I. Articles

Terrorist Decision-Making: Insights from Economics and Political Science

by Jacob N. Shapiro

Abstract

Terrorist groups repeatedly take actions that are ultimately politically counter-productive. Sometimes these are the result of deliberate calculations that happen to be mistaken - Al-Qaeda's decision to conduct the 9/11 attacks is the most obvious example of an ultimately self-defeating operation. Sometimes they reflect the challenges groups face in controlling their operatives: Al-Qaeda in Iraq's excessive public violence against other Sunni organisations stand out. At other times they appear to steer difficult political waters quite effectively despite of deep internal divisions—Hamas is the exemplar here. This article reviews recent developments in the literature on terrorist decision-making in economics and political science. Overall, tremendous advances have been made in the last 10 years, but much work remains to be done. In particular, it is argued that the literature needs to do better at testing its theories in inferentially credible ways and at considering terrorism as one tactical option among many for opposition political groups.

Introduction

Over the last 10 years research on terrorism in the academic literature has grown massively (Young and Findley, 2011). Early on in this process McCormick (2003) laid out what the existing literature said about terrorist decision-making in terms of strategic, organisational, and psychological approaches. In his typology, strategic approaches are those that assume terrorists adapted rationally to the opportunities and constraints they face for advancing political goals, while organisational approaches begin from the premise that much terrorist decision-making is driven by internal group dynamics; psychological approaches focus mainly on the decision to become a terrorist. As the literature has developed in economics and political science, the focus has increasingly been on integrating insights from all these fields and identifying interdependencies.[1]

This piece lays out what we have learned since 2003 about terrorist decision-making. Overall, the key takeaway from this review is that terrorism is a contextual phenomenon and it thus makes sense that successful analysis of terrorist group decision-making needs to take into account a variety of contextual factors. This, in turn, means that successful research requires detailed knowledge of the group(s) in question, the persons involved in decision- making (or influencing) roles within the group, and the operating environment in which that group is situated. In cross-group quantitative work, these requirements translate into sensitivity for the statistical biases inherent in how data on terrorist groups is developed.

The remainder of this article proceeds as follows. The first section discusses the general importance of considering terrorism as one point in a spectrum of possible tactics for anti-government groups, an issue with particular bite when it comes to thinking about how groups decide to engage in terrorism in the first place, and why they stop. The second section focuses on strategic considerations by terrorist groups, the dominant strand in the literature. Given the rich evidence that terrorist groups behave strategically, this section reviews arguments about their strategic choices, and concludes by a discussion how those choices are influenced by organisational and resource constraints. The third section addresses non-strategic considerations, which enter into terrorist decision-making, including technological constraints and internal dynamics. The fourth section discusses approaches to studying terrorist decision-making, suggesting a way they can complement one another to help develop more reliable knowledge in the next decade. It concludes with some challenges to researchers.

Legal Action vs. Terrorism vs. Rebellion

A general principal that should guide future work is that terrorism is not an attribute of a group whose members have a specific psychological profile or who share a particular ideology (Laitin and Shapiro, 2007). Rather terrorism is one point on the spectrum of tactics adopted by groups seeking to change the political status quo, one chosen given a set of internal and external constraints and one whose further use is sensitive to changes in those constraints (Bueno de Mesquita, 2011). Left-wing political movements in the United States in the 1960s, for example, generated mostly peaceful political organisations (e.g. Students for a Democratic Society), relatively extreme but mostly non-violent groups (e.g. the Black Panther Party), and at least one outright terrorist group (i.e. the Weather Underground).

If this perspective is correct, it has two implications. First, counting incidents as separate observations may be the wrong way to measure the degree of terrorism in the world. Such data do not allow us to distinguish between factors leading to increases in terrorism due to substitution from traditional political activities into terrorism (or from insurgency into terrorism) from factors that predict an increase in the overall level of opposition political activity.[2] To solve that indeterminacy, data needs to be collected on terrorism as part of a family of related rebellious activities, and acknowledge that groups under changing circumstances will switch strategically among these activities.[3]

Second, more attention needs to be paid to the political opportunity structures facing rebels. Fortunately, an emerging literature is exploring such issues. Key findings so far are that dictatorships with fewer mechanisms for citizens to influence politics see more terror- ism (Aksoy et al., 2012), that groups seeking change within the existing political status quo are less likely to emerge in democracies which offer more opportunities to small parties (i.e. proportional-representation systems with small districts) than in other democracies (Aksoy and Carter, 2012), and that democracies with more veto players see higher incidence of terror (Young and Dugan, 2011) which the authors attribute to blocked opportunities for change through normal means. Overall, this literature suggests that the lack of opportunities to effect change through normal politics increase the chances that opposition groups will turn to terrorism, a finding matched by earlier qualitative work.[4]

More broadly, new empirical and theoretical work emphasizes the importance of considering various forms of political activism in a unified framework. On the empirical side, two findings stand out. First, it turns out that most terrorism occurs in the context of civil war or shortly before or after one (Findley and Young, 2012). Second, comparing violent and non-violent activists operating in the same struggle leads to important inferential gains by revealing relationships masked when considering them in isolation. In the standout paper of this type, Lee (2011) compares the backgrounds of Bengali independence activists involved in violence with those who were not. He finds that while terrorists were better educated and had higher status jobs than the population average, they were less educated and less wealthy than the nonviolent activists.

On the theoretical side, Bueno de Mesquita (2011) nicely illustrates that if rebels can endogenously choose between symmetric (insurgency and civil war) and asymmetric (terrorism) tactics, then any analysis of tactics in isolation risks making incorrect inferences about the causes of conflict and potential policies to mitigate it. The core intuition of the model is that rebels have a choice first whether to fight, and then how to fight. Different modes of contestation have different returns and those returns depend on how much of the population mobilizes to support the rebels' struggle. When only a small group will mobilize in response to rebel's political appeals, then asymmetric tactics (i.e. terrorism) yield greater benefits, but when a sufficient proportion of the population is willing to mobilize, then symmetric conflict is better for the rebels. This argument fits well with the discussions of rebel strategists themselves going back at least to the early Russian Marxist group Narodnya Volya and yields a rich set of results which can account for a range of observations about the relationship between rebellion and terrorism. In particular, the results highlight why successful counterinsurgency sometimes leads to increased terrorism [5] and why so many rebel groups in reasonably developed places begin with a terrorist vanguard, or at least try to, before shifting to more conventional insurgent tactics.[6]

Strategic Theories

The dominant strand in the literature on terrorist decision-making in economics and political science starts from the premise that terrorist groups strive to match means to ends given limited and imperfect information about the world. This assumption appears to be correct. There is now a rich body of evidence that terrorist organisations behave rationally across a range of domains. Evidence from Israel, for example, shows that they match more skilled operatives to harder targets (Benmelech and Berrebi, 2007) and that the availability of such operatives varies with economic conditions in exactly the ways one would expect if individuals became less likely to participate as their other opportunities improve (Benmelech et al., 2012). This section therefore reviews what we know about the different constraints that influence strategic decision-making by terrorist groups.

Tactical Choices and the Strategic Environment

The cleanest delineation of the relationship between terrorists' strategic environment and their choices of tactics comes from Kydd and Walter (2006) who approach the question from a bargaining theory framework. Since conflict in such a framework is *ex ante* inefficient— with

perfect information there always exists some bargain that is preferable to fighting since fighting is destructive—terrorist campaigns only make sense when there is some uncertainty, either over the other side's power, resolve, or trustworthiness. Kydd and Walter argue that how terrorists approach the struggle depends on the interaction between where the uncertainty lies and whether they are trying to persuade the enemy or their own population. They identify five strategic reasons to engage in terrorism:

1. *Attrition*. When terrorists are trying to gain favorable political changes by convincing an enemy of their power or resolve, they engage in a struggle of attrition, conducting as many attacks as possible to demonstrate their capacity and resilience.

2. *Spoiling*. When terrorists are trying to scuttle a peace process that embodies a settlement they do not like, they may use attacks to convince the enemy that the moderates on their side cannot be trusted.

3. *Intimidation*. When terrorists seek to keep their own population in line—perhaps because too many people are sharing information with government forces—they may engage in attacks against that population to reaffirm their power.

4. *Outbidding*. When a terrorist group is competing for prominence with other groups, and there is uncertainty among these groups' potential supporters about which of the several groups is a better representative of the cause, then they may engage in attacks to convince potential supporters of their resolve.

5. *Provocation*. When terrorist groups wish to convince their own population that a government cannot be trusted, they may engage in attacks designed to prompt that government to excessive action, what has long been known by terrorist strategists as the 'action-reaction cycle.'

In this typology tactical choices arise as the result of groups trying to resolve different kinds of uncertainty. These comprise a distinct set of tradeoffs involved in each strategy. Those inherent in strategies of provocation and outbidding have so far received the most attention.

On the provocation side, Bueno de Mesquita and Dickson (2007), examines the interaction between terrorists trying to provoke a government into action which reveals its perfidy to their supporting population, a government trying to minimize support for terrorists, and civilians unsure about how much the government cares about their welfare. They show that terrorists face very different strategic incentives depending on how costly it is for the government to respond in a discriminate way and on what the population at large believes about the government. Building on this insight, Carter (2012a) analyzes terrorist attacks and counter-terrorist actions in Europe from 1950-2004, offering evidence that groups with anti- system focus seek to provoke excess reaction while groups seeking to change policies within the existing political system do not. Carter's work is novel in its introduction of structural modeling into the terrorism literature, an approach that allows one to build beliefs about the strategic environment into the statistical estimators used to analyze the data.

On the outbidding side, Bloom (2004) and Jaeger et al. (2011) both provide valuable evidence. Using interviews and qualitative analysis, Bloom demonstrates how dynamics of outbidding shaped the growth of suicide bombing in Palestine and the early years of the second intifada. Jaeger et. al. combine attack data with public opinion data to study how popular opinion reacts to

militant violence. Importantly, they show that while militants do see political gains from successful attacks, those gains do not cross over tacit boundaries. When secular groups (e.g. Fatah) conduct an attack, they gain support at the expense of other secular groups, but do not garner additional adherents who formerly supported an Islamist group, and vice versa. The gains from outbidding, in other words, are constrained by pre-existing political categories.

One area of decision-making that the strategic literature has not yet studied effectively is individual and group decisions to leave terrorism. There have been excellent case studies on why individuals leave or on why specific groups stop using terrorism (Bjørgo and Horgan,

2009; Horgan, 2009), but these do not examine a systematic sample that makes identifying broad trends possible. In the most prominent recent quantitative studies on the subject, Cronin (2006) identifies nine distinct ways in which groups can end, half of which imply a coherent decision and not simply the slow attrition of the group. Cronin (2009) extends the analysis of each way groups can end but does not delve deeply into the strategic logic of those ways which are intentional. For prominent groups which made a conscious decision to end terrorism, the decision-making process is well understood because key leaders have shared their thinking with journalists and scholars (e.g. the African National Congress, Fatah, M-19, and the Provisional Irish Republican Army), but much less is known about decision making in less prominent groups. More historical research is needed here before scholars can develop broad testable theories. A good place to start would be with the histories of groups that successfully employed terrorism as part of an anti-colonial struggle, since those participants who are still alive will likely be willing to share their experiences and face no legal jeopardy for doing so.

Resource Constraints

A substantial literature in the study of rebel groups and terrorist organisations focuses on how groups' resources impact on their behavior.

Focusing on the nature of the fighters groups can attract, Weinstein (2007) argues that groups which attract opportunistic joiners will have a harder time maintaining discipline and so be more likely to abuse civilians. They will, in other words, be more likely to engage in activity that would be coded as terrorism in any of the canonical datasets. Weinstein argues that groups will tend to attract opportunistic joiners when they have access to substantial readily distributed resources, while those without such resources must rely on ideological appeals to find recruits and so get a more easily controlled set of operatives.

While his argument focuses on natural resources (e.g. conflict diamonds), an obvious analogy is that groups with access to substantial external sources of funding will attract more opportunistic individuals and so engage in more violence. Accepting foreign resources also creates additional incentives to engage in highly visible violence. As Hovil and Werker (2005) show in the context of African rebel groups, external sponsors are often ill-informed about how hard their proxies are fighting and so look for dramatic public signals of effort. This, in turn, creates incentives for groups receiving external support to engage in spectacular attacks that generate high levels of media coverage and international attention.

Turning to more obvious impacts of groups' finances, recent work has pointed out that the nature of attacks groups conduct, and thus the patterns of terrorist campaigns, must depend on the relationships between their financial capital, ongoing income, and the costs of organising different kinds of attacks (Feinstein and Kaplan, 2010). When terrorist groups have low levels of capital, there are strong reasons for them to start small, conducting attacks that can be financed with ongoing income. However, as groups develop greater resources, the risks inherent in investing in large-scale attacks become more tolerable. The key implication is that groups' finances may impact the types of attacks they conduct in subtle ways.[7]

Terrorist groups may also be constrained by their access to security resources. In particular, access to foreign sanctuary may be critical (Salehyan, 2007). As Bapat (2007) shows, terrorist groups face a tough decision in seeking foreign sanctuary because doing so enhances their chances of survival but also places them under the influence of a foreign power that may require them to alter their demands or turn on them in the future. Bapat models the strategic decisions of terrorists who take into account that tradeoff as well as the strategic incentives of the prospective host and provides initial evidence that terrorists are more likely to move to host states that have low capacity to influence their activities. More recent work, though, calls into question the basic premise that access to foreign sanctuary is an unalloyed good. Carter (2012b) shows that groups with foreign sponsors actually become more vulnerable if that sponsor provides a safe haven. He posits this is because those sponsors face strong incentives to sell out their terrorist allies when they stop being useful proxies.

Of course, a key determinant of how much security groups have is the baseline levels of support they enjoy from a population. Drawing on this insight, Berman et al. (2011) model the three-way interaction between insurgent organisations seeking to do violence, government forces seeking to suppress them with a mix of public goods provision and military action, and the population stuck in the middle which must decide whether to share information with counterinsurgents. They show that norms of non-cooperation with the government can critically impact the equilibrium of that interaction and use data from Iraq to test the model.

In an empirically-focused piece, S´anchez-Cuenca and de la Calle (2009) review evidence on the social constraints domestic terrorist groups face. They also argue that groups' cannot survive without some degree of state support and that their uses of violence in domestic terrorist campaigns are thus strongly constrained by social norms. Groups operating in societies where extreme violence is simply beyond the pale will have to be much more careful than groups with identical political goals operating in places more tolerant of violence. These arguments are surely correct and are mirrored in the internal discussions of groups, including Al-Qaeda in Iraq (AQI) whose members debated the proper ways killing their Iraqi enemies without causing the population to turn against them (Shapiro, in press).[8]

Overall, future advances in understanding the social constraints to terrorist decision-making will require far more research on the correlates of support for terrorist groups. This can be can be done well with surveys, at least in some contexts such as Pakistan (Bullock et al., 2011; Blair et al., 2012) and the Israeli-Palestinian conflict (Jaeger et al., 2011).

A promising early effort to ties insights about terrorists reliance on popular support and their decision-making together is Wood (2010) who uses data on one-sided violence in civil wars to

show that terrorists are most likely to attack civilians when they face strong government, and so need to compel compliance from their supporters, but have few financial resources with which they can buy off the population. This pattern suggests that terrorist groups make strategically rational choices about how to allocate their efforts between attacking security forces and attacking civilian targets.

Organisational Constraints

A distinct strand in the rationalist literature posits that groups face a set of constraints stemming from their organisational structure. Many of the findings in this literature come from cross-national regressions on new datasets that record organisational traits over time. Asal and Rethemeyer (2008), for example, show that organisations that are large, control territory, and have a religious ideology are more lethal. The authors, do not, however, establish how traits like whether a group controls territory or its estimated size are calculated independent of references to the group's activities. It seems likely that estimates of group size in the secondary literature are strongly influenced by assessments of what a group is doing, with analysts assuming that groups conducting more attacks must have more people.

The most subtle set of arguments in this strand stems from efforts to explain why some religiously-motivated terrorist groups are so deadly (Berman and Laitin, 2008; Berman, 2009). The basic insight is the familiar one that terrorist groups are inherently vulnerable to leaking information to government forces. Given this, if government forces will pay more for information that lets them stop attacks against more valuable targets or that do more damage (i.e. suicide attacks), then only organisations which are unusually effective at preventing people within the movement from cooperating with the government will be able to conduct such attacks. Just as religious organisations which run mutual aid networks and require sacrifices from their members turn out to be unusually good at stopping such defections in less violent settings, Berman and Laitin (2008) show that religiously motivated terrorist groups which provide services to their members are more deadly and more likely to successfully attack high value targets. Importantly, the role of religion here is not in generating greater commitment to the cause; rather, religion serves as a method of embedding potential agents in a dense network of reciprocal relationships which make it relatively more costly for them to defect by sharing information with government operatives.

A second set of arguments about organisational constraints comes from arguments about what we can think of as the organisational ecology in which groups operate. As Bloom (2004) noted, groups who must compete with one another for prominence have incentives to conduct more attacks than simply pressuring the opposing government might imply. Chenoweth (2010) tests this logic in a cross-country setting, finding that where there is more competition between terrorist groups (which tends to happen in democracies) there is more violence. However, these findings are based on regressions which do not account effectively for the possibility that certain arrangements of political preferences in the population may make it more likely that terrorist groups break into multiple factions.[9]

One might think that an implication of arguments about how the struggle for prominence motivates violence is that when key leaders are killed there should be a spike in violence as

people vie to make a name for themselves and take over top slots. The evidence, however, does not support this view. In the only cross-national study which effectively tests the causal impact of leadership decapitation, Johnston (2012) shows that successful assassinations of insurgent leaders (many of whom are from groups many data sources classify as terrorist) lead to reduced violence. If competition within a movement were an important motivation for excess violence, we would expect the opposite to be the case. Because Johnston (2012) is one of the few authors in this literature to identify a causal relationship, it is worth mentioning how he does so. Basically, Johnston compare successful leadership decapitation efforts with failed ones, relying on the randomness inherent in the success or failure of any given attempt to identify the causal effect of success, an approach previously used by Jones and Olken (2009) to study the impact of leadership changes on economic growth.[10]

Non-Strategic Considerations

While the rationalist literature does an excellent job when outlining how groups respond to constraints that impact their strategic opportunities, groups face a broad set of non- strategic considerations that limit their options. In particular, technological constraints loom large for terrorist groups. These are typically small groups that rarely have substantial research and development capacity, meaning the diffusion of organisational technologies across groups is a critical source of tactical options. This fact has been observed broadly in the policy-oriented literature interested in the spread of tactics from insurgent in Iraq to Afghanistan, but has also attracted scholarly attention. Horowitz (2010), for example, examines the diffusion and adoption of suicide bombing across groups, finding that groups with organisational traits that make them more capable of adopting suicide tactics do so sooner and that key results in earlier studies of suicide bombing fail when the diffusion process is accounted for.

Internal agency problems also loom large in constraining terrorist decisions. The key insight in this literature is that terrorist groups face substantial internal managerial challenges, including: controlling operatives who wish to do more violence than is politically optimal from their leader's perspective; making sure funds are spent properly and not raised in ways which alienate the community; coordinating actions between covert operatives across long distances; and resolving intense political disagreements.[11] Tools to deal with these challenges - expense reports, frequent communications, screening operatives by requiring them to engage in violent acts, and the like - all entail security costs for groups, which means that groups facing strong pressure may simply not be able to carry out leaders' decisions.

One enduring puzzle which suggests non-strategic considerations play a key role in motivating terrorist decision-making is that terrorist organisations almost always fail to achieve their strategic demands (Abrahms, 2006). Indeed their attacks on civilians often make it harder for governments to compromise (Abrahms, 2011). There are several possible explanations for this phenomenon. The simplest is that achieving strategic demands is too high a bar for measuring 'success'; perhaps terrorists should be considered as succeeding when they shift the terms of debate around an issue. By that metric, Gould and Klor (2010) show that terrorism by Palestinian groups has been a success in that it has shifted the entire electoral map in Israel. Their study is

particularly credible as it effectively uses sub-national variation in exposure to terrorism to identify the causal effects of terrorist violence.

A slightly more nuanced possibility is that terrorism is simply the best of a poor set of options available to would-be political entrepreneurs. That terrorist groups fail quite often is a fact; yet crucial is the question is whether they fail more often than those seeking similar political changes through other means. If they do, then the puzzle has real bite, but identifying a valid set of counterfactual cases to test this question is inherently challenging. Abrahms (2012) takes a step in the right direction by comparing violent sub-state campaigns that target civilians against those that do not in a regression setting. While he finds groups that target civilians are less likely to succeed, his research design does not exploit an exogenous source of variation in civilian targeting, and so leave us unsure if violent opposition groups lose at higher rates when they target civilians, or if they target civilians when they see no other options for success.

Still, suppose that Abrahms is correct, and that among similarly capable organisations seeking similar changes, those which employ terrorism have less chance of success. Several explanations would be possible. One is that the agency problems identified above simply make it very hard for any covert organisation to use violence effectively and that they are more debilitating for managing terrorist violence than for managing other kinds of opposition activity. A second explanation is some that terrorist groups are not, in fact, motivated by achieving political goals. There is good evidence that individual terrorists are motivated largely by the desire to form affective ties with their compatriots (see e.g. Abrahms (2008)), but whether those individual motivations add up to group-level decision-making is an open question.

How Should Terrorist Decision-making be Studied?

In the last 10 years analysts have brought a broad range of tools to bear on the study of terrorist decision-making. I conclude this review by summarizing them and then suggest how these tools can be profitably combined to yield more accurate knowledge.

Game theory has proven extremely useful for laying out the strategic dynamics terrorist decision makers face. While its descriptive accuracy and the reality of its assumptions regarding subjective expected utility (SEU) maximization have been questioned, there is a growing body of literature in experimental economics which suggests that people operating in settings in which they have experience do in fact maximize SEU in decision-theoretic settings and play equilibrium strategies in interactions with others.[12] The question for terrorism analysts considering whether rationalist models are useful should shift from the overly simplistic question of whether such models assumptions' are always correct - of course they are not - to the more subtle question of whether the domain of terrorist decision-making in question is one in which we should expect individuals or groups to follow equilibrium strategies.

Interviews and archival work have been extremely valuable in illuminating specific cases of terrorist decision-making. Interviews have been used to greatest effect to study organisational processes in groups where a successful peace process has made it possible for former participants to talk about their actions. The work if English (2003) and Moloney (2002) on the Provisional Irish Republican Army are two of the best examples.[13] Archival work has proven extremely

useful for studying jihadist movements. Thanks to the U.S. government's Harmony database, thousands of internal documents from Al-Qaeda Core, Al-Qaeda in Iraq, and related groups are now archived. More of these documents are becoming available over time and they have been used in a range of reports which highlight the managerial failings of these groups, as well as the extent of disagreement within them (Brachman and McCants, 2006; Felter and et. al., 2006; Shapiro and Watts, 2007; Fishman et al., 2008; Bahney et. al, 2010). Work with captured documents has also provided great insight into the FARC (Smith, 2011).

In a slightly different version of archival work, a number of scholars have used trial transcripts to provide a broad range of detailed information on individuals and organisations (Sageman, 2004, 2008; Magouirk et al., 2008). Helfstein and Wright (2011) use such data to show that six prominent attack networks do not appear to have been organised to maximize secrecy; rather they were organised to maximize productivity and cohesion in the run up to their attacks. This important finding emphasizes the importance of considering how hierarchy and structure contribute to terrorist organisations' abilities to make decisions in the first place.

So how should these tools be combined? I argue that detailed knowledge of groups' political and organisational histories is critical for using quantitative tools effectively. Most quantitative results cited above are associational, they show correlations which could be a result of the impact of key variables on terrorist behavior, but could also be due to the fact that both independent and dependent variables are influenced by the same factors (or at least our measurement of them is). While there are some important exceptions to this observation, Johnston (2012) writing on the impact of leadership decapitation, Benmelech et al. (2011) on the impact of home demolitions, and Gould and Klor (2010) on the impact of terrorism on Israeli politics - most of the empirical literature remains quite unreliable by current standards for quantitative work in economics (and increasingly in the literatures on civil war and insurgency). This is not simply a problem in quantitative work, few qualitative studies properly identify plausible counterfactuals or identify cases that were similar but for some key independent variable.

More detailed knowledge can help here. In the first place, it can identify plausibly exogenous variation in key variables which enable one to estimate causal effects.[14] In the second place, it can draw our attention to key points in time around which we should see changes in terrorist activity. LaFree et al. (2012), for example, examine whether patterns of ETA attacks shifted after their 1978 announcement that they would begin conducting attacks across Spain in an effort to wear out the government and compel concessions to the Basque movement. They find that the pattern of ETA violence did indeed become more dispersed following this announcement, suggesting the announced strategic shift was, in fact, carried out. This kind of analysis, in which one looks for breaks in the patterns of terrorist activity, could surely be applied across a range of groups to gain greater insights as to whether and how decisions translate into action.

Even when clever identification strategies are not available, quantitative research in this field needs to be much more careful about interpreting correlations found in cross-country or time-series data. Four tools in particular can help quantitative researchers establish greater confidence in their findings. First, cross-country regressions should always report a model employing country fixed-effects to make sure that unit-specific factors are not driving the results. If adding fixed-effects substantially changes the results. That does not mean the study is useless, it simply

is another piece of information about the underlying social process. Second, researchers should make greater use of placebo tests in which one tests the impact of the treatment in question (say a change in government counter-terror policy) on a variable known to be unaffected by the cause of interest. In a study of the impact of mobile communications on violence in the Iraqi insurgency, for example, Shapiro and Weidmann (2012) show that turning on new towers in areas that have pre-existing coverage has no impact on violence, while introducing coverage in previously-uncovered areas leads to substantial reductions in violence. Third, researchers should explicitly test various implications of the most likely sources of bias. Finally, researchers can consider concordance tests with the factual record in key places, basically making sure their model predicts correctly what happened in a few specific instances, ideally those that are a key source of intuition for their underlying theoretical concepts.

So, where should the literature on terrorist decision-making go next? First, we need more theoretical work on terrorism as one tactical choice among many for those who would change the political status quo. Second, quantitative empirical work needs to move beyond finding endogenous correlations into reliable causal inference - the same move the civil war literature has made in last few years. Third, there needs to be much more dialogue between researchers from the qualitative side of the field who have rich knowledge of the specifics needed to reliably test theories and quantitative researchers who have the data and tools to find average tendencies across a range of comparable groups.

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Notes

[1] Jackson (2009) reviews many of these developments, laying out the rich set of influences in the literature, ultimately identifying some 47 factors that have been posited to impact terrorist decision-making.

[2] Blomberg et al. (2011), for example, study the impact of terrorism on growth in Africa, finding a negative effect of rates of terrorism on economic growth. The authors do not account for the possibility that terrorism may simply be parodying for other kinds of opposition activity.

[3] Groups as diverse as the Russian Social Democratic Labor Party from 1905 - 1910, the FARC over the last twenty years, and Hamas from 1993 - 2006, have constantly adapted their activities to changing circumstances, varying both levels of violence and specific tactical choices.

[4] For a brief summary, see Laitin and Shapiro (2007).

[5] The author highlights Chechnya but other relevant examples include the MILF in the Philippines, IRA over the long run, AQI in Iraq, and now possibly the Taliban in Afghanistan.

[6] See for example M-19 in Colombia, AQI in Iraq in 2003 -04, the Party of the Socialists Revolutionary in Russia in 1904 - 1905, and now perhaps the resistance in Syria.

[7] Relatedly, groups that fund themselves through illicit business may attract opportunistic joiners—a repeated problem for Loyalist terrorist groups in Northern Ireland—but also face incentives to keep a low profile to minimize disruption to those businesses. Peters (2012) provides a useful discussion of the interplay between violence and both licit and illicit businesses for the Haqqani network.

[8] As Fishman (2009) shows, AQI as a whole failed in making these calculations.

[9] See e.g. Bueno de Mesquita (2008) ; this is discussed more below.

[10] Price (2012) finds a correlation between leadership decapitation and reduced organisational durability that is consistent with Johnston's result. He does not, however, exploit a source of exogenous variation in leader death, and so his estimates, while probative, should be accorded less weight.

[11] Key citations in this literature include Cu´ellar (2007); Shapiro (2007); Shapiro and Siegel (2007); Eilstrup-Sangiovanni and Jones (2008); Helfstein (2009); Shapiro and Siegel (2012).

[12] List's body of work on the subject is too rich to cite in full, but for exemplary pieces, see List (2003) and Levitt et al. (2010).

[13] See Berko (2007) for a creative use of prison interviews to provide evidence on the motivations of Palestinian suicide bombers.

[14] See for example Condra and Shapiro (2012) who use the randomness inherent in weapons effects to identify the impact of civilian casualties on insurgent violence in Iraq, or Lyall (2009) who uses the particulars of how Russian soldiers conducted artillery missions to identify how insurgents responded to the abuse of civilians in Chechnya.