

The Evolution of Terrorist Tactics

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Abstract:

We argue that terrorists are rational actors when it comes to tactical choices. Organizations adopt and continue use tactics based on the prior effectiveness of these tactics. However, organizational constraints can limit strict adherence to this cost-benefit calculation. We develop these intuitions by focusing on airline hijacking as a tactic that has developed through its entire life cycle. Drawing on both existing and original data, we find that groups are highly responsive to prior successes in terms of demands met and hijacker escapes when determining whether to continue with the tactic or adopt it for the first time. This suggests a functionalist explanation for the decline of the tactic. However, the failure of many previous adopters of hijacking to adopt suicide terrorism, the next major innovation in terrorist tactics, indicates that organizational politics play a critical role shaping terrorist group behavior as well.

Introduction

Despite the massive body of research on international and domestic terrorism, scholars still debate the most basic elements of who terrorists are and why they do what they do. Are they purposefully seeking political ends, maximizing personal interests, working for their group's survival, or something else entirely? At its core this question comes down to whether terrorists are rational political actors. Scholars have come down on both sides of the divide. Pape (2005), for example, argues that suicide bombing is a rational strategic response to occupation, while Berman (2008) suggests that sympathizers are attracted to terrorist groups as a rational response to the social services that they provide. But Abrahms (2008) argues that terrorist behavior is not consistently strategic and that the rational pursuit of political goals is not the primary motivation for most terrorist groups.

Notwithstanding this lack of consensus, the underlying incentive structure that motivates terrorist actors matters a great deal, possibly most for the policymakers and practitioners that are responsible for state security. Presumably, rational actors will respond in predictable ways to counterterrorism efforts through well-understood mechanisms such as deterrence and substitution. In contrast, if it is primarily irrational zealots who perpetrate terrorism, then an unpredictable adversary may well undermine the best-laid plans of governments and international organizations. In this analysis, we speak to this critical issue by assessing the extent to which terrorists' tactical choices are shaped by their own successes and failures as well as those of their peers.

Although academics and policy makers have devoted significant attention to the strategies employed by terrorist groups, the relative success of those strategies, and the ways in which governments have responded, most intuition and research is derived from a single ongoing

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case – suicide bombing (e.g. Hoffman 1998; Pape 2005; Bloom 2005; Asal and Rethemeyer 2008; Piazza 2008, 2009; Pedahzur 2005; Moghadam 2009; Chenoweth 2010; Horowitz 2010). Underlying the suicide bombing case are well-documented processes of innovation and diffusion: the development of new tactics and the spread of these tactics to other groups. But the existing body of knowledge has little to say about whether these insights generalize to other tactics, or how terrorist tactics eventually stabilize or decline. Will suicide terrorism saturate the universe of potential adopters and then hold steady? Will counterterrorism efforts gain traction and force down the number of incidents? Will a new, more attractive tactic ultimately displace it? Indeed, it is difficult, if not fully impossible, to answer these question by studying a tactic that by many measures is still in its prime.

In this paper we develop a more general intuition about the rise and decline of terrorist tactics that seeks to address the unresolved question of how terrorists respond to changing incentives.¹ We accomplish this by studying a once innovative tactic that, unlike suicide bombing, has already gone through the full life cycle of invention, diffusion, proliferation, and decline: airline hijacking.² While originally one of the most studied phenomenon in the broader terrorism literature, very little recent work addresses this once widespread tactic and the factors that drove its use (for exceptions, see Dugan et al. 2005; Asal et al. 2010).

We develop a theory of tactical diffusion that we then subject to empirical validation. We argue that a combination of strategy and opportunism underlie a group's decisions to use a

¹ This raises the thorny question of the definition of terrorism. Many scholars restrict “terrorism” to attacks on civilian targets in order to differentiate it from insurgency. See, for example, Wilkinson (1986), Ganor (2002), and Byman (2011), among others. For consistency, we rely on a definition drawn from the *Global Terrorism Database* run by the START Project at the University of Maryland, which is based on the use of coercion for political gain. Specifically, we define terrorism as the illegal use of violence by a non-state actor to attain a political, economic, or social goal through fear, coercion, or intimidation.

² Throughout this paper we are concerned only with hijacking as a terrorist tactic. This intentionally puts hijacking done for criminal economic gain, to seek political refuge, or for any other reason, outside the analysis. For a treatment of the empirical analysis of hijacking writ large, see Dugan et al. (2005).

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particular tactic. When the strategic incentives are high, for instance when success is likely, terrorists are more likely to use that tactic. Similarly, when conditions arise that facilitate tactical adoption, such as connections to other groups who have already hijacked, they should also be more likely to incorporate that tactic into their own arsenal. In other words, we demonstrate that tactical adoption is not only a matter of rational choice, but also a matter of practicality. In this way, terrorists are not dissimilar from other types of organizations – like business firms, for example – in how they respond to both short and long-term trends in their operating environment.

Our findings make several contributions to the literature on violent non-state actors. First and foremost, we provide novel empirical evidence showing that terrorist organizations are highly strategic. These organizations are responsive to the risks and rewards of their tactical choices – groups tended to adopt hijacking when the demands of hijackers throughout the system were met, and move away from hijacking when it became less successful. Moreover, terrorist organizations tended to adopt hijacking if they were linked to others that had previously adopted that tactic, suggesting a diffusion process based in part on existing inter-organizational relationships. Third, we find that past experience with hijacking greatly contributes to the likelihood that a group hijacks again in the future. Overall, and as Crenshaw (1991) argues, our research suggests that it is the interaction of government strategy and the internal organizational characteristics of terrorist groups are critical to mapping their behavior. This lends support to the growing body of evidence that terrorist groups are subjected to the same types of organizational pressures and constraints that are known to affect other sorts of groups.

The section that follows sketches the rise and decline of hijacking as a terrorist tactic. We build on this information to create a general theory of tactical diffusion, from which we derive

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hypotheses. We then test these hypotheses at the organizational level and the event level using new data on terrorist hijackings. We conclude with a discussion of the implications of our findings for the future evolution of tactics and counterterrorism efforts. Understanding the factors that drive the rise and decline of terrorist tactics is not just an issue of academic concern, but also an issue with policy relevance. Developing models that can predict the decline of terrorist tactics and when groups are likely to shift to new types of attacks could yield improvements in counter-terrorism policy as well as a greater overall understanding of violent non-state actors.

The Rise and Decline of Hijacking

While the most famous airline hijacking in modern history, the September 11, 2001 attacks, occurred only a decade ago, it bears more tactical similarities with suicide bombing than with hijacking as traditionally conceived. Indeed, the 9/11 attacks broke the implicit contract that made the traditional model of hijacking work – the perception that if the hostages and the authorities complied with the hijackers, then the loss of life would be minimized. By making the death of the hostages integral to the attack, the 9/11 attackers all but ensured that passengers would not be compliant in future hijacking incidents. This adaptation occurred with shocking speed, as indicated by the behavior of the passengers on United Flight 93, and subsequent incidents on aircraft have been met by near immediate passenger retaliation.³ By making death seemingly inevitable, the 9/11 hijackers changed the payoffs for future hijackers and passengers in a way that resolved the collective action problem that previously enabled one or a few lightly armed hijackers to pacify dozens or hundreds of passengers.

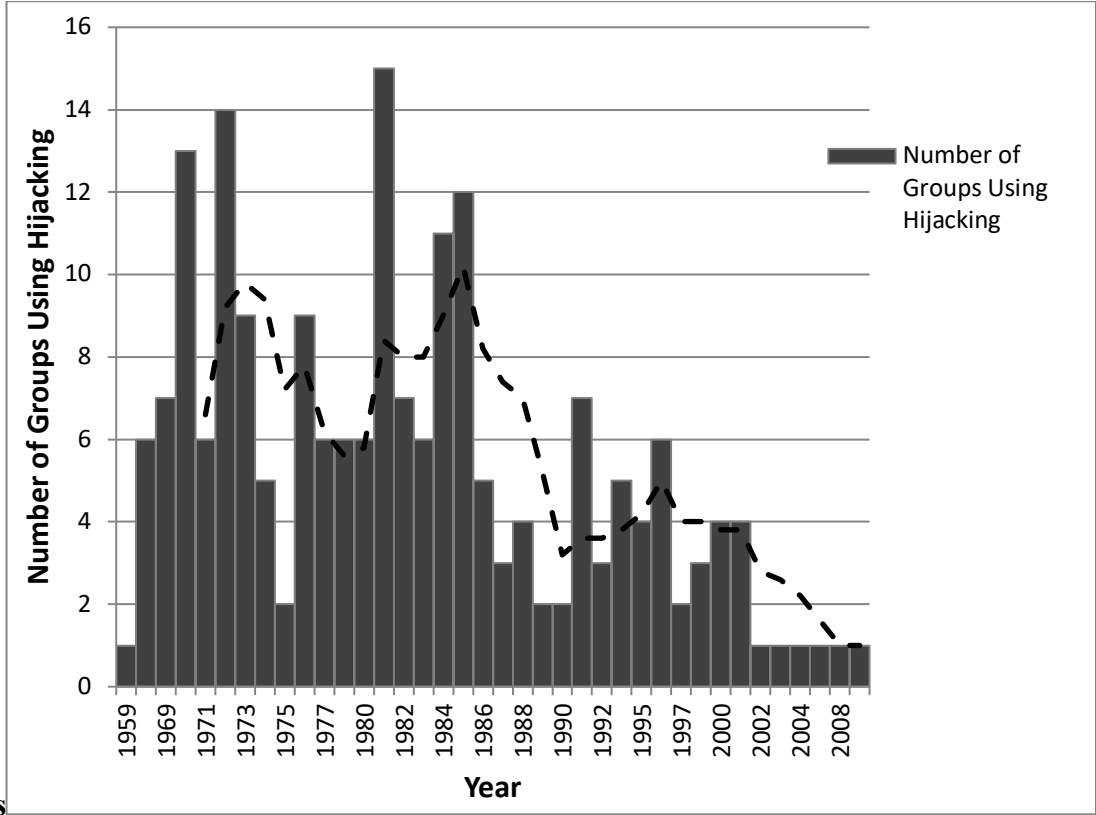
³ For example, passengers quickly subdued Richard Reid (shoe bomber) and Umar Farouk Abdulmutallab (underwear bomber) because they assumed (correctly) that they would be killed if they did not resist immediately.

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However, hijacking had been in decline long before Al Qaeda’s “breach of contract.” This is evident in Figure 1 (below) that plots the rise in hijacking over time – and then its eventual decline. The first recorded incidence of modern airline hijacking occurred in 1961 when a group of Cubans took over a National Airlines plane flying from Miami to Key West (Landes 1978). In the following years hijacking emerged as the preeminent terrorist tactic, including one noteworthy period from 1968-1969 where 75 successful hijackings occurred (Evans 1969). The bellwether incident occurred in 1968 when the Popular Front for the Liberation of Palestine (PFLP), gained control of an El Al Boeing 707 in transit to Tel Aviv⁴. Three PFLP members aboard the flight demanded the plane be flown to Algeria where they sought the release of Arab prisoners in Israel in exchange for the safe return of the aircrafts crew and passengers (Clutterbuck 1992; Clarke and Newman 2006). The attack was a substantial success: all three of the hijackers escaped after securing the release of 16 convicted compatriots. Media coverage of this event turned it into a crucially important signal for other terrorist groups about the utility of hijacking.

⁴ El Al Flight No. 426, flying a Boeing 707.

Figure 1 – Terrorist Hijackings by Year⁵

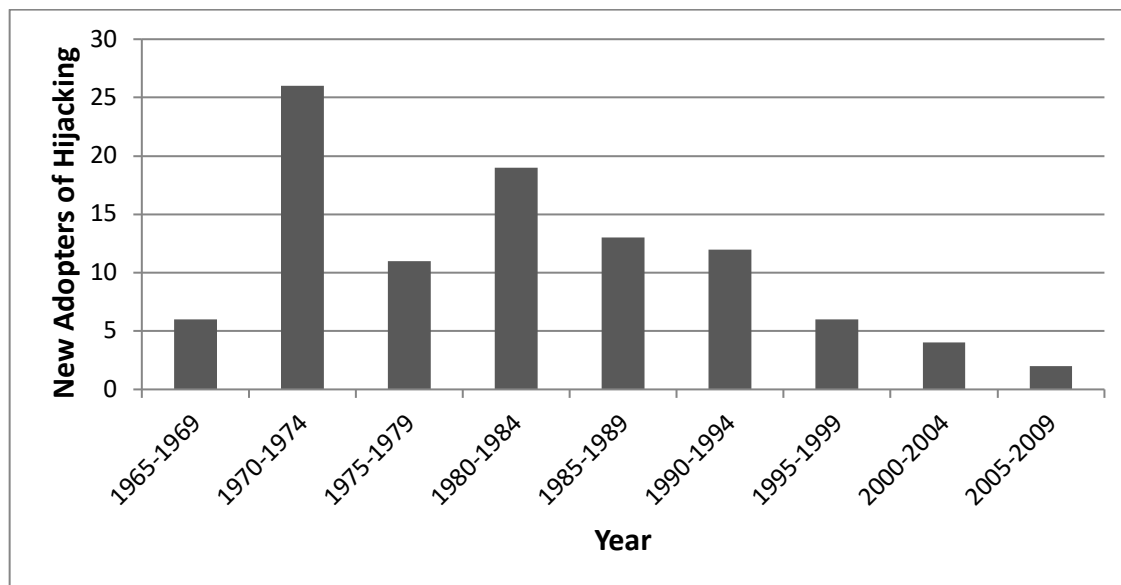


Rapid diffusion and tactical innovation soon followed the infamous National Airlines hijacking. Throughout this process, the PFLP remained a key innovator and model for other groups not only interested in gaining attention for their cause, but also for those seeking to demonstrate their competence and tactical sophistication. For example, after extensive media coverage of the PFLP’s simultaneous hijackings in September 1970, hijackings of Iranian, Costa Rican, and Indian planes immediately followed. Then, when the PFLP hijacked a German plane and held the plane for ransom in 1972, at least eight other planes were hijacked for ransom by other organizations the same year (Holden 1986). Indeed, hijacking soon came to symbolize the behavior of a set of organizations that seemed new to many in the West: the terrorist group

⁵ Data obtained from the Global Terrorism Database, collected by the Study of Terrorism and Responses to Terrorism (START) Center.

(Dempsey 1986).⁶ Figure 2 below shows how these incidents led to widespread mimicry in the short to medium term, but how new groups became decreasingly likely over time to adopt hijacking.

Figure 2: New Hijacking Adopters (Terrorist Organizations)



What explains the rise and fall of aerial hijacking over time? We argue that the answer lies in both the strategic and opportunistic incentives facing terrorist organizations.

Terrorist groups exist by virtue of their violent opposition to states, meaning they have strong incentives to seek out new tactics that are likely to help them achieve their goals and shy away from tactics that are ineffective (Horowitz 2010). [[Cite IO article]] As scholars have argued for decades (for example, see Juergensmeyer 2000), multiple factors drive the incentives of terrorist groups to launch particular attacks. Part of the purpose of attacks is to coerce

⁶ The emergence of terrorist groups engaged in hijacking was such a challenge that the prevailing way of thinking about them at the time drew on the only non-state actors that states had been dealing with for centuries -- pirates (Jacobson 1972). Ironically, when piracy in the Gulf of Aden accelerated in the second half of the last decade, many attempted to use a terrorism framework to understand piracy (Lehr 2007; Pham 2010).

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governments by imposing costs, an approach Hoffman and McCormick (2004) have labeled dirty bargaining. In this way terrorists hope to achieve victory by demonstrating that it is in a state's own interest to give in to their demands.

While the economic and human toll from a terrorist attack represents one potential goal, there are other motivations as well. In particular, terrorist attacks send signals to both the public and governments about the group's strength and the lengths to which they are willing to go to achieve their goals. The central idea is that by demonstrating their resolve and intimidating both the government and public, the group becomes more likely to gain concessions. Thus, while terrorist campaigns rarely actually succeed (Abrahms 2006, 2008), perhaps owing to the difficult position of organizations who resort to terrorism in the first place, drawing attention to a terrorist campaign and signaling their dedication and ability can be nearly as important as the actual imposition of costs.⁷

Terrorists can only coerce the state and demonstrate their resolve when attacks succeed. In stark contrast, terrorist failures often have the inverse effect, becoming public relations windfalls for the state that can highlight the inability of the group and the effectiveness of the government.⁸ Consequently organizations are incentivized to move away from tactics that authorities have "figured out" from a counterterrorism angle, or tactics that are otherwise unable to impose costs and elicit concessions. The result is that terrorist groups value novelty, efficacy, and visibility in their tactical choices.

⁷ There are, of course, other audiences for attacks as well. For example, a group engaging in dangerous attacks like suicide attacks can demonstrate its seriousness to its potential pool of recruits and local population, which can help it gain support in internal competitions for influence with other geographically proximate terrorist groups (Bloom 2005).

⁸ To be fair, just attempted attacks can send a signal to the target population that a group or particular ideology is dangerous, e.g. the failed Times Square bombing in the U.S. That being said, the costs to groups of failure are generally higher than the "positive" signal they get just from the attempt.

With regards to airplane hijackings, this suggests a relationship between the ease and effectiveness of the tactic and the probability that groups will adopt it. Some early work supports this facet of the lifecycle argument. For example, Chauncey (1975), Landes (1978), and Minor (1975) argue that airline hijacking should vary with the estimated costs of hijacking for the terrorist group. In other words, attacks should decline when governments raise the cost of attacks through counterterrorist measures. Along these lines, Dugan, LaFree, and Piquero's work (2005) identifies structural factors driving the use of aerial hijacking through 2005, including the severity of punishment and changes in the probability of apprehension resulting from new anti-hijacking measures. They show that government-led changes in the operating environment, like introducing metal detectors and baggage screening programs, influence the frequency of aerial hijackings perpetrated by terrorists and non-terrorists alike (such as Cubans stealing aircraft to fly from the United States to Cuba).

Our approach, however, adds an additional layer of complexity by differentiating between “group success” and “global success.” That is, we believe that terrorists will base their tactical decisions not only on their own successes and failures, but also by assessing the relative successfulness of others. Even if a particular group hijacked unsuccessfully in the previous year, this approach suggests they might launch another attempt if their peers remain successful. We believe it is important to draw this distinction since terrorists receive multiple signals about effectiveness and only examining one source of information would misrepresent the strategic environment. Furthermore, as we allude to above, there are also multiple ways to define “success.” Tactical success might stem from effectively taking over a plane, while operational (e.g. diverting the plane to a different airfield) or strategic (e.g. achieving government

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concessions) success have different criteria. It is unclear which of these metrics – if any – terrorist groups utilize in their own decision-making processes.

We therefore expect measures that suggest a decreasing probability of hijacking success – either by getting caught or killed, by failing to take over the plane, or by not achieving their strategic objectives – will subsequently influence the probability that groups will attempt aerial hijackings in the future. This idea finds support in the American experience: responding to a rash of successful hijackings, the United States implemented metal detectors in 1973. The new measure required the screening of passengers and their carry-on luggage for both firearms and explosives. Screening was perceived as effective because it was fast, avoided delays during check-in and boarding, and used metal detectors and x-ray machines that were operated by trained security personnel. During this same period, governments also developed profiles of suspected hijackers, upgraded airport perimeter security, and trained flight crews to thwart the demands of hijackers.. Dugan et al. show that the adoption of these new anti-terrorism measures played a vital role in reducing the number of hijackings (Dugan et al. 2005; Fahey et al. 2011). However, Figure 2 above suggests that these measures may have had a short-term impact on terrorist adopters, which our theory can more effectively explain.

Ultimately, these measures altered the mix of potential costs and payoffs for hijackers. The risk of being identified before the attack was even underway, for example at a security checkpoint equipped with metal detectors, opened the possibility that an attempted attack could be reliably foiled before causing any meaningful disruption at all. Such an event would run directly counter to a terrorist group’s goals. Government authorities would demonstrate mastery to their publics and terrorist organizations would lose committed members and possibly deter

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future recruits, both of which are highly valued yet always in short supply. This leads us to the following hypothesis.

H1: Counterterrorist measures that raise the costs of hijacking and decrease the likelihood of success decrease the probability of groups launching hijacking attempts.

Changes in counterterrorism and detection methods are one way to assess the strategic incentives motivating groups to employ hijacking. Stronger counterterrorism policies and more accurate means of detection should lower the perceived and actual likelihood of success, making groups hesitant to hijack. However, it is insufficient to assume that these new policies will always produce the intended effects. For instance, some studies have found that the installation of metal detectors in US airports on June 5, 1973 had no impact on the likelihood of terrorist hijacking attempts. Also analogous are changes to operational detection of IEDs. Though intended to deter, terrorists have simply undercut these measures by altering how they construct their devices. To get around the potential disconnect, we examine whether more granular, observable changes in success and failure rates influence the probability that subsequent groups – or even the same group – employ hijacking in the future. Although scholars such as Holden (1986) and Dugan et al (2005) both find a significant “contagion” effect in response to successful hijackings in the late 1960s/early 1970s, nuance in the metrics of both success as well as failure have yet to be explored, leaving open the question of what exactly terrorist groups respond to.

While we agree that beliefs about success and failure condition the way that groups perceive an attack, we depart from existing work by treating success in a more nuanced way than do similar studies. Here, we disaggregate success into two dimensions: operational success and strategic success. Operational success involves proximate goals like taking over the plane and

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landing at a desired location. Strategic success has to do with a group's political or social demands that underscore the decision to launch the hijacking attempt in the first place.

We do not know, however, if terrorists primarily respond to the observed *successes* or observed *failures* of their peers. Although hijacking failures are yet another complicated concept – since a failed attack might still be seen as somewhat successful if it brings attention to the terrorist's cause – we need some way to gauge decreasing incentives to hijack. To get around this issue we operationalize failure in terms of the cost imposed on the terrorist group. When the cost is high groups should be less inclined to attempt a hijacking, but when it is low they should be more willing to try. We measure cost as the number of terrorists killed and captured in hijacking attempts.

This leads to our second set of hypotheses, which are based on the notion that successful hijackings make further hijackings more likely, and failures and high costs make hijackings less likely:

H2a: Prior successful hijackings, measured in terms of demands and objectives met, are associated with increased incidences of hijacking.

H2b: Prior failed hijackings, measured in terms of hijackers killed and captured, are associated with decreased incidence of hijacking.

Our hypotheses thus far focus on perceptions of the cost and the efficacy of aerial hijackings, suggesting that groups that witness their peers' successes might be more likely to attempt a hijacking themselves. In addition to this indirect means of diffusion – whereby proliferation is driven by imitation and perceptions of success – existing research also finds that tactical choices are in part driven by opportunism as well. In other words, we expect that tactical decision-making is not simply a product of strategic foresight, but also of feasibility. Thus, when certain conditions facilitate tactical diffusion, lowering the costs and difficulty associated with

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learning a new ability, groups should be increasingly likely to incorporate this option into their attack portfolios. To ignore this aspect of tactical diffusion – one that indeed deviates from a purely strategic perspective – is to ignore a basic aspect of terrorist groups: their organizational dynamics. Indeed, many of the same dynamics that drive business firms and start-ups are present among terrorists groups, and central among these is complacency and cost-avoidance. Militants must balance the opportunity costs of learning new attacks against the benefits of specialization and the status quo, and when the former decreases, they should be increasingly likely to branch out.

In particular, connections between terrorist groups can play a critical role in boosting group capabilities through the direct transfer of knowledge. Asal and Rethemeyer (2008) as well as Horowitz and Potter (forthcoming) show that ties between groups are strongly and positively associated with group lethality, meaning groups with more and more extensive ties to other terrorists are able to inflict larger numbers of casualties. Horowitz (2010) also demonstrates that interorganizational connections facilitate the spread of suicide bombing between groups, and [[IO cite]] show that connections are also positively associated with more expansive tactical portfolios in the aggregate. These studies demonstrate that intergroup connections play important roles, transferring knowledge and expertise, but significantly, they also help to explain diffusion in a rational manner.

When it comes to hijacking in particular, terrorist groups that are linked to others that have themselves hijacked in the past should become more likely to adopt the tactic for two reasons. First, those direct alliances serve as points of training and learning, meaning the prior non-adopter has access to specialized sources of information and knowledge concerning the best way to conduct these attacks. Second, the prior adopter serves as a role model. Especially when

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the prior adopter is a bigger and more successful group, these alliances can drive mimicry as groups seek to demonstrate their own competence through the use of hijacking. Prior research demonstrates that during the period in question, especially in the 1970s and 1980s, terrorist training camps in places ranging from Libya to Lebanon served as critical hubs for the exchange of information between groups. For example, documents captured by the Israeli army during their intervention in Lebanon in 1982 showed that groups from Europe, the Middle East, and Latin America had coordinated activities in Lebanese camps (Bar-Maoz 1991, 8). In Libya, a similar phenomenon emerged. Groups ranging from the Red Brigades to the Palestinian Liberation Organization to Action Directé met and discussed tactics and strategy (Bar-Maoz 1991; Katagiri 2002). We therefore expect conditions that facilitate tactical diffusion between organizations, like connections between groups who have and have not hijacked, to increase the chance of the tactic being used.

H3: Links to a group that has previously hijacked makes adoption more likely.

Research Design

In the analysis that follows, we examine these hypotheses statistically, employing a new dataset of terrorist hijacking attempts as well as a new data set of terrorist alliances. For the hijacking data, we began by combining preexisting sources of information (Dugan 2005, **CITE**, **CITE**) and returning to the source documents both to fill in as much missing information as possible and to collect new variables relevant for testing our hypotheses. As such, our data paints a much more complete picture of each individual hijacking attempt than any previous effort: we now have information on the number of hijackers involved, the number of hijackers captured or killed, the number of passengers on board and the subsequent number that were either freed or

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killed, whether demands were met, whether tactical objectives were met, and so forth. As we have outlined, our analysis improves upon past studies by analyzing more than just success or failure in the aggregate since for the first time we can distinguish between such things as tactical and strategic success.

We also leverage new data on terrorist alliances, from the Militant Groups Alliances and Rivalries dataset, to understand their impact on diffusion. This new dataset contains information on the full spectrum of militant relationships, from cooperative to conflictual.

Information on individual terrorist groups, including their motivations and home bases, comes from the Terrorist Organizational Profiles originally created by the Memorial Institute for the Prevention of Terrorism and the RAND Corporation but now hosted by the START project (Terrorism Knowledge Base 2006). The aggregated terrorist group information available through the MIPT-RAND dataset identifies 823 organizations. MIPT-RAND data also provides information on the start date and motivations each group, which we employ in this analysis. We also use information from the Global Terrorism Database to fill in years in which groups were not hijacking so that we avoid problems that arise from selecting on the dependent variable.

We build models with two distinct units of analysis to test the theory outlined above. The first set of models employ the organization-year as the unit of analysis to identify factors that contribute to trends in the frequency of hijacking over time. The second set of models analyze the time between terrorist hijackings using the Cox proportional hazards model. Modeling the time between individual incidents permits a more granular examination into the rise and fall and hijacking missions at the most disaggregated level possible. This allows us to examine how individual successes and failures affect proximate hijacking attempts. But at the organization-year level we can more effectively determine how group characteristics and other organizational

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concepts affect the likelihood that hijacking is used in a particular year. The combination of these approaches yields a more complete understanding than could either individually.

At the organization-year level, we generate several variables from our new dataset of hijacking efforts that aim to assess the relative utility of hijacking from the perspective of potential perpetrators. First, we include *Group Hijack Casualties*, a count variable that measures of the number of a group’s hijackers either killed or captured in the previous two years’ hijacking attempts. A higher value signifies that the tactic was particularly costly to the organization and as a result they should be less willing to launch subsequent attempts. We also include *Prior Success*, a measure (count) of how often a group achieved their demands or their objectives in the previous two years. In contrast to members being captured or killed, these successes should lead the organization to continue hijacking. Third, we calculate *Global Hijack Casualties and Global Success Rate*, which are the same as the last two variables except measured across the universe of hijacking attempts over the past two years. As mentioned before, we measure the “Global” variables across all terrorist hijackings since this information should play an important role in determining whether a group decides to use hijacking as a tactic. This is particular true when attempting a tactic for the first time as the organization’s leadership will have no experience of their own.

We measure these independent variables at two-year intervals since it balances the stickiness of certain experiences with the sometimes rapidly changing strategic environment. We believe that two years, rather than one year, is more likely to accurately capture a terrorist organization’s perception of the tactical environment. Although groups do not have an infinite memory, operating solely on the previous year’s successes and failures is an unrealistic expectation. A single year, for instance, also might not provide enough observations for groups

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to reach any firm conclusions. Since the frequency of hijacking attempts, both individually and globally, fluctuates, a particular year might witness very few hijacking attempts for no particular reason. Nonetheless, we also believe that particular experiences should endure for more than a single year. A group that loses ten members in a single hijacking attempt will definitely remember that incident for more than just twelve months. However, we find it hard to believe that events that occurred more than two years ago will factor into a group's strategic calculus since these attempts likely faced very different operating conditions. Nonetheless, while we believe there are strong theoretical and practical reasons to use a two year lag, we also test these measures at other time intervals to establish robustness..

We also control for a limited number of potentially confounding variables potentially conflated with both our independent and dependent variables. For example, some research on terrorism focuses on the regime type of target governments as a key factor precisely because it changes the nature of counterterrorist and popular responses. Pape, Chenoweth, Li, and others (Pape 2003, 2005; Chenoweth 2010) argue that democracies, in contrast to authoritarian regimes, are more likely to be targets of terrorist violence and they are also particularly sensitive to terrorism in general (also see Piazza 2008; Jackson Wade and Reiter 2007; Moghadam 2009). Pape's logic is that terrorist groups are aware of the internal political situations in the countries they attack, and democracies are more likely to feel the immediate consequences of terrorism since public reaction to terrorist attacks can be swift. Democratically elected officials, fearing losing office, are therefore more responsive to terrorism than are officials in other regimes. Arguably the same factors that make Pape suggest democracies are more likely to experience suicide terrorism should exist for hijacking as well, prompting us to include a control for regime type in our models whenever possible. We use Polity IV data to construct dichotomous measures

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of authoritarian or democratic regimes, using the common designation of democracies as seven or above, and autocracies as negative seven or below.

Since more populous countries have more flights, on average, and might be more likely to experience hijackings, we control for the logged population of the country using the Correlates of War national population totals (Singer 1987; Correlates of War 2 Project 2004). To address the way more wealthy countries might attract more potential hijackers, we use logged energy consumption per capita since it correlates with GDP per capita but has less missing data (Jackson Wade and Reiter 2007).

We also generate several variables to test particular organizational characteristics that might influence a group's likelihood to adopt hijackings. First, as is the case with suicide terrorism, groups with similar motivations may employ similar **tactics (any number of citations here)**. Thus, we include several dichotomous motivation variables in the analysis. The full set of motivations identified by MIPT are: anarchist, anti-globalization, communist/socialist, environmental, leftist, nationalist/separatist, racist, religious, right-wing conservative, and right-wing reactionary. In unreported models we controlled for all of these, but report findings only for nationalist, communist/socialist, leftist, and religious motivations. No organizations with the other motivations ever hijacked, meaning there would be no variation in the dependent variable for those controls and they were forcibly dropped from all models.⁹ For each possible motivation, a dummy variable is coded 1 if MIPT identified an organization as having that particular motivation and 0 otherwise.

To test the relationship between government counter-measures and hijacking, we generate dichotomous measure indicating the existence of metal detectors in airports. Groups

⁹ Hijacking aside, these motivations are very rare in the data overall and therefore are commonly excluded from other models even when they seek to control for motivational factors.

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founded after the widespread introduction of metal detectors in airports in 1973 are coded with a 1, those founded prior to that are coded 0. The idea here is that this introduction would increase the barriers to potential hijacking. We choose 1973 as the cut point based on the introduction of metal detector technology in the United States in that year.¹⁰ Groups that came into existence after 1973 might still view hijacking as the predominant terrorist group tactic of the period, but there would be an additional barrier to adoption – the growing probability of being caught prior to successful taking over the plane.

We also used data gathered by the authors to test the possibility that diffusion properties influence the adoption of hijacking. To test for the possibility that links to other groups that employ hijacking may contribute to the adoption of that tactic we control for the number of connections that each group has to other groups that previously employed hijacking. We also include a dummy variable for the years in which more than 5 aerial hijackings were launched. This is designed to account for the periods of time when terrorists hijacked most frequently and when the tactic would most likely diffuse to new organizations. A raw count of hijacking frequency, which might appear as a more simple control, would correlate too highly with other variables.

Finally, scholars have also found that organizational capacity is key to understanding tactical adoption and we therefore control for age in our analyses, a common proxy for capacity. As LaFree and Ackerman (2009) point out, despite a rich literature in the business world on the topic, terrorism research in the past has too often minimized the possibility that organizational dynamics such as age may influence group behavior (this is changing in some ways, see Pedahzur 2005; Asal and Rethemeyer 2008). Rather than simply being a function of the costs

¹⁰ In future drafts we will have metal detector start dates for each country, which will allow us to more accurately measure this variable.

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and benefits of using a particular tactic, though that could matter, the propensity for a group to use a particular tactic might also be driven by their capacity to utilize a tactic and its consequences internally for the organization. Along these lines, Horowitz (2010) demonstrates that those groups with lower organizational ages, indicating higher levels of organizational capital, were significantly more likely to adopt suicide terrorism than groups with higher organizational ages

Hijacking, however, is a different type of innovation than suicide terrorism. Hijacking would not have been perceived by terrorist groups at the time as particularly disruptive to their way of doing business since most of them did not have long operational profiles prior to the debut of hijacking. Since the modern hijacking era started in the 1960s and most terrorist groups active during the heyday of hijacking started around that time or afterwards, older groups should be significantly more likely to have employed hijacking when they were in their developmental stages. The same thing that made older groups less likely to adopt suicide terrorism - organizational sclerosis - would not have existed when they had to make key decisions about whether or not to use hijacking. To draw on the language of business innovation, hijacking is also more of a sustaining innovation than a disruptive innovation (Christensen 1997), because the functions involved in taking over an airplane are conceptually similar to taking or attacking other types of targets.. Thus, in the hijacking case, organizational age may have a positive relationship to adoption, unlike suicide bombing (Horowitz 2010), since older groups with more overall capability should be more likely to adopt a given tactic (following the logic of Miller 2008 and Asal and Rethemyer 2008). We therefore expect to find a positive relationship between organizational age and the adoption of hijacking as a tactic.

Results

We begin by modeling hijacking by organization-year between 1968-2011 depending on when the organization began and when it perpetrated its last known attack. Here, we identify the universe of terrorist groups and analyze which groups adopt hijacking and which do not. This avoids the selection on the dependent variable problem evident in Pape's work on suicide bombing (Pape 2005; Ashworth et al. 2008; Horowitz 2010), whereby the factors that groups that use hijacking have in common might also be shared by non-adopters of hijacking.

The dependent variable is simply whether an organization hijacked a plane, either successfully or unsuccessfully, in a given year during their existence. Since we are analyzing yearly observations of different terrorist organizations, we use random effects logistic regression to model the dichotomous dependent variable. Summary statistics for the variables in models 1-4 are available in the Appendix.

To provide a baseline expectation, Model 1 examines group identity and country characteristics (which are also included in each of the subsequent models). This particular model finds an association, albeit weak, between population size and the likelihood of a hijacking; larger countries are estimated to experience fewer hijackings, all else being equal. These results also suggest that there is a connection between a group's characteristics and the likelihood that it employs hijackings, with communist-socialist and leftist groups being the most likely. This is an interesting finding since unlike other forms of violence, particularly suicide bombings, there is no strong theoretical reason to connect hijackings with any specific underlying grievance. This finding could, however, be an artifact of the nature of the groups that were most active when hijacking was at its peak. Yet not too much emphasis should be placed on this correlation as its significance diminishes with additional controls, but the direction remains the same.

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Model 2 incorporates information on group capacity and connections to understand the ways in which more practical organizational dynamics might influence tactical adoption. Notably, two variables are highly significant below the .05 level: first, if a group hijacked in the past 5 years it is significantly likely to do so again. This suggests an almost path-dependent understanding of a group's strategic choices: once they gain experience and develop tactical knowledge they are likely to continue using that particular mode of violence. Thus, once a group learns to effectively hijack a plane, their members possessing valuable institutional knowledge, it becomes increasingly unlikely that they would abandon this comparative advantage. But interestingly, our measure of organizational capacity which we proxy with age, does not appear to mean anything for the adoption of hijackings. Building on Mancur Olson (Olson 1982), Horowitz (Horowitz 2010) shows that, due to the high organizational requirements associated with adopting suicide bombing, groups with lower organizational ages should adopt since they are more likely to have greater flexibility when it comes to tactical innovation. However, possibly because hijacking requires fewer organizational changes – since the practice of hijacking is not dissimilar from other sorts of armed attacks – organizational *capacity* might not play a role in the ability for groups to either adopt or not adopt, but organizational *knowledge* might make them more hesitant to try something new.

Additionally, the hijacking alliances variable is also positive and significant in Model 2, meaning those groups that are linked to others that adopted hijacking at some point are more likely to adopt it themselves. This reinforces the findings in prior work (Horowitz ; Horowitz and Potter 2011) suggesting that such connections have a meaningful relationship with the diffusion of terrorist tactics. It is important to note that this effect is not just driven by the fact that more capable groups are more likely to have more alliances. If that were the case, than the variable

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measuring alliances with groups that did not adopt hijacking would also have been positive and significant. Figure 3 shows the coefficients from model 1 displayed in graphical terms to aid in evaluating the significance of different variables. Note that these are not marginal effects – they are just a graphical presentation of model 1 from Table 1 in a format that is easier to read.

Model 3 assesses whether the effectiveness of counter terrorism (in terms of responding to a hijacking, rather than thwarting it ahead of time) impacts the frequency of future hijacking. Following the logic of hypotheses 1 and 2, organizations that observe from their own experience that attackers are likely to be lost should be less inclined to attempt a hijacking mission. Conversely, if a group has previously observed successes they should instead be more likely to hijack. To operationalize the effectiveness of responses, we identify the number of a group's hijackers that were killed and also captured in the previous two years. Furthermore, we calculate the number of times that a group achieved its goals or demands from a hijacking attempt in the previous two years. Table 1 demonstrates that we only find support for the second proposition; terrorist organizations appear unresponsive to the loss of members in previous hijacking attempts. Instead, they are significantly more likely to hijack in a given year if they achieved more demands in the past two years. In line with findings from Holden (1986) and Dugan et al (2009), our results show that success is contagious and begets more attacks, while the cost of the event in terms of members being captured or killed has no lasting impact on a group's strategic calculus.

Model 4 addresses two other indicators of a “successful” hijacking but at the global instead of the organizational level. In addition to accounting for an organization's own successes and failures with hijacking, we further operationalize success with the total number of hijackings that achieved their demands or goals in the previous two years as well as with the number of

hijackers killed and captured in the previous two years. These measures provide an overall sense of how successful or how costly the tactic has become. In accordance with hypotheses one and two, individual groups should be more likely to launch their own attacks when hijackings across the globe are achieving success; as groups witness others successfully taking over the plane and forcing government concessions, they should be more likely to adopt the tactic themselves. But when the cost of hijacking is considerably high and groups are losing members in each attack, organizations should be less inclined to attempt it on their own. In this model we also account for the popularity of hijacking worldwide with a dummy variable indicator for years when more than five hackings were launched worldwide. This provides a sense of how popular the tactic currently is while avoiding multicollinearity with other variables of interest. Overall, Model 4 gives us our most complete test of how the combination of government countermeasures and prior success influences the probability of hijacking in a given year.

Table 1 – Determinants of Hijacking By Organization-Year

	<i>Model 1</i> <i>B/(SE)</i>	<i>Model 2</i> <i>B/(SE)</i>	<i>Model 3</i> <i>B/(SE)</i>	<i>Model 4</i> <i>B/(SE)</i>	<i>Model 5</i> <i>B/(SE)</i>
Group Demands Met, Past 2			0.268***	0.017	
			-0.101	-0.118	
Group Objectives Met, Past 2					0.051
					-0.107
Group Hijackers Killed, Past 2			-0.101	0.002	0.000
			-0.076	-0.087	-0.085
Group Hijackers Captured, Past 2			0.078	0.066	0.059
			-0.062	-0.071	-0.071
Global Demands Met, Past 2				0.101**	
				-0.044	
Global Objectives Met, Past 2					0.0929**
					-0.042
Global Hijackers Killed, Past 2				-0.121***	-0.119***
				-0.041	-0.040

Global Hijackers Captured, Past 2				0.006	0.006
				-0.007	-0.007
Hijacking Popularity				0.907**	0.955**
				-0.450	-0.416
Hijacked Past 5 Years	1.457***	1.267***		1.104***	1.128***
	-0.367	-0.406		-0.427	-0.424
Hijacking Connections	0.311**	0.292**		0.273**	0.269**
	-0.137	-0.139		-0.131	-0.130
Other Connections	-0.056	-0.051		-0.038	-0.039
	-0.041	-0.042		-0.041	-0.041
Metal Detector Age	-0.621	-0.620		-0.082	-0.100
	-0.379	-0.385		-0.377	-0.375
Org. Age	0.004	0.004		0.006	0.006
	-0.009	-0.009		-0.008	-0.008
Autocracy	0.613	0.455	0.456	0.247	0.235
	-0.386	-0.358	-0.355	-0.347	-0.348
Democracy	-0.043	-0.251	-0.283	-0.275	-0.282
	-0.450	-0.408	-0.398	-0.412	-0.409
Regime Durability	0.003	0.003	0.003	0.001	0.001
	-0.004	-0.004	-0.004	-0.004	-0.004
Pop. (logged)	-0.198*	-0.100	-0.079	-0.102	-0.101
	-0.106	-0.101	-0.101	-0.095	-0.096
Energy p/c (logged)	-0.240	-0.235	-0.240	-0.158	-0.155
	-0.155	-0.171	-0.170	-0.148	-0.147
Religious	0.424	0.358	0.357	0.711**	0.703**
	-0.438	-0.392	-0.385	-0.357	-0.358
Nationalist-Separatist	0.436	0.301	0.254	0.357	0.353
	-0.304	-0.273	-0.270	-0.269	-0.268
Communist-Socialist	0.757**	0.340	0.288	0.412	0.401
	-0.350	-0.285	-0.293	-0.276	-0.274
Leftist	0.843*	0.534	0.506	0.531	0.527
	-0.484	-0.464	-0.452	-0.485	-0.483
Constant	-2.579***	-3.283***	-3.433***	-3.932***	-3.912***
	-0.971	-1.091	-1.101	-1.119	-1.115
Observations	3,718	3,671	3,671	3,668	3,668
Number of Groups	523	523	523		523

Note: Table entries are maximum likelihood coefficients obtained from logistic models. The organization year is the unit of analysis. Robust standard errors in are parentheses.

*** p<0.01, ** p<0.05, * p<0.1

Several interesting findings emerge from the full model (Model 4) listed in Table 1. First, success continues to be a main driver of hijacking adoption but no longer at the group level. While the previous model identified a correlation between a group's own successes in the past two years and likelihood of a hijacking attempt, the full model finds that it is global success rates, rather than group success rates, that more acutely affect tactical usage and adoption. The number of demands met in the past two years significantly increases the likelihood of a subsequent hijacking attempt. It thus appears that when deciding to launch an attack, the terrorist strategic calculus is highly affected by the success and failures of others.

The additional measure of cost, in terms of hijackers killed or captured in global hijacking attempts in the past two years, produces a moderating effect on the chance that a group will hijack. In other words, the expectation that a hijacking attempt will cost a group many members decreases the chance that the tactic will be used. But interestingly, a group's own losses to hijackings in the previous year appear not to matter. This is a somewhat contradictory finding, possibly suggesting that these terrorists are not particularly concerned with their own individual outcomes, but when a high mortality rate is almost certain groups are less willing to try again. Thus, a group can write off the loss of a few members in the previous year but when they see that everyone is suffering high losses they may decide that the risk is no longer worth what seems to be an almost assured cost. But this does not mean that a group's own experiences are inconsequential.

Combined, these metrics of tactical success and operational cost suggest that groups are highly responsive to the risks (counterterrorism) and rewards (success of missions) of particular tactics. When they see others achieving their goals, it is more likely that a group will try that particular tactic again the next year. But despite being able rationalize their own losses, when it

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appears that an attack will almost surely be met with a strong government response that will cost many lives groups shy away from using that tactic again.

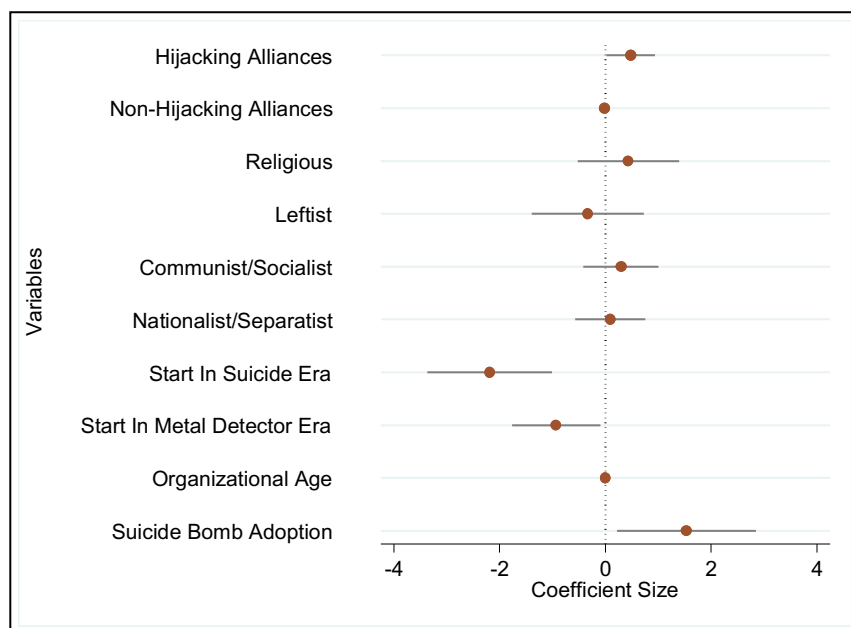
The full model, as with previous iterations, continues to reveal that organizational dynamics play a key role in the ability and the decision of groups to adopt particular tactics. Once again, relationships are important to tactical diffusion and the insignificance of non-hijacking alliances demonstrates that it is not simply more well-connected and more capable organizations that are most able to adopt tactics. Similarly, whether a group has itself hijacked in the past five years continue to produce one of the strongest associations with usage. Groups that develop experience and expertise are highly unlikely to abandon these assets. Combined with other findings, it would seem that terrorists are reluctant to change tactics in light of personal losses, but it is when a tactic appears to be failing more widely that they undertake major strategic changes.

Model 4 is also the only model to include a measure of tactical popularity that is operationalized with a dummy variable for years in which more than 5 hijackings occurred. The coefficient is positive and significant, as we would expect, but interestingly it does not really diminish other coefficients implying that popularity has an independent effect on the rise and fall of tactics. Cues from other organizations might therefore play a role in a group's strategic calculus, but assessments of risk and reward are nonetheless important. Finally, it is also worth noting that that one particular group motivation, religion, generates a significant correlation with hijacking usage. This is largely unexpected, as we had no prior theory to connect any particular motivation to the use of hijacking.

Our last analysis, Model 5 is similar to the previous full model but we swap out the variables referring to group and global demands met in favor of objectives. The difference is that

demands refer to the overarching goals of the hijacking that typically have to do with social, political, or other sorts of grievances. Objectives, on the other hand, refer to taking over the plan and successfully rerouting it, if that is attempted. The rationale for disaggregating success in this way is to better understand if terrorists respond more to tactical success (objectives) or to strategic success (demands). The results listed in Table 2 demonstrate that there is little difference between the two; the coefficients are in the same direction and nearly identical in magnitude. And as before, group successes have no significant impact while global objectives are what seem to drive hijacking usage.

Figure 3: Significance of factors driving hijacking adoption



Next, we conduct an analysis to examine more specifically who terrorists take their cues from: do terrorist react to changes in the success of *terrorist* hijackings, or to changes in *all* hijackings even if not performed by a terrorist organization? Our data identifies 153 hijacking incidents that are attributable to known terrorist organizations and another 144 incidents

perpetrated by individuals, or non-terrorist groups but that are still classified as terrorism. These next analyses replicate the models above but two dependent variables – global demands and objectives met as well as global hijackers killed and captured– are now constructed using data on all hijackings and not just terrorist hijackings.

The results in Table 2 show that terrorists most respond almost equally to the successes and failures of hijackings regardless of the perpetrator. Model 1 and Model 2 below in Table 2 mimic the full models presented earlier, and the coefficients on both global demands and objectives met as well as global hijackers killed, our two primary measures of the successfulness of hijacking attempts each year, generate nearly identical coefficients as before. This is an interesting but not entirely surprising finding; non-terrorist and terrorist hijackings alike might follow similar patterns since they are conducted within the same security environment. For instance, both groups would undergo metal detector screening after they were introduced in most airports starting in 1973, and as a result success rates and other variables are likely to move in tandem. Further examination shows that the success rates and costliness of terrorist and non-terrorist hijackings are highly similar.

Table 2 – Determinants of Hijacking By Organization-Year, Terrorist Non-Terrorist Hijacking Indicators

	<i>Model 1</i> <i>B/(SE)</i>	<i>Model 2</i> <i>B/(SE)</i>
Group Demands Met, Past 2	-0.024 -0.125	
Group Objectives Met, Past 2		0.002 -0.109
Group Hijackers Killed, Past 2	-0.010 -0.090	-0.016 -0.086
Group Hijackers Captured, Past 2	0.100 -0.073	0.089 -0.072

Global Demands Met, Past 2	0.0720**	
	-0.034	
Global Objectives Met, Past 2		0.0792**
		-0.037
Global Hijackers Killed, Past 2	-0.144***	-0.141***
	-0.042	-0.040
Global Hijackers Captured, Past 2	-0.00924*	-0.0128**
	-0.005	-0.005
Hijacking Popularity	1.279***	1.249***
	-0.399	-0.427
Hijacked Past 5 Years	1.070**	1.084**
	-0.444	-0.446
Hijacking Connections	0.261**	0.260**
	-0.129	-0.129
Other Connections	-0.041	-0.043
	-0.040	-0.040
Metal Detector Age	-0.160	-0.144
	-0.387	-0.389
Org. Age	0.007	0.007
	-0.008	-0.008
Autocracy	0.305	0.288
	-0.362	-0.363
Democracy	-0.166	-0.148
	-0.418	-0.413
Regime Durability	0.002	0.002
	-0.004	-0.004
Pop. (logged)	-0.114	-0.118
	-0.093	-0.093
Energy p/c (logged)	-0.245	-0.253
	-0.171	-0.169
Religious	0.608*	0.619*
	-0.361	-0.361
Nationalist-Separatist	0.385	0.380
	-0.275	-0.273
Communist-Socialist	0.438	0.441
	-0.282	-0.278
Leftist	0.580	0.579
	-0.493	-0.491
Constant	-3.643***	-3.519***
	-1.073	-1.054
Observations	3,671	3,671
Number of Groups	523	523

Note: Table entries are maximum likelihood coefficients obtained from logistic models. The organization year is the unit of analysis. Robust standard errors in are parentheses.

**** p<0.01, ** p<0.05, * p<0.1*

Finally, we run an additional analysis to further bolster the robustness of our findings. While the previous analyses are conducted at the group-year level, we now examine the same data at the individual level to take full advantage of the nuances of the information we gathered. In these analyses we have chosen to prioritize information on particular attacks while downplaying group and state-specific variables. In this way we are able to more acutely examine how changes in the tactic itself, and not necessarily group capabilities or state characteristics, influence tactical adoption. To do so we model the data using Cox proportional hazard models to estimate the impact of changes in successfulness on the likelihood that another attack is launched. The dependent variable in the model is therefore the time between hijacking events and the coefficients represent changes in the estimated hazard of a hijacking attempt occurring.¹¹

Since data is now being analyzed at the event level it is necessary to construct new variables and metrics. Our primary indicator of success is constructed in a similar way to Dugan, LaFree, and Piquero (2005) and it is a ratio of the successfulness of the past three attacks over the density of those attacks. In other words, it is the number of success from the past three attacks (by either demands met or objectives met,) divided by the time between those attacks (t_1-t_3). A higher ratio means that attacks were more successful and launched closer together, while a lower ratio represents just the opposite: that attacks were unsuccessful and spread out.¹² This variable tests the proposition that hijacking success begets further attempts as groups perceive it

¹¹ Discuss data compromises

¹² One difference is that Dugan, LaFree and Piquero (2005) divide their measure by 365, but we do not. Doing so yields similar results, however (see appendix).

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to be successful, and also the possibility that a higher density of attacks, a proxy for popularity, will correlate with more attempts.

Furthermore, we include a count of the number of hijackers that escaped in the past 3 hijacking attempts and the number of hijackers captured or killed in the past 3 attempts. These statistics identify the changing cost of hijacking: when more members are captured or killed groups should move away from hijackings as the expected cost to the organization is high, while more perpetrators escaping should signal a relatively low cost, low risk environment. For similar reasons we also include a measure of how many passengers were killed in the past 3 hijacking attempts. A higher amount of passenger fatalities might deter future attempts since it is not intended for hostages to be killed. These fatalities might signal a government's unwillingness to cooperate, for instance, or even more simply a botched operation. Either way, increased passenger fatalities should be correlated with a lower chance of attack.

Finally, as before we include a measure to account for state counter-hijacking initiatives. Specifically we note whether an attack occurred after 1973, the year when the US implemented metal detectors at airports and other countries soon followed. Other studies have shown that this initiative in particular had a dramatic effect on the likelihood that groups would attempt an airline hijacking. It is important to note, however, that this measure is different from the one used in this paper's previous analyses: the earlier measure indicated whether groups formed after 1973 – in the metal detector age – since this should make them less likely to adopt the tactic. Now, however, the measure more simply notes whether the attack occurred after 1973 or not. This is because the survival analysis in particular is more concentrated on the tactical environment and not group conditions: launching an attack after 1973 should simply be harder than doing so

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before 1973. Lastly, we include a cubic yearly time trend in the model. Without including a time trend the analysis would essentially ignore the time ordering of hijacking events.

The results are in Table 3 below. The findings once again prove that terrorists react rationally to the changing successfulness of airline hijackings. In particular, the density of successful attacks, both measured in terms of demands and objectives met, generated the strongest effect size across all three models. Since this measure is a ratio of successfulness over the time between the three previous events, it suggests not only that success is contagious: when hijackings are successful and used frequently, others terrorist groups are likely to launch their own attacks.

The results also demonstrate that groups react to other indicators of success, namely government initiatives. The indicator for the dawn of the metal detector era is significant and negative in each model meaning that terrorist organizations were much less likely to launch an attack after 1973. Since the previous measure of the metal detector era – whether the group formed after 1973 or not – was insignificant, this suggests that groups formed before and after 1973 were both just as likely to use hijacking, but that the chance of *any* group trying to hijacking after 1973 is lower since it is easy to recognize that the endeavor will be much harder with metal detectors at airports.

It is interesting that unlike previous models, the survival analysis finds no connection between the timing of events and measures of costliness operationalized by hijackers captured, hijackers killed, or even passengers killed. It is possible that this results from our analysis focusing on the conditions immediately preceding individual hijacking attempts, unlike the previous models that looked at trends over the past two years. These negative signals might not affect behavior as quickly as success seems to, possibly because it is harder for terrorists to

change their ways than to maintain the same capabilities. For instance, if a group sees other being successful they can quickly launch another attack – especially if they already have experience – but transitioning away from hijackings to another method of attack is likely a slower process that does not result from three or even five costly attacks, but rather by broader trends in the tactical environment.

Table 3 – Determinants of Hijacking, Survival Analysis

	<i>Model 1</i>	<i>Model 2</i>
	<i>B/(SE)</i>	<i>B/(SE)</i>
Passenger Fatalities, Past 3	0.998	0.998
	-0.002	-0.002
Hijackers Captured, Past 3	0.997	0.998
	-0.021	-0.021
Hijackers Killed, Past 3	1.045	1.046
	-0.030	-0.030
Demands Met Density, Past 3	7.478***	
	-1.942	
Objectives Met Density, Past 3		7.548***
		-1.923
Metal Detector Era	0.290***	0.284***
	-0.132	-0.130
Time Trend	1.364***	1.370***
	-0.152	-0.154
Time Trend ²	0.985***	0.985***
	-0.006	-0.006
Time Trend ³	1.000**	1.000**
	0.000	0.000
Observations	138	138

Conclusion

The rise and decline of hijacking is perhaps the best possible case for testing theories concerning the adoption of tactics by terrorist groups. Unlike the suicide terrorism case, which is still ongoing, the general decline in hijacking over the last few decades means it may represent a

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“complete” innovation in terms of the innovation life-cycle. The tests presented above suggest that the prior success of hijacking, the expected cost of hijacking in terms of members lost, the likelihood of detection at the airport, and links between groups and other adopters of hijacking may predict which groups adopt hijacking and when.

This is a timely question since we may already be observing the decline of suicide bombing. Evidence of fatigue with this tactic seems to be emerging in the ongoing Israeli-Palestinian conflict, which is, of course, the context in which the tactic rose to maturity. Moreover, some argue that that the indiscriminate suicide attacks that occurred during the Iraq insurgency largely discredited the tactic among elite practitioners and the public alike. Emerging evidence suggests that Osama bin Laden, in his last months, began to advise against striking civilians, even western civilians, because it was not having the desired effect on governments

The results in this paper confirm what scholars have posited in recent years: that terrorist organizations do respond rationally to changing tactical environments, they do update their beliefs in accordance with expectations of success and failure, but they also act like any other organization in the sense that group constraints and capabilities do matter. Key predictors of hijacking attempts are a history of using the tactic and connections to other groups who have used hijacking themselves. This demonstrates that there is a practical element to terrorist decision making, suggesting that terrorist groups are not unlike other sorts of organizations. Further integration of these literatures might therefore be beneficial.

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