus on "making" human capital and building employee skills through training and development initiatives. The benefit of internal development is that firm-specific skills are nontransferable and internal development is less likely to result in capital loss (Barney, 1991; Becker, 1976). Second, businesses also develop human capital through acquisition. Acquisition strategies focus on "buying" human capital that does not require further investment. The benefit of

acquiring human capital is that firms do not have to further invest in development initiatives and have instant access to skilled employees.

Based on the items retained in the structuring of activities dimension, terrorist groups acquire criminal capital resources through both a combination of internal development and acquisition. For example, measures of organization, ideological, and combat training are internal development strategies in terrorist groups. As noted by Jung and Lee (2015, p. 68), training of terrorist groups not only increased knowledge and skills but also facilitated indoctrination of their political or religious ideology and creeds.” Following Hegghammer (2006), it is likely that training in terrorist groups focus on four factors: violence acculturation, indoctrination, training on tactical and operational attack skills, and relationship-building with other members. Criminal capital resources are greater in terrorist groups who invest in training. Terrorist groups also building human capital through acquisition. For instance, the measure of deep-level diversity (i.e., background diversity of membership) is related to acquisition. Terrorist groups high in deep-level diversity have a heterogenous membership with individuals varying in characteristics such as educational attainment or specialized skills such as weapons or religious training (Windisch et al., 2019). While some of these skills can be internally developed, others cannot, suggesting that individuals developed these skills prior to joining the group. Although the deep-level diversity measure does not tease out whether these specialized individuals were acquired through traditional “top-down” recruitment as opposed to self-selection, there is evidence that terrorist groups engage in periods of targeted recruitment and talent spotting (Bloom, 2017; Hunter et al., 2017; Windisch et al., 2018). During these recruitment cycles, terrorist groups construct expertise through

pragmatic assessments of their workforce and selective recruitment (Bloom, 2017). In other words, these groups seek to acquire specific criminal capital resources that cannot be addressed via internal development strategies.

In sum, findings from this dissertation emphasize the importance of centralized control and criminal capital resources on performance among terrorist groups. In the next section, I discuss how findings from this study have practical implications for practitioners and those in the field.

Practical Implications

Findings from this study can be used to guide practitioners including law enforcement, the intelligence community, and policymakers as to which terrorist groups pose the larger threat based on their organizational sophistication and violent capabilities. For example, results from this dissertation suggest that certain group characteristics factors are linked to terrorist groups' capacity to engage in complex violence. Using classified and unclassified sources, law enforcement and counter terrorism analysts could periodically assess these characteristics as evidence of a group's increase (or diminishing) capabilities. For example, if a terrorist group establishes a network of training camps and begins a focused recruitment campaign, it is likely that they have an increased capacity to engage in highly destructive attacks on hard targets. If a terrorist group loses territory they once held and experiences a leadership decapitation event, it is likely that they have a reduced capacity to attack hard targets in favor of soft targets (Abrahms & Potter, 2015). Intel analysts could examine these group characteristics on a weekly or monthly bases, depending on the availability of the information, to provide a real-time, actionable insights into terrorist groups' capabilities.

From this perspective, characteristics of terrorist groups can be viewed as group level risk factors related to their capacity for violence. Risk factors involve different types of adverse conditions that increase the likelihood of delinquency and criminal behavior (Hawkins et al., 1998; Loeber et al., 1998; Moffitt, 1990; Simi et al., 2016). Consistent with the general theme of this dissertation, much of the growth of the risk factor paradigm has come from street gang research (Hawkins et al., 1992; Klein & Maxson, 2006; Thornberry et al. 2003). For example, the backgrounds of many gang members are characterized by adverse family conditions such as domestic violence, sexual abuse, and neglect. In relation to this study, risk factors are those indicators of organization that increase the capacity of terrorist groups to engage in highly destructive, complex acts of violence. Although this study does not examine why ideological groups turn to violence, there is evidence that certain group characteristics predict the onset of violence (Asal, Chermak, Fitzgerald, & Freilich, 2020). This research coupled with the results of this study could be integrated into the risk factor paradigm to provide a comprehensive understanding of the adoption and capacity of violence among terrorist groups. That said, research on group characteristics and violent outcomes is still relatively novel and much more research is needed to translate findings into policy.

Limitations and Directions for Future Research

There are five primary limitations of this dissertation to bear in mind. First, the LEADIR dataset relies on open source, secondary information for collecting and coding organization data. Although an increasing number of terrorism dataset based on open source data such as the BAAD dataset (Asal & Rethemeyer, 2008), the Global Terrorism Database (LaFree, 2010; LaFree & Dugan, 2007), the United States Extremist Crime

Database (Freilich et al., 2014), the Profiles of Individual Radicalization in the United States dataset (Freilich, Chermak, Belli, Gruenewald, & Parkin, 2014), and the Salafi Jihadist Inspired Profiles and Radicalization Clusters dataset (Ligon, Windisch, Braun, Logan, Derrick, & Armstrong, 2019), there is the potential of reporting inaccurate, biased, or false information when using secondary data. Furthermore, given the polarization of terrorism, there is also the potential that government-censored information may influence results. To mitigate these issues, the LEADIR dataset only included terrorist groups with more than five attacks ensuring that there is an ample amount of information for each group to collect and code. Nevertheless, results of this study should be interpreted with limitations related to open source data in mind.

Second, the LEADIR dataset includes terrorist groups with more than five attacks between 2008 and 2017. While this includes the majority of highly active terrorist groups, it does not include all terrorist groups. The removal of terrorist groups with less than five attacks likely leads to the removal of less durable – and potentially less organized groups. Perhaps the results of this dissertation and the influence of the structuring of activities and concentration of authority dimensions would be more robust with a more robust sample. The difficulty is that including terrorist with few attacks would make it increasingly difficult to examine markers of organization since the amount of open source information tied to a group is often linked to how often they perpetrate violence. Recall that LEADIR also does not include terror attacks perpetrated by lone actors or collectives without identifiable group boundaries. As a result, the generalizability of my findings is applicable to highly active terrorist groups with patterns of sustained violence as opposed to lone actors or collectives with limited sporadic acts of

violence. Third, since the LEADIR data are limited to a specific time period, I could not examine how terrorist group organization changes overtime nor how organizational changes influence violence overtime. Rather findings from this study highlight general patterns between the degree of organization among terrorist groups and violence during a 10-year time period.

Fourth, it was difficult to capture when a terrorist group started and ended. This limitation is not unique to this study and several terrorism scholars have emphasized the difficulty in capturing this information (e.g., Miller, 2016; Young & Dugan, 2014). In the LEADIR dataset, terrorist groups were treated as a different group if they rebranded, changed their name, or broke away from a larger group. For example, the Al Qaeda in Iraq (AQI) and the Islamic State and the Levant (ISIL) are treated as two different terrorist groups. As such, ISIL was ‘founded’ in 2013 when they broke away from Al Qaeda. The drawback to this approach is that ISIL was well established in 2013 – in terms of resources and structure – given their relationship with Al Qaeda. However, ISIL’s organizational age would only account for the time in which they self-identified as ISIL and not the years in which they operated under a different name. Finally, LEADIR relied on fixed-value imputation to replace missing information on variables for which substantive knowledge or subject expertise suggested a most likely or highly probable value. For instance, missing data for variables that generally leave an evidence trail, such as drug trafficking or state sponsorship were replaced with null values when they were not mentioned in open sources. Recently, LaFree and colleagues (2018) demonstrated that there were no substantive differences in the results using the fixed-value approach

compared to other strategies for handling missing data. Nevertheless, the results of this dissertation should be interpreted with this in mind.

While the present effort suggests that the dimensions of terrorist group organization are important to consider when examining lethality and hard target selection, it should also serve as a springboard for future research. For instance, future research could examine the relationship between the dimensions of terrorist group organization and other types of violence such as attacks on soft targets or infrastructure attacks. Furthermore, future studies could examine other non-violent outcomes. For example, both structuring of activities and concentration of authority were correlated with drug trafficking at the bivariate level. However, these relationships could be examined through multivariate analyses to assess the relative effect of the dimensions of organization on drug trafficking after accounting for other group characteristics. Additional non-violent outcomes such as state sponsorship or alliance funding could also be examined.

Future studies should incorporate contextual effects when examining the relationship between terrorist group organization and violence. Given the exploratory nature of this study, I used HLM to account for contextual influences despite not including any higher-level variables. That said, future studies could include contextual influence such as measure of social disorganization and relative deprivation and examine their cross-level interaction with the dimensions of organization. Finally, it is important that future research continue to examine and replicate findings at the group level of analysis using different data sources. For example, the relationship between organization size and violence found in this study overlaps with findings from previous research (Asal & Rethemeyer, 2008). Given the general scarcity of quantitative research on terrorism

(Schuurman, 2018), research should continue to collect and examine data on group level characteristics and violence to build an empirical body of knowledge about terrorist groups.

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Appendix A

Group Name	Size	Ideology	Goals
Abdullah Azzam Brigades	0	R	E
Abu Obaida bin Jarrah Brigade	1	R	TC
Abu Sayyaf Group	1	R, EN	E
Achik National Volunteer Council-B	1	EN	TC
Adan-Abyan Province of the Islamic State	1	R	E
Ahle Sunnat Wal Jamaat	2	R, EN	RC
Ahlu-sunah Wal-jamea	3	R	TC
Ahrar al-Sham	4	R	E
Ajnad Misr	1	R	RC
Akhil Terai Mukti Morcha	1	LW,EN	TC
Al-Aqsa Martyrs Brigade	1	R	TC
Al-Ashtar Brigades	0	R	RC
Al-Islah Party	0	R	RC
Al-Mua'qi'oon Biddam Brigade	0	R	TC
Al-Naqshabandiya Army	2	EN	SQ
Al-Nasir Army	2	0	RC
Al-Nusrah Front	3	R	E
Al-Qaida in Iraq	3	R	E
Al-Qaida in the Arabian Peninsula	2	R	E
Al-Qaida in the Indian Subcontinent	1	R	E
Al-Qaida in the Islamic Maghreb	0	R	E
Al-Shabaab	3	R	E
Al-Sham Legion	4	R	RC
Aleppo Fatah Operations Room	3	R	RC
Algeria Province of the Islamic State	0	R	E
Alliance of Patriots for a Free and Sovereign Congo	2	EN	TC
Allied Democratic Forces	2	R	RC
Ambazonia Defense Forces	1	EN	TC
Animal Liberation Front	0	0	PC
Ansar al-Din Front	1	R	RC
Ansar al-Dine (Mali)	2	R	TC
Ansar al-Islam	1	R	RC
Ansar al-Islam (Burkina Faso)	1	R	RC
Ansar al-Sharia (Libya)	2	R	TC
Ansar al-Sharia (Pakistan)	0	R	E
Ansar al-Sharia (Tunisia)	2	R	E
Ansar al-Sharia Operations Room	3	R	E
Ansar Bayt al-Maqdis	2	R	TC
Ansaru	2	R	E
Ansarullah Bangla Team	0	R	E
Anti-Balaka Militia	0	R, EN	RC
Arab Movement of Azawad	1	R	TC
Arakan Army	2	EN	TC

Arakan Rohingya Salvation Army	2	R, EN	TC
Asa'ib Ahl al-Haqq	2	R, EN	TC
Awami League	2	LW	PC
Azawad National Liberation Movement	3	EN	TC
Badr Brigades	4	R,EN	TC
Baloch Liberation Army	2	EN	TC
Baloch Liberation Front	0	EN	TC
Baloch Republican Army	2	EN	TC
Baloch Republican Guards	0	EN	TC
Bangladesh Nationalist Party	4	EN	RC
Bangsamoro Islamic Freedom Movement	1	R, EN	TC
Barisan Revolusi Nasional	2	LW,EN, R	TC
Barqa Province of the Islamic State	0	R	E
Base Movement	0	R	RC
Basque Fatherland and Freedom	1	EN	TC
Benghazi Defense Brigades	2	R	RC
Bodu Bala Sena	1	R, EN	RC
Boko Haram	3	R	E
Caucasus Emirate	2	R	E
Caucasus Province of the Islamic State	2	R	E
Comite d'Action Viticole	0	LW	PC
Communist Party of India - Maoist	4	LW	TC
Communist Party of Nepal - Maoist	3	LW	RC
Communist Party of Nepal-Maoist	1	LW	TC
Conspiracy Cells of Fire	0	0	SR
Coordination Committee	2	EN	TC
Coordination of Azawad Movements	0	EN	TC
Corsican National Liberation Front	1	EN	TC
Deccan Mujahideen	0	R	TC
Democratic Front for the Liberation of Palestine	0	LW,EN	TC
Democratic Front for the Liberation of Rwanda	2	EN	RC
Democratic Front of the Central African People	0	EN	RC
Devrimci Halk Kurtulus Cephesi	0	LW	SR
Donetsk People's Republic	4	EN	TC
Earth Liberation Front	0	0	PC
Economic Freedom Fighters	0	LW,EN	SR
February 17th Martyrs Brigade	2	R	RC
Fetullah Terrorist Organization	4	R	RC
Free Papua Movement	2	EN	TC
Free Syrian Army	2	0	RC
Garo National Liberation Army	0	EN	TC
Gorkha Janmukti Morcha	0	EN	TC
Gorkha Liberation Army	0	EN	TC
Group of Popular Fighters	0	0	SR
Hadramawt Province of the Islamic State	1	R	E

Haftar Militia	4	0	RC
Halqa-e-Mehsud	2	R	RC
Hamas	3	R, EN	TC
Haqqani Network	3	R	E
Hasam Movement	1	R	RC
Hay'at Tahrir al-Sham	4	R	E
Hezbollah	4	R, EN	TC
Hizb-I-Islami	3	R, EN	TC
Hizbul al Islam	1	R	RC
Hizbul Mujahideen	2	R, EN	TC
Hmar People's Convention-Democracy	0	EN	TC
Houthi extremists	4	R	RC
Hynniewtre National Liberation Council	0	EN	TC
Illuminating Paths of Solidarity	0	0	SR
Indian Mujahideen	0	R	E
Informal Anarchist Federation	1	0	SR
International Revolutionary Front	0	0	SR
Islamic Courts Union	2	R	TC
Islamic Front	4	R	TC
Islamic State in Bangladesh	0	R	E
Islamic State in Egypt	0	R	E
Islamic State in the Greater Sahara	2	R	E
Islamic State of Iraq	3	R	TC
Islamic State of Iraq and the Levant	4	R	E
Jahba East Africa	0	R	E
Jaish al-Fatah	4	R	TC
Jaish-e-Islam	1	R, EN	TC
Jaish-e-Mohammad	1	R, EN	TC
Jama'at Mujahideen Bangladesh	2	R	E
Jamaah Ansharut Daulah	0	R	E
Jamaat Nusrat al-Islam wal Muslimin	2	R	E
Jamaat-E-Islami	3	R	RC
Jamat al-Tawhid wal-Qisas	0	R	E
Jamiat ul-Mujahedin	1	R, EN	RC
Janatantrik Terai Mukti Morcha - Goit	2	EN	TC
Janatantrik Terai Mukti Morcha	0	EN	TC
Janatantrik Terai Mukti Morcha- Jwala Singh	1	EN	TC
Janatantrik Terai Mukti Morcha- Rajan Mukti	2	EN	TC
Janjaweed	4	EN	TC
Jaysh al-Islam	4	R	E
Jharkhand Janmukti Parishad	0	EN	RC
Jund al-Aqsa	2	R	TC
Jund al-Khilafah	0	R	E
Jundallah	1	R, EN	PC
Justice and Equality Movement	2	R, EN	RC
Kachin Independence Army	3	EN	TC

Kamtapur Liberation Organization	0	EN	TC
Kamwina Nsapu Militia	1	EN	TC
Kangleipak Communist Party	1	EN	TC
Karbi People's Liberation Tigers	0	EN	TC
Karen National Union	2	EN	RC
Kata'ib Hezbollah	4	R, EN	TC
Khalistan Liberation Force	1	EN	TC
Khorasan Chapter of the Islamic State	2	R	E
Kuki National Front	1	EN	TC
Kurdistan Free Life Party	2	EN	RC
Kurdistan Workers' Party	3	LW, EN	TC
Lashkar-e-Islam	3	R	TC
Lashkar-e-Jhangvi	1	R, EN	TC
Lashkar-e-Taiba	4	R, EN	E
Liberation Tigers of Tamil Eelam	2	EN	TC
Libya Revolutionaries Operations Room	2	R	RC
Libya Shield Force	2	0	TC
Lord's Resistance Army	1	R, EN	RC
Luhansk People's Republic	0	EN	TC
M23	1	EN	RC
Macina Liberation Front	1	R, EN	TC
Madhesh Rastra Janatantrik Revolutionary	0	EN	RC
Madhesi Mukti Tigers	1	LW, EN	TC
Mahaz Fedai Tahrir Islami Afghanistan	0	R	RC
Mai Mai Bakata Katanga Militia	1	EN	TC
Mai Mai Mazembe Militia	1	EN	TC
Mai Mai Simba Militia	1	EN	TC
Maute Group	1	R, EN	TC
Mayi Mayi	3	EN	TC
Misrata Brigades	2	R	RC
Moro Islamic Liberation Front	3	R, EN	TC
Moro National Liberation Front	2	R, EN	TC
Movement for Oneness and Jihad in West Africa	2	R	TC
Movement for the Emancipation of the Niger Delta	1	EN	PC
Movement of Democratic Forces of Casamance	1	0	TC
Movement of Niger People for Justice	2	EN	PC
Mozambique National Resistance Movement	2	R	SQ
Mujahedeen Shura Council in the Environs of Jerusalem	1	R, EN	TC
Mujahideen Ansar	1	R	TC
Mujahidin Indonesia Timur	0	R	TC
Muslim Brotherhood	4	R	E
Najd Province of the Islamic State	2	R	E
National Democratic Alliance Army	2	LW, EN	TC
National Democratic Front of Bodoland	2	EN	TC
National Liberation Army of Colombia	2	LW	RC

National Liberation Front of Tripura	1	EN	TC
National Socialist Council of Nagaland-Isak-Muivah	2	LW,EN, R	TC
National Socialist Council of Nagaland-Khaplang	2	EN	TC
Nduma Defense of Congo	1	EN	TC
New People's Army	2	LW	RC
Niger Delta Avengers	1	EN	PC
Niger Delta Greenland Justice Mandate	0	EN	PC
Nur-al-Din al-Zinki Movement	2	R	TC
Nyatura Militia	1	EN	TC
Oglaigh na hEireann	0	EN	TC
Okba Ibn Nafaa Brigade	0	R	TC
Organization for Revolutionary Self-Defense	0	0	SR
Pagan Sect of the Mountain	0	0	SR
Palestinian Islamic Jihad	2	R, EN	TC
Patriotic Ginbot 7 Movement for Unity and Democracy	0	EN	TC
Patriotic Resistance Front in Ituri	1	EN	RC
Peace at Home Council	0	0	RC
People's Committee against Police Atrocities	1	LW	TC
People's Liberation Army (India)	2	EN	TC
People's Liberation Front of India	0	LW	RC
People's Revolutionary Party of Kangleipak	1	EN	TC
People's Revolutionary Party of Kangleipak-Progressive	1	EN	TC
Popular Front for the Liberation of Palestine	1	LW, EN	TC
Popular Front for the Renaissance of the Central African Republic	0	EN	TC
Popular Liberation Army	1	LW	RC
Popular Resistance Brigade	0	R	RC
Popular Resistance Committees	1	R, EN	TC
Popular Resistance Movement	1	EN	RC
Raia Mutomboki Militia	2	EN	SQ
Ranbir/Ranvir Sena	1	0	SQ
Rashtriya Swayamsevak Sangh	4	R, EN	RC
Real Irish Republican Army	1	R, EN	TC
Revolutionary Armed Forces of Colombia	3	LW	RC
Revolutionary Punishment Movement	0	R	E
Revolutionary Struggle	0	0	SR
Right Sector	2	0	SQ
Rubicon (Rouvikonas)	1	0	SR
Runda Kumpulan Kecil	1	R, EN	RC
Samyukta Jatiya Mukti Morcha	0	EN	PC
Sanaa Province of the Islamic State	1	R	E
Seleka	3	R, EN	RC
Shamiya Front	2	R	RC
Shining Path	1	LW	RC

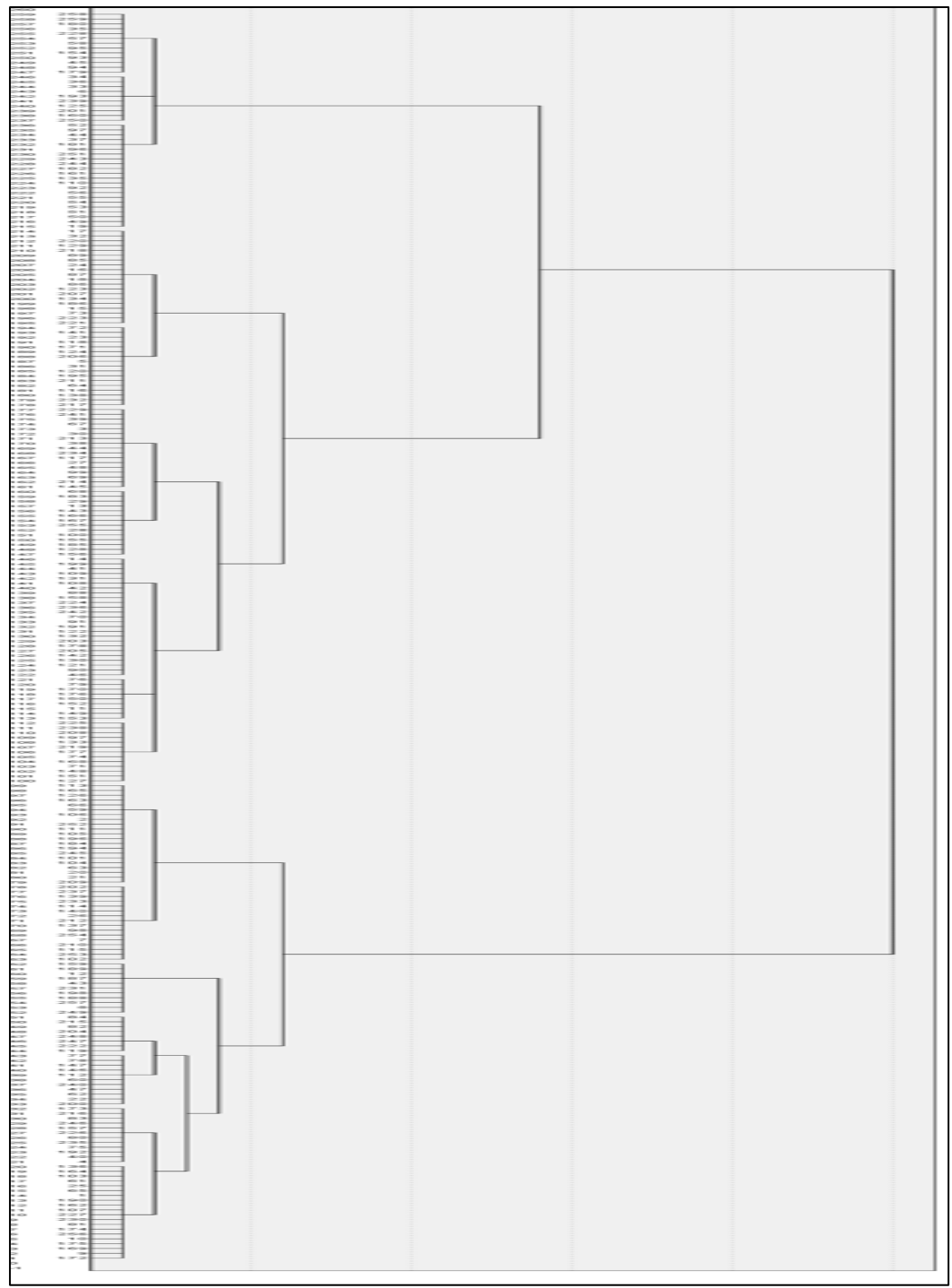
Shura Council of Benghazi Revolutionaries	3	R	E
Shura Council of Mujahideen in Derna	1	R	TC
Shutdown G20: Take Hamburg Offline!	0	0	PC
Sinai Province of the Islamic State	2	R	E
Sindhudesh Liberation Army	0	EN	TC
Southern Front	4	0	RC
Southern Mobility Movement	3	R	TC
Students Islamic Movement of India	0	R	E
Sudan Liberation Army-Minni Minawi	0	EN	RC
Sudan Liberation Movement	0	EN	TC
Sudan People's Liberation Movement - North	0	EN	TC
Sudan People's Liberation Movement in Opposition	2	EN	TC
Taliban	4	R	RC
Tehrik al-Mojahedin	1	R, EN	RC
Tehrik e-Taliban Pakistan	4	R	RC
Tehrik-e-Khilafat	0	R, EN	E
Terai Army	0	EN	TC
The Defense Command of the French People and the Motherland	0	0	SQ
The Joint Revolutionary Council	0	EN	RC
The New Irish Republican Army	1	EN	TC
Tripoli Province of the Islamic State	3	R	E
Tripoli Revolutionaries Battalion	2	EN	RC
Tritiya Prastuti Committee	1	LW	RC
Turkestan Islamic Party	3	R, EN	RC
Ulster Volunteer Force	1	EN	SQ
United Baloch Army	0	EN	TC
United Democratic Liberation Army	0	EN	RC
United Democratic Madhesi Front	0	EN	TC
United Front for Democracy Against Dictatorship	0	LW	RC
United Liberation Front of Assam	2	LW, EN	TC
United National Liberation Front	2	LW, EN	TC
United Revolutionary Front (India)	0	0	PC
United Self Defense Units of Colombia	0	0	SQ
Vishwa Hindu Parishad (VHP)	4	R	SQ
Weichan Auka Mapu	0	LW	SR
Wild Individualities	0	0	SR
Zeliangrong United Front	1	EN	TC

Size: (0: 0-99; 1: 100-999; 2: 1,000-4,999; 3: 5,000-9,999; 4: 10,000+)

Ideology: (R: Religious; EN: Ethnonationalist; LW: Left-Wing; O: Other)

Goals: (E: Empire; SR: Social Revolution; TC: Territorial Control; RC: Regime Change; SQ: Status Quo; PC: Policy Change)

Appendix B



Ward Linkage

Agglomeration Schedule

Stage	Cluster Combined		Coefficients	Stage Cluster First Appears		Next Stage
	Cluster 1	Cluster 2		Cluster 1	Cluster 2	
1	258	259	.000	0	0	143
2	98	254	.000	0	0	145
3	96	251	.000	0	0	152
4	204	248	.000	0	0	102
5	243	244	.000	0	0	6
6	182	243	.000	0	5	30
7	236	242	.000	0	0	103
8	229	241	.000	0	0	13
9	60	240	.000	0	0	168
10	225	238	.000	0	0	104
11	144	234	.000	0	0	37
12	139	233	.000	0	0	140
13	39	229	.000	0	8	111
14	158	224	.000	0	0	149
15	133	219	.000	0	0	144
16	132	218	.000	0	0	146
17	131	217	.000	0	0	147
18	130	216	.000	0	0	148
19	129	215	.000	0	0	149
20	128	214	.000	0	0	150
21	127	213	.000	0	0	151
22	126	212	.000	0	0	152
23	125	211	.000	0	0	153
24	124	210	.000	0	0	154
25	123	209	.000	0	0	155
26	122	208	.000	0	0	156
27	121	207	.000	0	0	157
28	120	206	.000	0	0	158
29	119	205	.000	0	0	159
30	118	204	.000	0	0	160
31	117	203	.000	0	0	161
32	116	202	.000	0	0	162
33	115	201	.000	0	0	163
34	114	200	.000	0	0	164
35	113	199	.000	0	0	165
36	112	198	.000	0	0	166
37	111	197	.000	0	0	167
38	110	196	.000	0	0	168
39	109	195	.000	0	0	169
40	108	194	.000	0	0	170
41	107	193	.000	0	0	171
42	106	192	.000	0	0	172
43	105	191	.000	0	0	173
44	104	190	.000	0	0	174
45	103	189	.000	0	0	175
46	102	188	.000	0	0	176
47	101	187	.000	0	0	177
48	100	186	.000	0	0	178
49	99	185	.000	0	0	179
50	98	184	.000	0	0	180
51	97	183	.000	0	0	181
52	96	182	.000	0	0	182
53	95	181	.000	0	0	183
54	94	180	.000	0	0	184
55	93	179	.000	0	0	185
56	92	178	.000	0	0	186
57	91	177	.000	0	0	187
58	90	176	.000	0	0	188
59	89	175	.000	0	0	189
60	88	174	.000	0	0	190
61	87	173	.000	0	0	191
62	86	172	.000	0	0	192
63	85	171	.000	0	0	193
64	84	170	.000	0	0	194
65	83	169	.000	0	0	195
66	82	168	.000	0	0	196
67	81	167	.000	0	0	197
68	80	166	.000	0	0	198
69	79	165	.000	0	0	199
70	78	164	.000	0	0	200
71	77	163	.000	0	0	201
72	76	162	.000	0	0	202
73	75	161	.000	0	0	203
74	74	160	.000	0	0	204
75	73	159	.000	0	0	205
76	72	158	.000	0	0	206
77	71	157	.000	0	0	207
78	70	156	.000	0	0	208
79	69	155	.000	0	0	209
80	68	154	.000	0	0	210
81	67	153	.000	0	0	211
82	66	152	.000	0	0	212
83	65	151	.000	0	0	213
84	64	150	.000	0	0	214
85	63	149	.000	0	0	215
86	62	148	.000	0	0	216
87	61	147	.000	0	0	217
88	60	146	.000	0	0	218
89	59	145	.000	0	0	219
90	58	144	.000	0	0	220
91	57	143	.000	0	0	221
92	56	142	.000	0	0	222
93	55	141	.000	0	0	223
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95	53	139	.000	0	0	225
96	52	138	.000	0	0	226
97	51	137	.000	0	0	227
98	50	136	.000	0	0	228
99	49	135	.000	0	0	229
100	48	134	.000	0	0	230
101	47	133	.000	0	0	231
102	46	132	.000	0	0	232
103	45	131	.000	0	0	233
104	44	130	.000	0	0	234
105	43	129	.000	0	0	235
106	42	128	.000	0	0	236
107	41	127	.000	0	0	237
108	40	126	.000	0	0	238
109	39	125	.000	0	0	239
110	38	124	.000	0	0	240
111	37	123	.000	0	0	241
112	36	122	.000	0	0	242
113	35	121	.000	0	0	243
114	34	120	.000	0	0	244
115	33	119	.000	0	0	245
116	32	118	.000	0	0	246
117	31	117	.000	0	0	247
118	30	116	.000	0	0	248
119	29	115	.000	0	0	249
120	28	114	.000	0	0	250
121	27	113	.000	0	0	251
122	26	112	.000	0	0	252
123	25	111	.000	0	0	253
124	24	110	.000	0	0	254
125	23	109	.000	0	0	255
126	22	108	.000	0	0	256
127	21	107	.000	0	0	257
128	20	106	.000	0	0	258
129	19	105	.000	0	0	259
130	18	104	.000	0	0	260
131	17	103	.000	0	0	261
132	16	102	.000	0	0	262
133	15	101	.000	0	0	263
134	14	100	.000	0	0	264
135	13	99	.000	0	0	265
136	12	98	.000	0	0	266
137	11	97	.000	0	0	267
138	10	96	.000	0	0	268
139	9	95	.000	0	0	269
140	8	94	.000	0	0	270
141	7	93	.000	0	0	271
142	6	92	.000	0	0	272
143	5	91	.000	0	0	273
144	4	90	.000	0	0	274
145	3	89	.000	0	0	275
146	2	88	.000	0	0	276
147	1	87	.000	0	0	277
148	1	86	.000	0	0	278
149	1	85	.000	0	0	279
150	1	84	.000	0	0	280
151	1	83	.000	0	0	281
152	1	82	.000	0	0	282
153	1	81	.000	0	0	283
154	1	80	.000	0	0	284
155	1	79	.000	0	0	285
156	1	78	.000	0	0	286
157	1	77	.000	0	0	287
158	1	76	.000	0	0	288
159	1	75	.000	0	0	289
160	1	74	.000	0	0	290
161	1	73	.000	0	0	291
162	1	72	.000	0	0	292
163	1	71	.000	0	0	293
164	1	70	.000	0	0	294
165	1	69	.000	0	0	295
166	1	68	.000	0	0	296
167	1	67	.000	0	0	297
168	1	66	.000	0	0	298
169	1	65	.000	0	0	299
170	1	64	.000	0	0	300
171	1	63	.000	0	0	301
172	1	62	.000	0	0	302
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215	1	19	.000	0	0	345
216	1	18	.000	0	0	346
217	1	17	.000	0	0	347
218	1	16	.000	0	0	348
219	1	15	.000	0	0	349
220	1	14	.000	0	0	350
221	1	13	.000	0	0	