

I. Articles

Survival of the Fittest: Why Terrorist Groups Endure

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Abstract

Why do terrorist groups endure? This question is relevant to scholars and policy makers alike. In the past, this issue has not been addressed in a systematic fashion. Recent work investigates this question using data on transnational groups and finds that factors associated with the home country can influence the group's endurance. Applying the theory of outbidding to terrorist group survival, we argue that strategic competition among groups predicts group duration. Using the Global Terrorism Database, we develop a dataset using the terrorist group as the unit of analysis to model the duration of group activity and thus include the largest sample of groups yet. Controlling for previous explanations of both group duration and terrorism, we find a robust effect for the impact that group competition has on terrorist group survival.

Keywords: *Organisations, decision-making, quantitative analysis*

Introduction

Why do some terrorist groups endure? While this question is certain to interest policymakers and scholars, it has received little systematic investigation. Several scholars [1] have investigated why terror groups end, usually focusing on specific actions by the state or by organisational dynamics and decline. These studies have either only examined groups that end [2] or do not provide systematic investigation of the topic [3][4]. Asking why terror groups endure relates to understanding the environment that is conducive to groups that use terrorism. In short, we seek to understand why some groups who use terrorism survive for 40 years while others last fewer than 40 days.

Recent work demonstrates that the capabilities of the organisations [5] and the states in which they operate [6] explain why some groups endure longer than others. We apply the theory of outbidding [7] to this question and argue that the strategic environment for groups affects their survival. In short, both the numbers of competitors and where the group is in the food chain influences its likelihood of survival. Finally, we identify some alternative explanations for terrorist group survival relating to the regime characteristics of the state and its societal factors. Following this discussion, we define terrorism and what constitutes a terrorist group. We then explain how we conceptualize group survival. Next, we discuss the research design issues associated with modeling group survival and describe the data used. After explaining data and methods, we then discuss the results of the statistical analysis. In the conclusion, we discuss some of the limitations of this particular approach to understanding terrorist group survival and suggest some avenues for further research.

Why Some Groups Survive While Others Do Not

Most, if not all terrorist groups end, yet we do not fully understand why. Previous work on this question has been limited to case comparisons [8] or theoretical discussions without empirical tests.[9] As Cronin [10] claims, “[t]he question of how terrorist groups decline is insufficiently studied, and the available research is virtually untapped.” Previous attempts to explain terror group survival and decline have focused on strategic

choices made by governments and groups. These studies generally are single cases that fail to make large comparisons.[11] Using a cross-sectional database of 457 groups, Cronin argues that groups end because of negotiations, decapitation, internal organisational issues, success, a reduction in popular support, state repression, or a transition into other forms of violence.[12] While these factors contribute to the end of terror campaigns, we know less about the underlying conditions or environments that promote or inhibit group survival.[13]

Recent work provides systematic evidence for why groups fail. Blomberg et al. explain some of the variation in *transnational* group survival by examining the environment in which the group operates.[14] They find that a gap exists between young and old organisations where young groups are the most likely to fail (what they term *one-hit wonders*). They also find that socioeconomic conditions in the state can influence the duration of the group. Groups in Sub-Saharan Africa, for example, are likely to outlive groups in North America. Populous states encourage the lifespan of the group, and increases in GDP increase the lifespan of the group. They have the most comprehensive data on transnational groups (1,414 from 1968 to 2007).

Blomberg et al. use a more constrained set of groups (367, 1970-2007) to evaluate the impact that tactics, group size, ideology, region of operation, and base-country characteristics have on duration. [15] They find that larger, religious groups that diversify their tactics and are based in the Middle East or North Africa survive the longest. Democratic institutions also positively influence group survival. To gain information on ideology and group size, they use data from Jones and Libicki that limits their sample size.[16] These two studies, however, provide a baseline of both theory and evidence to suggest that the characteristics the groups and the states in which they operate influence their survival. Fortna, using an extensive database of insurgent groups, finds civilian targeting or terrorism prolongs the conflict but that the tactic is ultimately counterproductive.[17] Abrahms, like Fortna, suggests that terrorism is often self-defeating but does not investigate characteristics of the group or environment to explain the variation in the longevity of groups. [18] Building on this work, we offer an important characteristic that influences longevity: competition among groups.[19]

Outbidding and Group Survival

It is fairly uncontroversial to state that violent groups are affected by the competitive environment in which they operate.[20] Outbidding, or the use of increased violence to attract support from a domestic constituency, occurs where “groups try to distinguish themselves from one another.”[21] Bloom [22] argues that violence is a way to “gain credibility and win the public relations campaign.”[23] While a competitive environment may encourage terrorism, it also likely dampens group survival as other organisations drain the pool of potential recruits. Thus, similar to interest groups operating in competitive environments, some will succeed and some will fail.[24] Where there are a limited number of groups, these organisations are expected to live longer.[25]

In contrast, interest groups that experience heavy competition, using Darwinian terms, have a higher probability of being selected out. [26] Similarly, terror groups that are competing for support from populations will survive longer in a state with fewer competing violent organisations. Kydd and Walter claim that, “outbidding should occur when multiple groups are competing for the allegiance of a similar demographic base of support.”[27] Cronin concurs and argues that, “[g]roups may...decline because they lose a competition for members or support with other groups.”[28] This competition should drive groups out of the environment and lead to shorter life spans. As Bloom argues about the role of suicide bombing in competitive environments, “[a]lthough each bombing episode sacrifices one supporter, it recruits many

more.”[29]

Bloom’s theory is focused on how intergroup competition influences the probability of suicide terrorism. [30] We extend a more general logic of outbidding to terrorist group survival. For example, Bloom suggests that the Popular Front for the Liberation of Palestine (PFLP) turned to suicide terror as a means to attract supporters.[31] During the second Intifada, Hamas and other more violent organisations successfully attracted more supporters threatening the PFLP’s survival. Similar to Blomberg et al., diversifying their tactics, attracted more supporters and thus kept the organisation alive.[32] The outbidding theory has a longer history in the ethnic violence/politics tradition.[33] Others scholars, such as Kaufman [34], have applied the theory to civil conflict. In this formulation elites mobilize civilians by appealing to more extreme demands/tactics vis-à-vis their rivals and other ethnic groups.[35] Whether the goal is to mobilize co-ethnics, civilian supporters, anger towards another group, outbidding is a potential tool to separate a group from its competitors. As Brubaker and Laitin suggest outbidding can easily lead to violence and is a powerful mechanism “and a general one, not confined to *ethnic* outbidding.”[36] In sum, the goal of outbidding is to attract supporters from a limited constituency of supporters. As the number of groups increase, the less likely any group is to survive.

From this discussion, we can derive the following hypothesis:

Outbidding Hypothesis: Terror groups that operate in a more competitive environment are more likely to fail.

As the discussion above suggests, outbidding as an explanation for group survival is a natural extension of previous arguments. Additionally, arguments from organisational theory can also add some refined expectations concerning how certain kinds of groups are more likely to fail than others.

Regardless of the nature of the organisation, Hannan and Freeman (1989) citing Stinchcombe (1965) suggest “that organisations face a liability of newness” or that the failure rates of new groups should be higher than for established groups. New organisations are particularly vulnerable as their members are strangers or at least not properly trained or had enough time to build trust among their participants.[37] As Baum and Mezias argue in a study of hotel competition in Manhattan, if organisations are in a population are not equal competitors, a count of the number of organisations alone may not adequately measure competition among the groups.[38]

In our case, a count of terrorist organisations may not be enough to explain why certain groups fail more readily than others. Resource dependence is also another important predictor of organisational failure.[39] Larger firms and firms with greater resources are expected to survive in an industry longer and the empirical evidence confirms this claim.[40] To generate terrorist violence requires resources. If we assume that groups that are more violent, experienced and thus potentially drawing more resources have an advantage in the market, then we can differentiate these groups from less violent groups. In sum, these characteristics likely separate organisations that are new competitors with industry *Top Dogs*.

Terrorist groups similarly operate in these competitive markets with differentials in size, starting point, and resource endowments.[41] While the number may matter, we expect that being the dominant group in the market may reduce the risk of failure as compared to being newer/less dominant in the market. In Sri Lanka, for example, during the late 1980s many groups vied to represent the Tamil community in their goal to achieve an independent state from the Sinhalese majority. As Bloom highlights, the Liberation Tigers of Tamil Eelam (LTTE) systemically eliminated other competitors and by 2002 was the sole organisation bargaining with the Sri Lankan state.[42] The LTTE was advantaged over rivals as they had greater resources through local tax extraction as well as diaspora support disadvantaging competitors and increasing their

probably. Most importantly, the LTTE was the dominant non-state violent actor in the Sri Lankan conflict during this period. Despite this advantage, the LTTE was dealt a near fatal blow in 2009 after decades of fighting. However, according to the GTD, the LTTE might have perpetrated at least two attacks since then. As the research on organisations and this vignette suggest,

Top Dog Hypothesis: Top Dog Terrorist organisations are less likely to fail than their competitors.

In addition to this linear hypothesis, based on the above discussion, we also expect that Top Dogs are less likely to fail as they experience more competition. As the number of groups increases, we expect that Top Dogs are less likely to fail as compared to their competitors.

In the Palestinian market for violent organisations, Hamas or the PLO may be the Top Dog depending on the year. Their probability of survival may actually increase as the number of competitors increases. Smaller groups, such as Jund al-Sham or the Popular Front for the Liberation of Palestine, will be more likely to fail as the number of groups increases. As Blomberg et al. show, terrorist groups, like businesses, often fail in their first year.[43] Assuming that, on average, as the number of groups increase the power differential between any one of these groups and the Top Dog increases, we should expect the Top Dog to persist even longer. These less active groups likely suffer from what Aldrich and Auster call *the liability of smallness*, which often correlates with the *liability of newness*. [44] Holding newness constant, the liability of smallness suggests that groups will be more likely to fail when they lack resources.[45] If resources can be proxied by more frequent attacks, we should expect that this liability of smallness will make groups with less resources more susceptible to competition than the Top Dogs.

Interactive Hypothesis: As the number of terrorist groups increase, the less likely Top Dogs are to fail as compared to other groups.

Alternative Explanations

Democracy has held a prominent place in the discussion of terrorism beginning with Wilkinson [46] and has been a correlate of cross-national terrorism, albeit with mixed results.[47] The regime and institutional characteristics where the group operates may also affect likelihood of group survival.[48] Since democratic societies offer institutional recourse for aggrieved individuals, people have formal mechanisms for resolving their anger towards the state. This suggests that terror groups in democracies should be short-lived. While Eubank and Weinberg find that democracies generate more groups, this does not necessarily translate to more attacks.[49] The Peruvian group *Sendero Luminoso* (The Shining Path), operated in an environment with relatively few competitor groups and generated a huge number of attacks. As Li suggests, the effects that democracy has on terror can be contradictory.[50] Civil liberties and democratic participation may encourage groups to organise and generate terror, but a lack of executive constraints may allow states to pursue the requisite counterterror policies to end a group. Aside from these various regime explanations, other societal and contextual factors could influence group survival and trump capability-related explanations. We briefly discuss some of these in the research design section.

To date, one of the most comprehensive studies of how terror groups end and what states do to encourage this process is a study from the Rand Corporation.[51] Jones and Libicki amass a database of over 600 groups and examine the descriptive statistics to explain why some groups end and others do not. While this study moves beyond case analysis or comparison, they fall short of estimating regression models to control for alternative arguments.[52] Jones and Libicki identify eight ways that terrorist groups can end including: the group achieves its goals, it experiences partial success, state repression destroys the group, the group burns

out, the leadership is killed or imprisoned, there is a generational transition, the group loses popular support, or new alternatives for the group emerge.[53] While their arguments may explain why terrorism ended today and not yesterday, the current study is concerned with understanding the underlying country-level causes that extends a terrorist group's survival or facilitates its failure. Thus, we are interested in assessing what factors affect the longevity of the terrorist organisation's life span. To accomplish this task, we amass a large collection of groups from a more comprehensive dataset and estimate the factors that relate to their years of survival. As discussed above, to our knowledge only a few studies attempt to use a similar approach; these have focused, however, only on the transnational organisations found in ITERATE.[54] By limiting their group analysis to only transnational attacks, they capture only part of the picture. In short, the divide between domestic and transnational terrorism may be less important as interactions become more global. In order to better understand the life spans of all terrorist organisations, the data source should include attacks by organisations regardless of whether they only attack within one country or whether they attack across national borders. In the next section, we discuss how to define and operationalize terrorism, terrorist groups, and terror group survival.

Defining Terrorism, Terror Groups, and Survival

Defining terrorism has been an area of heated debate. As Schmid and Jongman noted, the “search for an adequate definition is still on,” yet “consensus on an adequate social science definition of terrorism...is still lacking, we are...somewhat closer to solutions than we were some years ago.”[55] After their careful examination of over 100 definitions, Schmid and Jongman came up with a definition that included many moving parts.[56] This type of definition, or what Munck and Verkuilen call a *maximalist definition*, includes too many elements, which could be difficult to empirically measure.[57] Further, the definition potentially confuses how these elements then relate to other concepts. For example, over 15% of the definitions that Schmid and Jongman survey include *the innocence of victims* as an important element of terrorism. [58] This element would likely lead to the exclusion of any attack on the military as a terrorist act, such as the bombing of the Marine barracks in Lebanon in 1983 or the 2000 attack on the *USS Cole*. While we recognize the importance of reducing the definition of terrorism to exclude elements that obfuscate the relationship between terrorism and other concepts in the world (i.e., democracy, economic development, and counterterrorism), a *minimalist definition* is also problematic. A minimalist definition will have more empirical referents, but will also fail to distinguish unlike events, such as terrorism and insurgency or terrorism and genocide.[59] By incorporating into the definition an element that requires the target of the violence to be different from its intended audience, then terrorist events can be separated from genocides and insurgencies.[60] This effort is especially important if we believe that these forms of conflict have different causal mechanisms.

Recent research suggests using different operational definitions of terrorism to explore how sensitive empirical inferences are to definitional specifications.[61] Thus far, analyses that use various definitional components of the Global Terrorism Database (GTD) find that the effects of key indicators on terrorism are robust to its different operational definitions.[62] The GTD includes incidents that meet all of the following three conditions:

1. ***The incident must be intentional*** – the result of a conscious calculation on the part of a perpetrator.
2. ***The incident must entail some level of violence or threat of violence*** – including property violence, as well as violence against people.
3. ***The perpetrators of the incidents must be sub-national actors.*** This database does not include acts of

state terrorism.[63]

In addition, the incidents must fit at least 2 of the following three criteria:

Criterion 1: The act must be aimed at attaining a political, economic, religious, or social goal. In terms of economic goals, the exclusive pursuit of profit does not satisfy this criterion. It must involve the pursuit of more profound, systemic economic change.

Criterion 2: There must be evidence of an intention to coerce, intimidate, or convey some other message to a larger audience (or audiences) than the immediate victims. It is the act taken as a totality that is considered, irrespective if every individual involved in carrying out the act was aware of this intention. As long as any of the planners or decision-makers behind the attack intended to coerce, intimidate or publicize, the intentionality criterion is met.

Criterion 3: The action must be outside the context of legitimate warfare activities. That is, the act must be outside the parameters permitted by international humanitarian law (particularly the prohibition against deliberately targeting civilians or non combatants).[64]

By using explicit criteria scholars using the GTD are able to filter the events by adding or subtracting these criteria. For the purposes of this study we need an operational definition that can identify relevant acts, can relate these acts to other important concepts related to terrorism, and is consistent with some identifiable portion of the GTD. For this study we define terrorism as *the intentional threat or use of violence by sub-national actors for a political goal intended to convey a message to a larger audience than the victims of the violence*. [65] This definition is consistent with the GTD, as Criterion 1 suggests that terrorism is used to fulfill a political, religious, social, or economic goal. Consistent with Hoffman [66], we chose to only add “political” to our definition as “terrorism...is fundamentally and inherently political...[it] is...about power: the pursuit of power, the acquisition of power, and the use of power to achieve political change.” Economic interests, religious beliefs, or social change may motivate a group to act together, but their goals are inherently coercive to change another individual or group’s behaviour and are thus *political*. The final important portion of our definition relates to differentiating the audience of violence from the victim. In other words, the people who are killed are not the audience for the violence. This audience is often a larger population, a government, or some other third party. Distinguishing between these groups helps differentiate terrorism from genocide (where the victim and audience are the same) and other forms of political violence.

A terrorist organisation is then defined as a group that uses terrorism as described above. While this statement has face validity, it leads to some difficult questions. Are all organisations that use terror, *terrorist groups*? If a group only uses one act of terror and uses nonviolent means in 99% of its other interactions, should it be labeled a terrorist group? Since we are trying to identify why terrorist groups (and thus acts of terror) persist or decline, we need to label any group who uses this act as a *terrorist group*. When they stop using this tactic, then they are no longer coded as a terrorist group. Using data on terrorist groups from the GTD [67], we created a database of terror organisations. By using terrorist attacks as a way to establish which groups are terror groups, we avoid subjectively labeling groups as *terrorist* and focus instead on their actions. Groups that use terror thus are considered terrorist organisations. As long as they use this act, the group maintains this label. When the group desists, it no longer fits the criteria. This is consistent with the way scholars who study the reasons why groups deliberately target civilians instead of using some other strategy of resistance, think about the issue. It is also consistent with the concerns of most governments that face terror campaigns: they want to understand what makes terrorism end. In sum, terrorist group survival is conceptualized as the time between a group’s first attack and its last attack. Some operational issues remain

and will be discussed in the Research Design section. We now turn to a discussion of the data and research design.

Data

Terrorist Organisations. The GTD chronicles terrorist incidents across the globe from 1970 through 2010 using media reports and other open sources.[68] When the source attributes an attack to a specific perpetrator, the name is also recorded in the GTD. Over half of the attacks in the GTD (50.3%) were attributed to at least one specific perpetrator.[69] In order to construct this dataset, we combined attacks that were attributed to the same organisation to determine its “start” date and its “end” date. We recognize that this measure of the organisation’s life span is only a proxy because organisations might have attacked outside of our documented span without being attributed to the attack.[70] Dugan outlines other sources of error when creating an organisational database from the GTD or any other terrorist event database that relies on open sources.[71] In short, our measure of span represents the lower bound estimate of the true span. Furthermore, these spans can also be considered the best measure of the organisation’s visible life span. Since groups who use this form of violence are trying to change a policy, influence a public, or compel a government, claiming credit or ensuring attribution of credit is necessary. In fact, Rapoport suggests that this issue of taking credit for violent acts is one of the primary differences between terror groups and criminal organisations.[72]

The temporal domain of this study is 1970 to 2010. The unit of analysis is the group-year, although the individual groups play an important role in this research. We initially include all 2,223 groups that committed terror acts during this period as recorded by the GTD.[73] Each group is assigned to the country in which it most often perpetrated attacks over its entire lifespan. By pairing up each organisation with one country, we assume that this country is the organisation’s *primary country*. Consequently each country has a set of terrorist organisations that primarily operated within its borders over its lifespan. We refer to these organisations as the country’s *primary groups*. This pairing of primary groups with primary countries is key for operationalizing the competitive environment for each terrorist organisation in order to test all three hypotheses. We acknowledge that the primary country of operation might not be the base of operations for every group, but it is an objective measure based on group behaviour rather than unconfirmed sources. Finally, by linking the organisation to a primary country, we are also able to use as covariates measures of that country’s capabilities. However, because we were unable to find measures for all countries, the final number of groups is reduced to 2,051.[74] Although missing data affects a little less than 8% of the cases, the sample is still substantially larger than any another study on terrorist groups. As previously mentioned, Jones and Libicki identify 648 groups from 1968 to 2006, but only analyze the 268 that they code as ending.[75] Blomberg et al. [76] rely on groups identified in the ITERATE dataset to assess the durability of transnational terrorist organisations from 1968 to 2007. While they have considerably more data than Jones and Libicki [77] with 1,414 groups, this is still fewer than the number of groups from the GTD.[78] Furthermore, because the ITERATE groups could still be attacking domestically after they cease transnational attacks, by excluding these attacks, the dependent variable in the Blomberg et al. study is likely vulnerable to measurement error. [79] In fact, a recent study that examines the activity of the 53 most threatening (to the U.S) international organisations found that more than 90% of their attacks against non-U.S. entities were in their home country [80], suggesting that a terrorist organisation’s activity is severely truncated when we only observe their transnational attacks. In the current research, we use about 600 more groups than those found in the ITERATE data. Further, the number of incidents perpetrated by these groups is considerably larger, as they include both domestic and transnational attacks. As LaFree and Dugan explain, about seven out of every

eight terror attacks are domestic in nature.[81]

Because the unit of analysis is the group-year, the total possible number of observations is 6,710, based on number of groups and number of years active. However, once we include the country-level measures to the dataset, the sample size drops to 6,087. Supplemental analysis is conducted on the original observations and without the country-controls and findings are substantively the same.[82]

Failure. The dependent variable is a dichotomous measure that is coded as one if the group stopped operating after the current year, and zero otherwise.

The independent variables fall under the categories of competitive environment, group capabilities, state capabilities, and control variables. Measures of competitive environment and group capabilities come from the GTD.

Competitive Environment. To test the *Outbidding Hypothesis*, we calculate from the GTD the total number of primary terrorist groups that operated in an organisation's primary country in a given year (*Number of Groups*). This value includes the current organisation that may or may not have perpetrated an attack in its primary country for each year it operated. In order to test the *Top Dog Hypothesis*, we include in the model an indicator of whether the terrorist organisation was the most active primary group its primary country during the current year. This variable was constructed by first examining the frequencies of attacks by all primary organisations for each country for each year. The organisations that perpetrated the most attacks in their primary country in a given year are marked as *Top Dog*. When two or more groups equally perpetrate the most attacks, all are marked as *Top Dog*. Finally, to test the *Interactive Hypothesis*, we include in a second model the interaction between *Top Dog* and *Number of Groups* (*Top Dog* × *Number of Groups*).

Group Capabilities. We also include measures that proxy alternative explanations of group survival from previous research. To control for and proxy a group's capabilities, we use two variables that were measured during the first 365 days beginning with the group's first attack.[83] First, we created a dichotomous measure of whether a group ever used multiple modalities of terrorism. The measure is coded a 1 if the group has ever done any combination of the following: bombings, assassinations, hijackings, kidnappings, armed assaults, facility attacks, and hostage-taking during its first year (*Multiple-Modality*).[84] Groups that used only one tactic are marked as zero. We expect that groups that have more flexibility to operate differently across attacks are likely to be more capable and to survive longer. We created a second variable that captures group capabilities that measures whether the group perpetrated attacks in more than one country (*Transnational*). This dichotomous measure is coded as 1 if a group attacked in more than one country during their first year of operation and zero otherwise.[85]

State Capabilities. Because the capability of the state to control and even dismantle terrorist organisations might influence the competitive environment and a group's capacity for survival, we include three measures of state capabilities in the current analysis. Measures of population and gross domestic product come from the Penn World Table [86], and geological terrain comes from research by Fearon and Laitin. [87] These variables are measured during each year of the analysis, unless they are time invariant. We use a measure of state capability that is often used in studies of civil war onset and duration, GDP. In terrorism research, GDP is generally used as a proxy for the level of development in society (*Development*).[88] GDP is measured in hundreds of thousands of dollars so that the odds ratio will be easier to interpret. Since another potential measure of state capabilities, the Correlates of War state material capabilities index, leads to an increased number of missing observations, we exclude it from our primary estimations. We discuss this variable in greater detail in the appendix. The population of a state (*Population*) might also influence its capabilities and

thus the survival of a terrorist group.[89] We include a logged measure of population from the Penn World Tables.[90] The final measure that proxies state capabilities is the percent mountainous terrain in a country (*Mountains*).[91] In civil war research, this is argued to increase the likelihood that rebels can hide from the state and thus survive.

Control Variables. Several control variables are also included in the analysis. Political measures come from the Polity IV Data Project.[92] Ethnic and religious measures come from research by Fearon and Laitin.[93] [94] In the online appendix, we list the specific variables and their original source. To investigate the effects democracy might have on a group's lifespan, we use a set of covariates related to regime characteristics and institutions. We use the Polity 2 score as a measure of the level of democracy in a state. The Polity 2 score (*Democracy*) is created by subtracting the authoritarian score from a general democracy score that results in a measure ranging from -10 (strongly authoritarian) to +10 (strongly democratic). As previous research suggests [95], different aspects of democracy might encourage or discourage terrorist group acts and survival. Democracy has had an inconsistent effect on survival with some evidence that under specific conditions it might encourage group longevity. We also control for the age of the current regime in power in a given state (*Age of Regime*). Fully consolidated regimes may invite less violent contestation than regimes that are new and have not established regularized means of political participation. On the other hand, regimes that are older are more consolidated which suggests that dissidents who oppose the current order are weak vis-à-vis the state and thus more likely to use terrorism as opposed to some other violent strategy. It may be that the older the regime, the more likely groups will challenge it with terrorism.

We also control for other factors that might correlate with our independent variables and the time to group failure. Ethnic fractionalization or more ethnic groups in society could explain the prevalence of terrorist groups and how long they survive. To control for this possibility we use a measure of the probability that two people randomly chosen from society will be from different ethnic groups (*Ethnic Fractionalization*). A similar logic applies to religious heterogeneity. To proxy for this concept, we use a measure of the probability that two people randomly chosen from society will be from different religious groups (*Religious Fractionalization*).[96] Some observers claim that certainly terrorism and possibly group survival might be a function of religious belief, especially the desire to build a global caliphate by adherents of radical Salafi Islam.[97] Religion can bind a group together and make the members see their struggle as a cosmic battle between good and evil.[98] We also use a measure of the percent of Muslims (*% Muslim*) in society to proxy the effect that this might have on terrorist group survival.[99] Some might argue that the end of the Cold War ushered a new era of conflict.[100] To control for this, we include a dummy variable (*Cold War*) for whether groups survived longer during the Cold War than in the period after this era.

We also include control variables for four of the five major regions of the world, *Europe, Africa, Asia, and America*. The reference region is the Middle East. Finally, in order to model the time dependence, we include three measures of number of years the group has been in the data (*Life Years, Life Years², and Life Years³*). A simple count of these years would assume a linear hazard. A squared version would assume a quadratic relationship. Inclusion of the cubic term allows us to capture temporal dependence similar to common parametric survival models as well as semi-parametric models like the Cox Model.[101]

Methods

We begin the analysis by estimating the baseline survival rates for terrorist groups through event history modeling.[102] This technique allows the analyst to estimate the time to failure or the time until a particular event of interest. In biomedical research, the event of interest may be the death of a patient after some

treatment. In the study of war, the event of interest may be the beginning of the war. In our case, it is the number of years until the group stops perpetrating terrorist attacks. We present the baseline survival rates for all organisations using the nonparametric Kaplan-Meier estimator of the survival function.

In order to test all three primary hypotheses (outbidding, top dog, and interactive) and the alternative explanations, we add to the model measures of competition, group capability, state capability, and controls. Because the data are constructed by year for each organisation, discrete-time survival analysis is conducted using stacked logistic regression models that estimate the effect of the independent variables on the probability that the group will fail before the end of the year (i.e., it will not attack again after the current year). The following model is run:

$$P(\text{Fail}_t=1) = \beta_0 + \beta_1 \text{CompEnv}_t + \beta_2 \text{GrCapability}_{it} + \beta_3 \text{StCapability}_t + \beta_4 \text{Controls}_t \quad (1)$$

Recall that the unit of analysis is the group-year. Thus, most of the independent variables are measured for each year of the study, and are thus denoted by the subscript t . However, some of the measures are time invariant, and are therefore constant throughout the analysis. Finally, the group capability measures are only measured during their first 365 days of operation so that longer running groups will not show higher capabilities leading to simultaneity bias.

Turning to equation 1, we recall from above that the dependent variable is a dichotomous value that equals one if the organisation stopped operating after the current year, and zero otherwise.[103] The key independent variables that we hypothesize affects the time that a group endures is a measure of the competitive environment (*CompEnv* in Equation 1). These variables include *Number of Groups*, *Top Dog*, and the interaction between the two (*Top Dog* \times *Number of Groups*) $_t$. If the *Outbidding Hypothesis* is supported, we would expect the odds ratio for *Number of Groups* $_t$ to be greater than one; and if the *Top Dog Hypothesis* is supported, we expect the *Top Dog* $_t$ odds ratio to be less than one in the model that excludes the interaction. Finally, if the *Interactive Hypothesis* is supported, we expect the odds ratio of the interaction two (*Top Dog* \times *Number of Groups*) $_t$ to be less than one.

The next set of control variables relate to the relationship between terrorist group survival (*GrCapability* $_{it}$ in equation 1) and state capabilities (*StCapability* $_t$ in equation 1). The group capabilities include *Multiple-Modality* $_{it}$ and *Transnational* $_{it}$. As both measures indicate group strength, we expect their odds ratios to be less than one. The state capabilities measures include *Development* $_p$, *Population* $_p$, and *Mountains*. As development and population are proxies for increased state capabilities, we expect their odds ratios to be greater than one (i.e., increasing the probability of group failure). Conversely, we expect the odds ratio of mountains to be less than one, increasing the chances of group survival.

Controls $_t$ include *Democracy* $_p$, *Age of Regime* $_p$, *Ethnic Fractionalization* $_p$, *Religious Fractionalization* $_p$, *Percent Muslim* $_p$, *Cold War* $_p$, *Europe*, *Africa*, *Asia*, *America*, *Life Years*, *Life Years* 2 , and *Life Years* 3 .

Results

Descriptive Statistics. Before addressing the hypotheses, we first take a look at the data to get a better sense of how groups in the GTD have operated over time. We begin by examining the patterns of attack and survival for the 2,223 terrorist organisations found in the GTD. Figure 1 shows the number of terror attacks (solid line) in the world from 1970 to 2010 and the number of groups (dashed line) who commit more than half of these acts from the GTD. Most notable is that the two trends seem to track one another relatively closely ($r = 0.78$). The deviation of these two lines shows that in the 1970s, while there were many groups, the overall number of attacks per known group was lower than in the 1980s, 90s, or late 2000s (9 to 1 versus 20

to 1). This suggests that the number of attacks is not uniform across known groups; and other factors such as the economy, the level of democracy, or the international system may influence these levels. Contrary to conventional wisdom, the high point for both number of known groups and number of attacks was the early 1990s (although attacks per group were not as high as in other periods).[104]

We see in this figure that the number of groups that attacked each year ranges from a low of 42 groups in 1972 to a high of 234 groups in 1992. This number drops again to another low in 1998 with only 80 groups attacking. The last decade in the series shows that the number of active groups ranges between 110 and 175. While the number of active groups never rises above its 1992 peak, we know that there were a total of 2,223 organisations that were attributed to attacks over this period. This means that a large portion of the groups were inactive during each year. In fact, according to Dugan [105] a majority of the groups in the GTD were only attributed to one attack; and about another 20% became inactive within their first year. However, the groups that were active for more than a year were also “responsible” for more than 93% of the attributed attacks.[106]

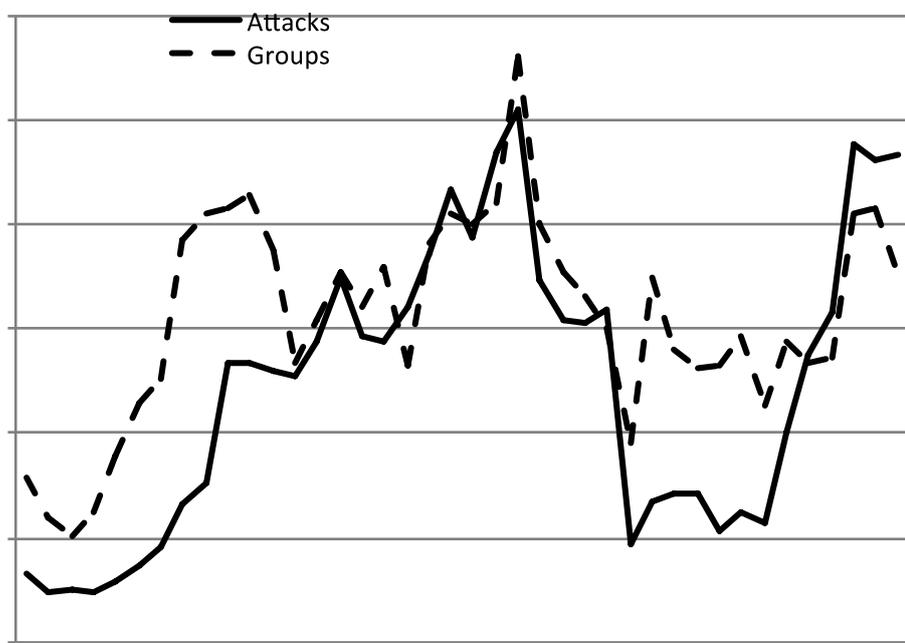


Figure 1. Number of Terror Attacks and Groups from 1970 to 2010, Global Terrorism Database

We now examine the survival patterns for the 2,223 terrorist organisations found in the GTD. On average, they operated for 3.33 years, although a vast majority (1,519 or 68%) stopped operating within their first year. This percentage is a little lower than that reported in Dugan’s research finding that 74% of the terrorist organisations between 1970 and 2007 ended within their first year.[107] This suggests that newer groups might be more likely to last longer than one year. In order to get a better sense of the survival patterns of these terrorist organisations, we estimate the baseline survival rate with the Kaplan-Meier survival function of all 2,223 organisations between 1970 and 2010 shown in Figure 2. Also included in that figure is the number of surviving organisations at zero, ten, twenty, thirty, and forty years (i.e, number at risk). By using the nonparametric Kaplan-Meier estimator of the survival function for the terrorist group data, we can evaluate the probability of surviving conditional on surviving until the current year. As Figure 2 shows, only about 30% of the groups survive past the first year. This leads to the same conclusion that about 70% (or 68%) of the terrorist organisations stop operating within a year of their first attack.[108] After five years, only about

20% of the groups are expected to survive.[109]

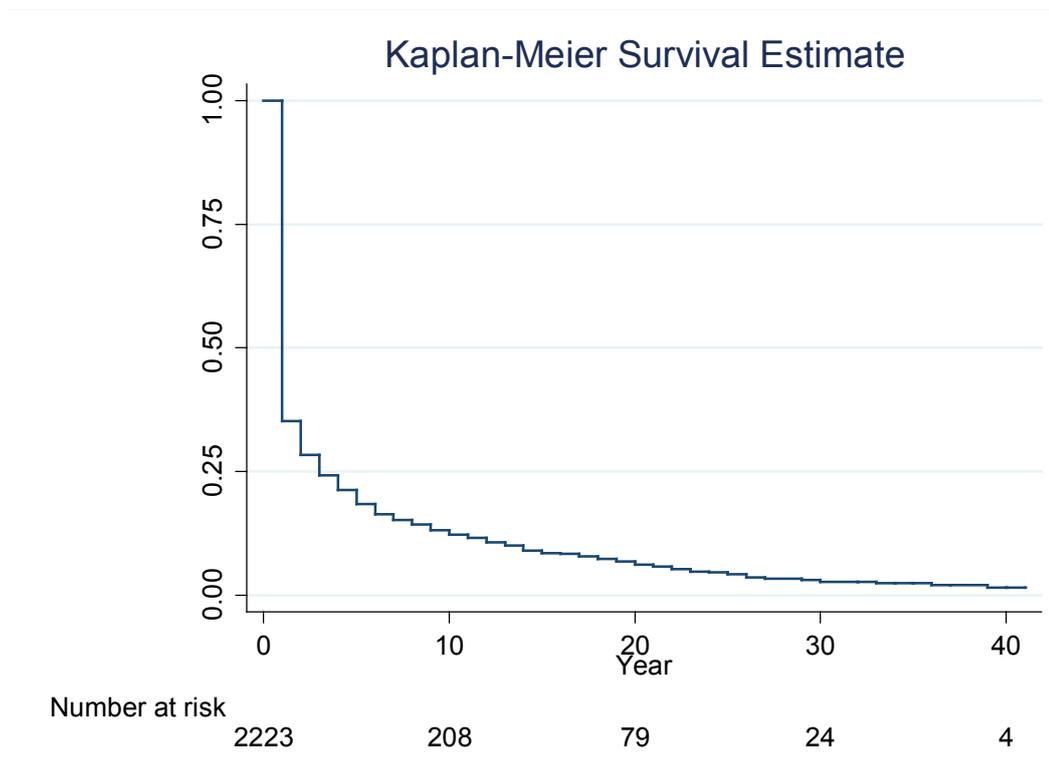


Figure 2. Kaplan-Meier Survival Function for 2,223 Terrorist Organisations, 1970-2010

We turn now to the descriptive statistics for the groups-by-year data presented in Table 1. Because we only include the group-years for those values that are in the final model, the sample size is 6,099 for all variables. Turning first to the dependent variable (failure), we see that in a little more than 30% of the group-years, the organisation becomes inactive by the following year. When we examine the competitive environment, we see that on average a terrorist organisation has about 10 active primary organisations in its primary country (including itself). The wide range of this values shows that there have been as many as 76 primary competitors in a given year. A closer look at the data shows that in 1978 there were 76 active terrorist groups in Italy. Table 1 also shows that in nearly 33% of the group-years, the organisation was a top dog during that year.

Turning to the control variables, we find no surprises. A relative minority of the group-years used multiple-modalities or attacked in more than one country during their first active year. We see that GDP ranges from around \$170.90 to \$43,697.50 (recall, that it is measured in values of \$100K). The remaining summary statistics show that all values are within reasonable range.

Table 1. Descriptive Statistics of Variables in Model (n=6,087)

	Means (St. Dev.)	Minimum, Maximum
Failure	0.311 (0.463)	0, 1
<u>Competitive Environment</u>		
Number of Groups	10.557 (12.773)	1, 76
Top Dog	0.328 (0.470)	0, 1
<u>Group Capability</u>		
Multiple-Modality	0.264 (0.441)	0, 1
Transnational	0.084 (0.278)	0, 1
<u>State Capability</u>		
Development	117.830 (98.412)	1.709, 436.975
Population	10.432 (1.612)	5.515, 13.961
Mountains	2.681 (1.143)	0, 4.421
<u>Other Controls</u>		
Democracy	5.469 (5.818)	-10, 10
Age of the Regime	34.844 (45.951)	0, 200
Ethnic Fractionalization	0.357 (0.291)	0.004, 0.925
Religious Fractionalization	0.306 (0.210)	0, 0.783
% Muslim	20.019 (34.107)	0, 100
Cold War	0.449 (0.497)	0, 1
Europe	0.289 (0.453)	0, 1
Africa	0.086 (0.280)	0, 1
Asia	0.196 (0.397)	0, 1
American	0.265 (0.441)	0, 1
Life Years	4.202 (7.003)	0, 39

Survival Model Results. We now address the hypotheses with the odds ratios generated from the discrete time survival models in Table 2. Model 1 shows the findings for the main effects for the *Outbidding* and *Top Dog Hypotheses*, while Model 2 also includes an interaction between *Top Dog* and *Number of Groups* for the *Interactive Hypothesis*. Turning first to the competitive environment we see that in both models the odds ratio is above one. In Model 1, this can be interpreted that with each additional competitor, the odds of failing within the year increases by 0.006, holding all else constant. In essence, we can think of this number as the approximate increase in the probability of failure that is attributed to an increase of one additional competitor (or primary organisation). While at first glance, this might seem like a small effect, the average number of

primary groups that use terrorism in a country year is 10.6 (see Table 1). The 75th percentile for this variable is 15. That means that roughly 25% of all of the terrorist groups attack in a country in which 11 other groups are also attacking in a given year. In this case, 15 groups in one country during one year would lead to an expected decrease in the survival time of any of the groups by about 12%. At the most extreme, Italy in 1978 had over 70 groups, substantially decreasing the survival time for any one of those groups. Thus, the *Outbidding Hypothesis* is supported in these data.

Table 2. Odds Ratios and (St. Errors) for Logistic Discrete-Time Survival Models (n=6,087)

	Model 1	Model 2
Competitive Environment		
Number of Groups _t	1.006* (0.003)	1.008** (0.002)
Top Dog _t	0.536** (0.046)	0.988 (0.127)
Top Dog × Number of Groups _t		0.820** (0.037)
Group Capability		
Multiple-Modality _{ti}	0.488** (0.045)	0.504** (0.046)
Transnational _{ti}	0.493** (0.067)	0.502** (0.065)
State Capability		
Development	1.003** (0.001)	1.003** (0.001)
Population	0.898* (0.046)	0.920 (0.042)
Mountains	0.969 (0.047)	0.978 (0.043)
Other Controls		
Democracy	1.010 (0.012)	1.015 (0.011)
Age of the Regime	0.996* (0.002)	0.995** (0.002)
Ethnic Fractionalization	1.167 (0.295)	1.125 (0.263)
Religious Fractionalization	1.045 (0.255)	1.077 (0.241)
% Muslim	1.004 (0.002)	1.004 (0.002)
Cold War	1.612** (0.141)	1.596** (0.134)
Europe	1.292 (0.353)	1.223 (0.301)
Africa	1.633* (0.341)	1.469* (0.285)
Asia	1.113 (0.264)	1.069 (0.228)
Americas	1.882** (0.440)	1.822** (0.393)
Life Years	1.351** (0.069)	1.381** (0.073)
Life Years Squared	0.966** (0.005)	0.964** (0.005)
Life Years Cubed	1.001** (0.000)	1.001** (0.000)

Likelihood Ratio Chi-Squared Test Statistic for Favoring Model 2 74.21**

All tests are two-tailed, * p<0.05, ** p<0.01

Turning now to the findings for *Top Dog*, we see that when a terrorist organisation is the most active in its primary country during a given year, its probability of failure is about 0.46 lower than the other primary groups in that country. This shows support for the *Top Dog Hypothesis*. Of course, this finding leads to the question of whether Top Dog organisations do better or worse in a highly competitive environment, which is the topic of the *Interactive Hypothesis*. The results under Model 2 show that the odds ratio of the *Top Dog × Number of Groups* interaction is less than one, supporting the hypothesis. The Likelihood Ratio Test comparing Models 1 and 2 favors Model 2 (p = 0.000), showing additional support for the *Interactive Hypothesis*. While we cannot directly interpret the odds ratio for the interaction term because it needs to be combined with the odds ratio for *Number of Groups*, we instead present in Figure 3 the predicted probability of failure conditional on the number of competitors in a given year for Top Dog organisations and Not Top Dog organisations.[110] This figure shows that when competition is low, each type of group has a probability

of failing of around 0.60. However, as competition increases, the probability that a Top Dog organisation fails drops dramatically, while that probability increases for all other groups. In a way, this is consistent with the story that a hiker does not have to outrun a bear during an attack, he or she only needs to outrun the person they are with. It is possible that when governments are busy countering weaker terrorist organisations, the stronger groups are better able to safely operate.

This brings us to the findings for Group Capability. We see by the low odds ratios in both models that organisations that were using multiple tactics and/or operating across national borders during their first year are more likely to survive into the following year. In fact, their chances of failing are about half that for other organisations in the same county during the same year.

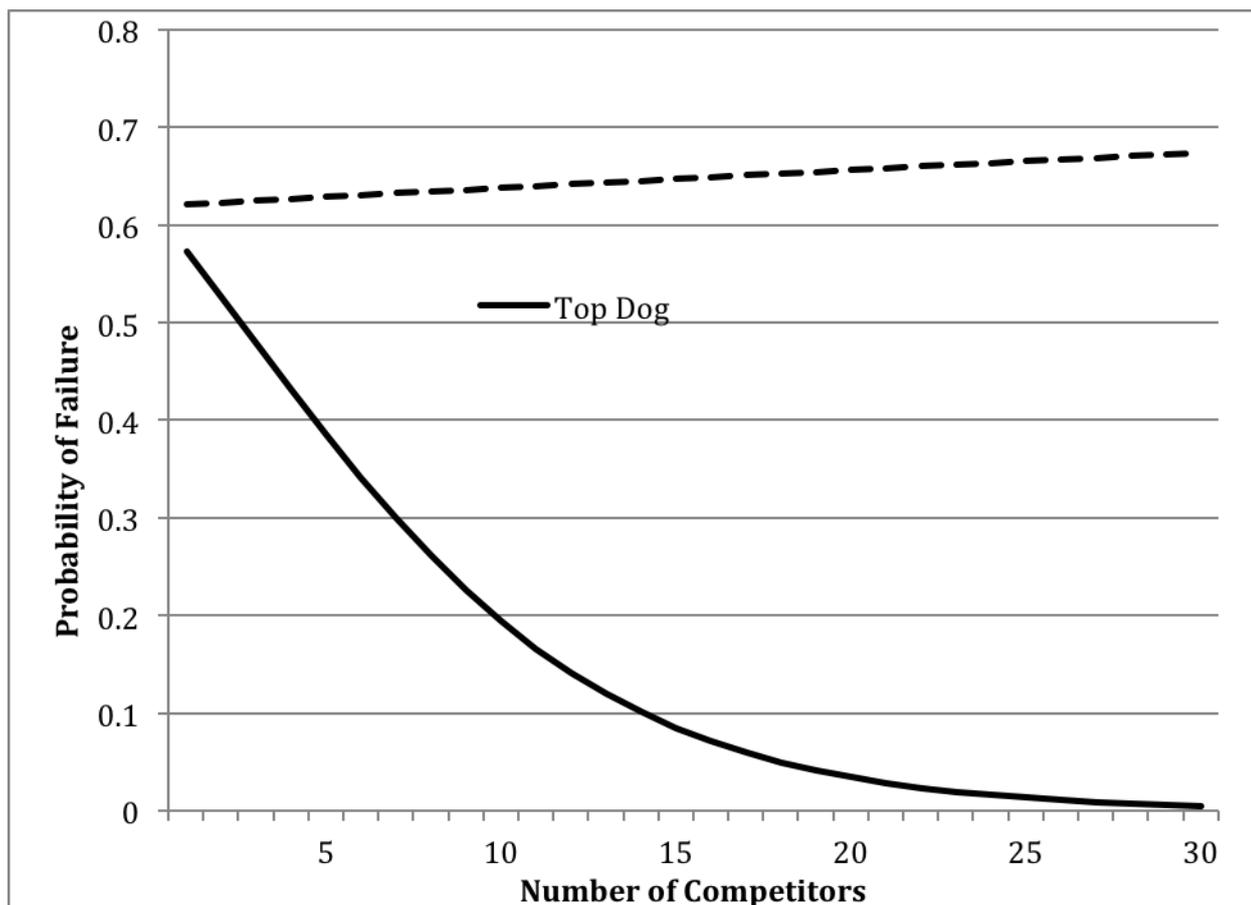


Figure 3. Probability that a Group Fails Conditional on the Number of Competitors

NOTE: All significant covariates are set at mean, insignificant covariates are excluded.

Table 2 also shows that controls that influence state capabilities from previous studies also impact survival. Increases in *Development* significantly shorten the life span of terrorist organisations (or increase their risk of failure). The estimated odds ratio shows that a one unit change in *Development*, which corresponds to an increase of \$10,000 in a country’s per capita GDP, is expected to increase the risk that a group fails by roughly 0.3%. We find weak effects for *Population* as it is only significant in the model without the interaction, and *Mountains* is insignificant.

Finally, we see that *Age of Regime*, *Cold War*, *Africa*, *America* and *Life Years* all show significant effects. First, every additional year that a regime has been in place (*Age of the Regime*) leads to an average decrease in the risk of a group ending by around 0.4%. This number seems small, but the average age of a regime in the sample is nearly 35 years with a standard deviation of 46 years. A one standard deviation increase in the *Age*

of the Regime is expected to increase the survival of a group by about 18%. Second, being involved with the *Cold War* increases the probability a group will fail by more than half. Third, the geographical indicators show that groups operating in both Asia and the Americas are more likely to fail by the following year than organisations in the Middle East. Similar to other approaches to modeling time dependence like splines, we are not interested in the significance of the life years variables. Instead, we plotted the probability of failure conditional on the average values of the independent variables at different values for the life years to examine their impact. Similar to previous work, the probability of failure is high at the beginning and then subsequently decreases until groups reach the age of approximately 30 years old. After this point, the probability of failure begins to rise. Because only a few groups that make it to this age and the recent endings of older groups, such as the New People's Army in the Philippines or the Irish Republican Army, this rise is quite large.

Conclusions

As Crenshaw suggests, “[s]ome processes of terrorism may be independent of government action.”[111] Our approach has been to identify some of these processes in a cross-national database of terrorist groups. We find consistent support for our core proposition that as the number of groups who use terrorism in a country increase, the less likely those groups will survive. Others have found an association between the strength of the state and the frequency of attacks. We also find a relationship between state capabilities and terrorist group survival using CINC and GDP. Using more indirect measures like mountainous terrain and population, the result is indeterminate. The capabilities of the group also matter. The more the group kills, uses different kinds of attacks, targets multiple states, or uses the most costly forms of attack, the more likely it will survive longer. While democracy has been associated with the frequency of terrorism events, we find little support for the relationship between democracy and terrorist group survival.[112] While democracies may be the target of more terrorism, groups facing these regimes are likely to last just as long as those facing autocratic regimes. One institutional characteristic, the age of the regime, does influence group survival. Even after controlling for these other known predictors of terrorism and terrorist group survival, the outbidding hypothesis receives unqualified empirical support.

While our approach helps to better understand how certain states encourage or discourage terrorist group survival by evaluating contextual factors like the competitive environment, there are limitations to this study. First, we do not take into account the proximate factors that might lead to the end of a terrorist group. To the extent the proximate causes and contextual factors are independent of each other, our findings should be unbiased from this omission. Instead, investigations of how certain counterterror policies increase or decrease group longevity or how certain organisational choices by groups increase or decrease their likelihood of survival should be complementary to our findings. Further, we investigated how general repression affects group survival but not at a microlevel. While repression increased survival time, it did not change any of the inferences from our other contextual variables. An analysis of these choices looking at events and actions by each group over a shorter temporal unit of aggregation such as daily, weekly or monthly is necessary to model the dynamic interaction between terrorist group and states countering terrorism. This type of research will be possible as more cross-national data is collected on both the organisational characteristics of terrorists groups [113] and the choices made by counterinsurgents.[114]

About the Authors

Joseph K. Young is an Associate Professor in the School of Public Affairs at American University in Washington DC. His research interests relate to political violence and human rights. He has published numerous peer-reviewed articles across academic disciplines, including political science, economics, criminology, and international studies. The National Science Foundation (NSF) and the National Consortium for the Study of Terrorism and Responses to Terrorism (START) have funded his research. **Laura Dugan** is an Associate Professor in the Department of Criminology and Criminal Justice at the University of Maryland. Her research examines the consequences of violence and the efficacy of violence prevention/intervention policy and practice. Dr. Dugan is a co-principal investigator for the Global Terrorism Database (GTD) and the Government Actions in Terrorist Environments (GATE) dataset. She received a Ph.D./MS in Public Policy and Management and an MS in Statistics from Carnegie Mellon University.

Notes

[1] Crenshaw, Martha. 1991. "How Terrorism Declines." *Terrorism and Political Violence* 3(1): 69-87. Cronin, Audrey Kurth. 2006. "How al-Qaida Ends: The Decline and Demise of Terrorist Groups." *International Security* 31(1): 7-48. Jones, Seth and Martin Libicki. 2008. *How Terrorism Ends*. Rand Corporation.

[2] Jones and Libicki. 2008. *How Terrorism Ends*.

[3] Cronin. 2006. "How al-Qaida Ends."

[4] Cronin, Audrey Kurth. 2009. *How Terrorism Ends*. Princeton: Princeton University Press. provides a large N comparison of groups ending, but her analysis is cross-sectional.

[5] Blomberg, S. Brock, Khusrav Gaibulloev, and Todd Sandler. 2011. "Terrorist Group Survival: Ideology, Tactics, and Base of Operations." *Public Choice* 149(3/4): 441-463

[6] Blomberg, S. Brock, Rozlyn C. Engel, and Reid Sawyer. 2010. "On the Duration and Sustainability of Transnational Terrorist Organisations." *Journal of Conflict Resolution* 54(2): 303-330

[7] Bloom, Mia. 2005. *Dying to Kill: The Allure of Suicide Terror* New York: Columbia University Press.

[8] Ross, Jeffrey Ian, and Ted Robert Gurr. 1989. "Why Terrorism Subsides: A Comparative Study of Canada and the United States." *Comparative Politics* 21(3): 405-4. See Chasdi 2002 for an empirical assessment on groups in the Middle East. Chasdi, Richard J. 2002. *Serenade of Suffering: A Portrait of Middle East Terrorism, 1968-1993*. Lexington Books.

[9] Crenshaw, Martha. 1981. "The Causes of Terrorism." *Comparative Politics* 13(4): 379-399.

[10] Cronin. 2006. "How al-Qaida Ends."

[11] While they do investigate how terror ebbs and flows rather than why it ends, Lafree, Dugan & Korte (2009) offer a case study of British counterterrorism policies in Northern Ireland. They investigate whether government interventions deterred or incited future terrorist acts and found that three interventions incited more terror (producing backlash).

[12] Cronin. 2006. "How al-Qaida Ends." and Cronin. 2009. *How Terrorism Ends*.

[13] Cronin (2006) specifically assesses why groups like Al-Qaeda may end, raising several propositions that are also amenable to empirical verification. Three years later Cronin (2009) tests some of these propositions and finds support for the notion that repression is largely counterproductive, decapitation only works against some groups, negotiations rarely work, and terrorists rarely succeed at achieving large strategic goals. Her analysis uses the now unavailable MIPT data and utilizes only 457 groups, excluding over 400 hundred short-lived groups (1 attack or 1 series of attacks) from the analysis. We do not replicate her findings as she uses data that are non-time varying. In short, she codes actions like negotiations and success but does not code what year these take place, just that they occur sometime in the lifespan of the group.

[14] Blomberg, et al. 2010. "On the Duration."

- [15] Blomberg et al. 2011. "Terrorist Group Survival"
- [16] Jones and Libicki. 2008. *How Terrorism Ends*.
- [17] Fortna, Page. 2011. "Do Terrorists Win? Rebels' Use of Terrorism and Civil War Outcomes." Working Paper, Columbia University, New York.
- [18] Abrahms, Max. "Why Terrorism Does Not Work." *International Security* 31(2): 42-78.
- [19] Andrew H. Kydd and Barbara F. Walter. "The Strategies of Terrorism," *International Security* 31, no.1 (2006): 49-80.
- [20] Bloom 2005, 95.
- [21] There is a budding literature on terrorist group cooperation that we do not directly test here. Some of it, such as work by Bacon, is qualitative case comparison. Work by Phillips suggests cooperation can be beneficial for survival and Horowitz and Potter suggests that this cooperation can be more lethal. Horowitz, Michael C., and Philip Potter. (Nd) "Allying to Kill: Terrorist Intergroup Cooperation and the Consequences for Lethality." Forthcoming in *Journal of Conflict Resolution*. Phillips, Brian J. (Nd) "Terrorist Group Cooperation and Longevity." Forthcoming in *International Studies Quarterly*. Bacon, Tricia. 2010. "Strange Bedfellows or Brothers-in-Arms: When Do Terrorist Organisations Form Alliances?." *APSA 2010 Annual Meeting Paper*.
- [22] Ibid.
- [23] Bloom (2005) mainly discusses the use of suicide terror as a tactic of outbidding. Kydd and Walter (2006), however, suggest that outbidding is a general strategy of a group that uses terror, suicide or otherwise.
- [24] Lower, David, and Virginia Gray. 1995. "The Population Ecology of Gucci Gulch, or the National Regulation of Interest Group Numbers in the American States." *American Journal of Political Science* 39(1): 1-29. While the studies are about all political interest groups, Oots as early as 1989, discussed the need for treating terrorist groups through the lens of organisational theory. Oots, Kent Layne. "Organisational Perspectives on the Formation and Disintegration of Terrorist Groups." *Studies in Conflict & Terrorism* 12(3): 139-152.
- [25] Lowery and Gray (1995) use the term *fitness*, borrowed from population ecology, to discuss the expected time to extinction for interest groups operating in a competitive environment.
- [26] Hannan, Michael T., and John Freeman. 1977. "The Population Ecology of Organisations." *American Journal of Sociology* 82(5): 929-964.
- [27] Kydd and Walter. "The Strategies of Terrorism." (2006, 77)
- [28] Cronin. 2009. *How Terrorism Ends*, 101
- [29] Bloom 2004, 85.
- [30] Bloom 2005.
- [31] Bloom 2005, 95.
- [32] Blomberg et al. 2011. "Terrorist Group Survival"
- [33] See Rabushka, Alvin and Kenneth Shepsle. 1972. *Politics in Plural Societies: A Theory of Democratic Instability*. Columbus, OH: Merrill, and Horowitz, Donald L. 1985. *Ethnic Groups in Conflict* Berkeley: University of California Press.
- [34] Kaufman, Stuart. 1996. "Spiraling to Ethnic War: Elites, Masses, and Moscow in Moldova's Civil War." *International Security* 21(2): 108-138.
- [35] Ibid.
- [36] Brubaker, Rogers, and David Laitin. 1998. "Ethnic and Nationalist Violence." *Annual Review of Sociology* 24: 423-452.
- [37] Hannan, Michael T. and John Freeman. 1989. *Organisational Ecology* Cambridge: Harvard University Press, p. 245, citing Stinchcombe 1965, p. 148-150.
- [38] Baum, Joel A. and Stephen J. Mezas. 1992. "Localized Competition and Organisational Failure in the Manhattan Hotel Industry." *Administrative Science Quarterly* 37(4): 580-604, p. 580.
- [39] Sheppard 1995
- [40] Ibid.
- [41] See Weinstein (2007) for a discussion of how these resource endowments influence the use of violence by organisations and Asal, Victor and Karl Rethemeyer. 2008. "The Nature of the Beast: Organisational Structures and the Lethality of Terrorist Attacks." *Journal of Politics* 70(2): 437-449, for how size influences terrorist

group lethality.

[42] Bloom 2005.

[43] Blomberg et al. 2011. "Terrorist Group Survival"

[44] Aldrich, Howard E. and Ellen Auster. 1986. "Even Dwarfs Started Small: Liabilities of Size and Age and Their Strategic Implications." In *Research in Organisational Behaviour*, eds. B.M. Shaw and L.L. Cummings. Greenwich, CT: JAI Press, 165-198.

[45] When discussing general organisations or businesses, these resources could be the number of people involved or the financial capital held by the company (Bruderl et al. 1992).

[46] Wilkinson, Paul. 2011. *Terrorism Versus Democracy: The Liberal State Response*. London: Taylor & Francis.

[47] Eubank, William & Leonard Weinberg. 1994. "Does Democracy Encourage Terrorism?" *Terrorism and Political Violence* 6(4): 417-443. Eubank, William & Leonard Weinberg. 1998. "Terrorism and Democracy: What Recent Events Disclose." *Terrorism and Political Violence* 10(1): 108-118. Eyerman, Joseph. 1998. "Terrorism and Democratic States: Soft Targets or Accessible Systems." *International Interactions* 24(2): 151-170. Li, Quan. 2005. "Does Democracy Promote or Reduce Transnational Terrorist Incidents?" *Journal of Conflict Resolution* 49(2): 278-297.

[48] Brooks, Risa. 2009. "Researching Democracy and Terrorism: How Political Access Affects Militant Activity." *Security Studies* 18(4): 756-788.

[49] Eubank and Weinberg. "Does Democracy Encourage Terrorism?"

[50] Li. "Does Democracy Promote or Reduce Transnational Terrorist Incidents?"

[51] They also have a much smaller sample of countries than what are available from the GTD or ITERATE datasets. Rand identifies 648 groups and Jones and Libicki (2008) utilize a sample of 268 to perform descriptive analyses. This is a classic case of selection bias as they only examine cases that failed thus selecting their cases based on the value of the dependent variable. This likely biases any inferences from their study.

[52] Jones and Libicki. 2008. *How Terrorism Ends*.

[53] Jones and Libicki. 2008. *How Terrorism Ends*, p. 259.

[54] Blomberg, et al. 2010. "On the Duration." and Blomberg et al. 2011. "Terrorist Group Survival."

[55] Alex, Schmid P., and Jongman J. Albert. 2005. *Political Terrorism*. New Brunswick: Transaction Publishers.

[56] Their definition has over 100 words and includes at least ten elements.

[57] Munck and Verkuilen, 2002.

[58] Schmid and Jongman, 2008.

[59] Munck and Verkuilen 2002, Goertz 2006.

[60] See Jenkins for a discussion of how terrorism is different from other forms of political violence, in part, because of various audiences for the violence. Jenkins, Brian 1974. "International Terrorism: A New Kind of Warfare." Rand Publication, Santa Barbara.

[61] Young, Joseph K., and Michael G. Findley. 2011. "Promise and Pitfalls of Terrorism Research." *International Studies Review* 13(3): 411-431.

[62] Whether terrorism includes only domestic/homegrown events, only foreign/transnational events, or including/excluding military does not change the inferences drawn from several studies. See Young and Findley 2011 and Young, Joseph K., and Laura Dugan. 2011. "Veto Players and Terror." *Journal of Peace Research* 48(1): 19-33.

[63] *Global Terrorism Database Codebook 3.0*. May 2009, p. 5. Accessed online at: <http://www.start.umd.edu/gtd/downloads/Codebook.pdf>

[64] Ibid.

[65] This definition excludes the state as a possible perpetrator. While states can and do use terror, the reasons they use terror are possibly distinct from the reasons substate actors pursue terror. To date no terrorism database, including the GTD, collects data on state terror, making it impossible to include it in our definition. Furthermore, state terrorism falls outside the purview of our thesis on terrorist group survival. There is some recent data on counterterror actions by states. See Chasdi, Richard J. 2010. *Counterterror Offensives for the Ghost War World: The Rudiments of Counterterrorism Policy*. Lexington Books, 2010.

[66] Hoffman, Bruce. 2006. *Inside Terrorism*. New York: Columbia University Press, p 2,

- [67] LaFree, Gary and Laura Dugan. 2007. "Introducing the Global Terrorism Database." *Terrorism and Political Violence* 19(2): 181-204
- [68] LaFree and Dugan. "Introducing the Global Terrorism Database." and LaFree, Gary and Laura Dugan. 2009. "Research on Terrorism and Countering Terrorism." *Crime and Justice* 38: 413-477.
- [69] Dugan, Laura. 2012. "The Making of the Global Terrorism Database and Its Applicability to Studying the Life Cycles of Terrorist Organisations," in D. Gadd, S. Karstedt, and S. Farrall (eds.) *Sage Handbook of Criminological Research Methods*. Newbury Park, CA: Sage Publications (forthcoming).
- [70] Ibid.
- [71] Ibid.
- [72] Rapoport, David C. 1997. "To Claim or not to Claim; that is the Question—Always!" *Terrorism and Political Violence* 9 (1): 11-17.
- [73] We excluded individual perpetrators like the Unabomber or Timothy McVeigh as the spatial unit of analysis is the group.
- [74] We are mainly missing country-year observations for GDP (182), population (566) and Polity 2 (353). Countries that lack a central government, such as Somalia or Lebanon during their civil wars, are the types of countries that are missing. Also, smaller island nations like St. Kitts lack data from Polity. Because these observations lack many of the missing covariates, imputation is quite difficult and imprecise.
- [75] Jones and Libicki. 2008. *How Terrorism Ends*.
- [76] Blomberg, et al. 2010. "On the Duration."
- [77] Jones and Libicki. 2008. *How Terrorism Ends*.
- [78] As mentioned above, because the ITERATE data only include data on transnational groups and attacks, they exclude purely domestic groups and acts. Whether these types of terrorism, domestic and transnational, have different etiologies is unclear (Enders, Walter, Khusrav Gaibullov, and Todd Sandler. 2010. "Domestic Versus Transnational Terrorism: Data, Decomposition, and Dynamics." Paper Presented at the Terrorism and Policy Conference, Dallas, Texas.). By just using transnational groups, however, the two types are being treated differently *a priori*.
- [79] Blomberg, et al. 2010. "On the Duration."
- [80] LaFree, Gary, Sue-Ming Yang and Martha Crenshaw. 2009. "Attack Patterns of Foreign Groups that have Targeted the United States, 1970-2004." *Criminology and Public Policy* 8(3): 445-73.
- [81] LaFree and Dugan. 2009. "Research on Terrorism and Countering Terrorism."
- [82] Although the main effects are insignificant in this model, the interaction between top dog and number of groups is negative and significant ($p < 0.001$). With an odds ratio of 0.86, this finding suggests that for top dog groups only, each additional competitor decreases the odds of failure by about 14 percent. A likelihood ratio test confirms that the interaction model is a better fit ($p < 0.001$).
- [83] We cannot include measures of group size or ideology as these measures exist for only a small portion of our groups. In the future, we plan to code these data. Abrahms does use a peak group size measure for the members of his more limited sample of terrorist organisations, which consists of 54 groups that make the State Department's Foreign Terrorist Organisation list. Abrahms, Max. 2012. "The Political Effectiveness of Terrorism Revisited." *Comparative Political Studies* 45(3): 366-393.
- [84] We also created two indexes of modalities to capture the flexibility of the group. For the first, we created a dummy variable for each kind of attack for each group each year then summed across the dummies, which resulted in an additive variable that ranges from 0 to 7. The second strategy incorporated a weighted index based on the difficulty associated with each kind of attack. The details are explained in the appendix. Both measures are highly correlated with the survival time of a group almost by definition. Groups with very few attacks cannot have a high index of modality. We prefer the dichotomous measure because it is less sensitive to this pitfall. Further, when we estimated models with either index, the results are similar. To also avoid potential endogeneity, we estimated a series of models with measures of *Multiple-Modalities* and *Transnational* that only take into account whether a group attacked multiple ways or multiple countries in their first year of existence. This allowed us to compare groups that last a long time and a short time based only on their behaviour in the first year. Results for these models were again quite similar.
- [85] Groups that attack once are coded as zero, which could bias this estimate away from null. Thus, in the appendix, we first included a dummy for single-attack groups; and second we estimate the models on only those groups who perpetrate more than one attack in order to confirm that our results are robust to this potential bias. The results show that the substantive findings are consistent.

- [86] Heston, Alan, Robert Summers and Bettina Aten, *Penn World Table* Version 6.3, Center for International Comparisons of Production, Income and Prices at the University of Pennsylvania, August 2009.
- [87] Fearon, James D. and David Laitin. 2003. "Ethnicity, Insurgency, and Civil War." *American Political Science Review* 97(1): 75-90.
- [88] We use GDP per capita in thousands of dollars. Blomberg et al. (2011) also interpret GDP as a proxy for an attractive state target or as a suitable environment for skilled recruits (Benmelech and Berrebi 2007).
- [89] Blomberg et al. 2011. "Terrorist Group Survival."
- [90] Heston, et al. 2009. *Penn World Table*.
- [91] This measure comes from Fearon and Laitin (2003) and is a logged percentage of terrain in a country that is mountainous. It is constant over time.
- [92] Marshall, Monty G., and Keith Jaggers. 2010. *Polity IV Data Project: Political Regime Characteristics and Transitions, 1800-2010. The Polity IV Data Set*. Found online at: <http://www.systemicpeace.org/polity/polity4.htm>
- [93] Fearon and Laitin. 2003. "Ethnicity, Insurgency, and Civil War."
- [94] Since the data on religious and ethnic fractionalization measures do not vary over time, we brought the data forward to 2010.
- [95] Li. "Does Democracy Promote or Reduce Transnational Terrorist Incidents?"
- [96] Both fractionalization measures come from Fearon and Laitin (2003).
- [97] Phares, Walid. 2005. *Future Jihad: Terrorist Strategies Against America*. New York: Palgrave Macmillan.
- [98] Juergensmeyer, Mark. 2000. *Terror in the Mind of God*. Berkeley: University of California Press.
- [99] Pape suggests that religion has nothing to do with reasons for suicide terrorism. Pape, Robert A. 2003. "The Strategic Logic of Suicide Terrorism." *American Political Science Review* 97(3): 343-361. Using a research design that compares suicide attacks to all attacks, Wade and Reiter find that percent of the country that is Muslim is correlated with more suicide attacks. While this point is not settled, we use it as a control as it remains an alternative claim. Wade, Sara Jackson, and Dan Reiter. 2007. "Does Democracy Matter? Regime Type and Suicide Terrorism." *Journal of Conflict Resolution* 51(2): 329-348.
- [100] Huntington, Samuel. 1993. "Clash of Civilizations?" *Foreign Affairs* 72(3): 22-49.
- [101] Carter and Signorino 2010.
- [102] This econometric technique is sometimes referred to as event history analysis, hazard modeling, duration analysis, or survival analysis.
- [103] We coded all groups as zeroes in 2010 as we could not confirm if they failed in that year or not. We also estimated the model without this year and the results are substantively the same.
- [104] The compilers of the GTD caution users about comparing events from the 1970 through 1997 period to those from the 1998 through 2007 period because they were collected according to different methodologies. Since the latter data were collected prospectively, they may systematically record fewer cases than the earlier data (<http://www.start.umd.edu/gtd/using-gtd/>).
- [105] Dugan. 2012. "The Making of the Global Terrorism Database."
- [106] Ibid.
- [107] Ibid.
- [108] In a separate set of analyses, we find that 50% of all groups only perpetrate one attack, which leaves 20% of the total number of groups who perpetrate multiple attacks but only within a single year.
- [109] See Dugan 2012 for a detailed description of the organisational life spans between 1970 and 2007
- [110] When constructing the probabilities for this figure, we set all insignificant values to zero. Further, all other values were set to the average values shown in Table 1. Finally, we limited the range of competitors to thirty in order to focus on the primary changes in the probability that a Top Dog organisation fails. That probability remains close to zero for larger numbers of competitors.
- [111] Crenshaw, Martha. 1991. "How Terrorism Declines," p. 72.
- [112] Chenoweth, Erica. 2010. "Democratic Competition and Terrorist Activity." *Journal of Politics* 72(1): 16-30, finds that political competition increases terrorist activity and the emergence of groups but does not examine group survival. This suggests an interesting potential set of results: Democracies create more groups; but

when there is a proliferation of groups, any of those groups is more likely to fail.

[113] Asal and Rethemeyer (2008) have some organisational data that is integrated with the groups from the RAND/MIPT data spanning from 1998 to 2005.

[114] LaFree, Gary, Laura Dugan and Raven Korte. 2009. "The Impact of British Counterterrorist Strategies on Political Violence in Northern Ireland: Comparing Deterrence and Backlash Models." *Criminology* 47(1): 17-45.