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# A Situational Model for Distinguishing Terrorist and Non-Terrorist Aerial Hijackings, 1948-2007

*Susan Fahey, Gary LaFree, Laura Dugan  
and Alex R. Piquero*

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Despite the centrality of situational variables to crime theories, they remain uncommon in criminology. Based on the hypotheses drawn from the literature on situational determinants of crime, we examine whether aerial hijackings perpetrated by terrorists are situationally distinct from other aerial hijackings. We define terrorist hijackings as those that include threatened or actual use of illegal force or violence to attain a political, economic, religious or social goal through fear, coercion, or intimidation. Other aerial hijackings include those perpetrated for transportation or extortion purposes. Using a newly updated dataset, we examined 1,019 aerial hijackings that occurred around the world from 1948 to 2007, out of which we classified 122 as terrorism. Results provide strong support for the argument that situational factors measuring organizational resources distinguish terrorist from non-terrorist aerial hijackings, and partial support for the argument that situational factors measuring publicity distinguish these events.

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*Keywords* aerial hijacking; situational factors; terrorism

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## Introduction

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In this paper, we explore whether the situational characteristics of aerial hijackings are distinct depending on whether the perpetrator was a terrorist or someone motivated by another purpose, such as transportation to a non-scheduled destination or the extortion of money. The data we use are drawn from a recently updated dataset of aerial hijackings from 1948 to 2007 (Dugan, LaFree, & Piquero, 2005). These data provide a new opportunity to study how the situational context improves our understanding of criminal events, a topic that has long been recognized as important (Sutherland, 1947), but is rarely embraced by mainstream criminological research. LaFree and Birkbeck (1991, p. 75, emphasis in original) define the situation as “*the perceptive field of the individual at a given point in time*” and argue that situations ought to cluster in empirically distinguishable ways according to the differing motivations of offenders in committing specific types of crime. Following LaFree and Birkbeck, we seek to determine whether a set of theoretically derived situational characteristics can successfully distinguish different types of aerial hijacking.

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We begin the paper with a brief review of the history of the situational perspective in criminology. Although criminologists have long applied theory to the study of situations, theoretically driven, empirical studies of crime situations are still relatively uncommon. Our situational approach to the study of aerial hijackings is derived especially from LaFree and Birkbeck (1991). After describing this theoretical approach, we provide a brief review of the relevant empirical literature and hypotheses, data and methods before presenting the results and considering their theoretical and policy implications. We turn now to a review of the often-mentioned but long-neglected situational approach in criminology.

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### Criminological Theory’s Treatment of the Situation

Beginning with the symbolic interactionists (Blumer, 1969; Cooley, 1922; Goffman, 1959; Mead, 1934), criminologists have long emphasized the situational aspects of criminal behavior. Symbolic interactionists argue that humans act within the constraints and freedoms shaped by situations. Actors may see the actions they contemplate and perform as objective and concrete, but it is the subjective meanings of actions through which actors actively interpret situations and determine their subsequent responses. Thus, situations can influence actors to change their responses to similar stimuli, depending on the characteristics of the situational milieu in which events occur (Goffman, 1959). In effect, symbolic interactionists promote a combination of foci, including the self and the subjective interpretation of events, the study of events and the situations in which they occur and the interactions between the situation and the self.

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An important step towards developing a situational approach in criminology was undertaken by Briar and Piliavin (1965), who incorporated the situation into control theory by arguing that offending behaviors are responses to situationally-induced motives, in which the inducement to commit a crime is manufactured in the context of the situation, according to the contingencies of the moment. The contingencies of the moment include the risks and benefits of the crime, as well as individuals' own levels of commitment to conformity. However, while Briar and Piliavin provide a synthesis of the situation and the traditional control perspective of commitment to a conforming lifestyle constraining delinquent behavior, they fail to expand their discussion into a full-fledged theory. Furthermore, when Hirschi (1969) first introduced his influential version of control theory four years later, he ignored the situational emphasis in the control perspective identified earlier by Briar and Piliavin.

Cohen and Felson's (1979) routine activity theory explicitly delineates the situational context by arguing that for any crime to occur, the three ingredients of crime (a motivated offender, a suitable target, and a lack of capable guardianship) must converge in time and space. If any one of these ingredients is missing, the crime will not occur. A target that is more exposed (visible, accessible), that is not well-guarded, that is proximal in distance to the offender and that is more attractive or desirable is more likely to be victimized. In addition, there are situational properties which define the specific crime itself, such as the ease of committing a burglary without a weapon (Cohen, Kluegel, & Land, 1981). Fundamentally, this theory asserts that all humans have routine activities, or patterns of conduct (i.e. situations) in which they engage as they live, work, and play. Crimes feed off the routine activities of legal behavior. Thus, a pickpocketing will be more likely than an assault to occur against a stranger, during the day, and in an indoor location (LaFree & Birkbeck, 1991).

Theories of situational selection explicitly examine an offender's decision-making process for choosing a particular situation as one suitable for crime (Birkbeck & LaFree, 1993, p. 123). The exemplar of this type of theory is rational choice (Cornish & Clarke, 1986), which assumes that offenders are risk averse and explicitly model their decision-making processes. The decisions to first become involved in crime (the initiation model), to continue committing crime (continuing involvement model), and to desist from crime (desistance model) are treated separately from the decisions of what crime to commit and where to commit that crime (Cornish & Clarke, 1986). A concern with the situation is directly addressed by the decision to commit a specific crime in a specific location. Offenders explicitly weigh the costs and benefits of both crime and non-crime actions; if offenders choose to commit crimes, they must choose which crimes and where. For example, in weighing a residential burglary in a middle-class neighborhood, offenders might consider the presence of alarms, dogs at home, or nosy neighbors. In addition, those who apply situational perspectives recognize the importance of situationally induced

5 rewards and punishments in the rational offenders' weighing of costs and benefits in both the choice of crimes as a solution to their needs as well as their choices of crime categories and specific crime victims.

LaFree and Birkbeck (1991) directly tested situational crime perspectives by comparing the situations under which common crimes occur in two countries. The authors reason that the differing motives behind different crime types should lead to predictable regularities with regard to crime situations. Indeed, crime-specific regularities were demonstrated by the authors in an analysis of instrumental (robbery, pickpocketing/snatching) and expressive crime (assault). The situational characteristics they examined included personal features of the target (age, gender, relationship to offender), the degree of monitoring over the victim, and the type of domain (private versus public places). For example, they found that pickpocketings in the US were far less likely than assaults to involve outside or nighttime locations, or lone or young victims (less than 40 years old). The results showed that instrumental crimes were more situationally clustered than expressive crimes and this situational clustering could be used to predict crime types based on situational characteristics.

In short, past theory and research suggest that different types of crimes have distinctive situational characteristics and that it may be possible to derive testable hypotheses about the situational correlates of specific crime types based on our understanding of the varying motives of offenders. In the next section, we apply these insights directly to the study of aerial hijackings.

### Situational Approaches to Aerial Hijackings

Clarke and Newman (2006) argue that terrorism resembles more ordinary crime and claim that while terrorist groups may have specific political motives, group members have their own individual reasons for their actions that are likely similar to the motives of ordinary offenders. Following Cornish and Clarke (1986), Clarke and Newman emphasize the background conditions that are necessary for terrorist groups to form and decide whether to commit terrorist acts (see also Freilich & Newman, 2009). These background conditions include social and economic measures, national and regional history and culture, the physical environment, levels of technological sophistication, levels of government activity, network connections between individuals and work, school and family, and informal controls. Terrorist groups may form out of these conditions and depending on the level of security and societal regulations, opportunities to commit terrorist acts may arise. Whether the opportunity is seized upon will depend on a number of factors, such as the accessibility to available targets, the ease of procuring appropriate weapons or tools (e.g. suicide vests for suicide bombings), and any societal conditions that facilitate specific attacks (e.g. an increased availability of small arms in a conflict zone; Clarke & Newman, 2006, p. 8). In sum, their perspective predicts that terrorist acts will

be more likely to occur in situations in which there are ample motivating political, social and economic factors that encourage the formation of terrorist groups and that these terrorist groups will be more likely to act in situations in which there is more perceived opportunity to commit terrorist acts. 5

Studying the situational determinants of aerial hijackings requires us to assume that individuals are goal seeking and engage in adaptation and learning within their environments. This implies that individuals choose their situations and match their behavior to those situations in order to maximize the chances of obtaining their goals. We further assume that individuals make choices, 10 weighing the relative costs and benefits of action, within a bounded- or situated-rationality framework and in interaction with the organization of everyday life that provides opportunity for action (Clarke & Newman, 2006; Cornish & Clarke, 1986; Norrie, 1986). Thus, we assume that hijackers make a series of choices based on limited information before and during the events to maximize 15 the chances that they will succeed in obtaining their goals (Becker, 1968; Clarke & Newman, 2006; Cornish & Clarke, 1986; Norrie, 1986, but see Akers, 1990).

Following Dugan et al. (2005, p. 1040), we define terrorism as “the threatened or actual use of illegal force and violence to obtain a political, economic, religious or social goal through fear, coercion, or intimidation.”<sup>1</sup> 20 Non-terrorist hijackings can be further divided between transportation (where the hijacker diverts a flight to a non-scheduled destination) and extortion (where the hijacker undertakes to extort money from the passengers, the airline, or authorities). We further assume that the situations under which aerial 25 hijackings cluster will be related to the motives of the individuals and groups carrying out the events. This is exemplified by LaFree and Birkbeck’s (1991) distinction between instrumental and character coercion crimes. Instrumental crimes are those committed by individuals who wish to retain anonymity while gaining access to material goods, and character coercion crimes are those in 30 which offenders seek recognition for committing crimes. If potential aerial hijackers want to take control of an aircraft for the instrumental purpose of obtaining transportation to a non-scheduled destination or to extort money, they will likely make choices specifically designed to maximize the probability of escape to a non-scheduled destination or of successfully extorting money. 35 By contrast, terrorist hijackings are instead more likely motivated by character coercion concerns regarding publicity for their political cause (shunning anonymity) and will seek to maximize the probability of achieving publicity for their actions (Hoffman, 1998; Jenkins, 1974).

Because terrorist and non-terrorist hijackings have different goal-seeking motives, and because goal-seeking motives are related to situational choices, 40

1. Note that in this definition of terrorism, the “economic goal” refers to a large-scale societal economic change, such as Marxism, and excludes incidents that are undertaken to personally enrich the perpetrator, and thus, it explicitly excludes extortion hijackings. Extortionists hijack in order to take money or valuables from national governments, airlines or passengers for personal gain, not for terrorist purposes.

we expect terrorist and non-terrorist hijackings to occur in predictably different situations. In this research, we seek evidence of situational clustering by examining the situations under which those hijackings occur. We concentrate on two major expected differences between terrorist and non-terrorist related hijackings suggested by prior research: publicity and organizational resources.

### Terrorism and Publicity

Compared to most ordinary crime, a defining characteristic of terrorism is its emphasis on publicity. While many criminal offenders go to extraordinary lengths to avoid publicity, most terrorism is directed specifically at obtaining it (LaFree & Dugan, 2004, p. 59). An influential article by Jenkins (1974, p. 16) defines terrorism as “theatre” and concludes that “terrorist attacks are often carefully choreographed to attract the attention of the electronic media and the international press.” In fact, publicity is so central to terrorism, that many definitions of terrorism require it (for a review of definitions, see Schmid & Jongman, 1988, pp. 5-6). Unlike common criminals, whose criminal activity is mostly selfish and whose goals typically end with criminal acts, terrorists are frequently pursuing violent acts as means to broader goals. Publicity is a key part of this process, and publicity is achieved by attacking or threatening people, perhaps killing or injuring some of them, and using an attention-getting strategy and target (Clarke & Newman, 2006). Aerial hijackings clearly satisfy these requirements by involving many victims in a very public drama.

Hoffman (1998, p. 131) points out that terrorism “is conceived specifically to attract attention and then, through the publicity it generates, to communicate a message.” More specific to the analysis presented here, St. John (1999) argues that aerial hijackings constitute the most dramatic form of “terrorism as theater” in that aerial hijackings inherently involve remarkable and uninterrupted control over the passenger-hostages, and the ability to transport all parties hundreds or thousands of miles at a moment’s notice. These abilities arguably make aerial hijackings one of the most riveting types of terrorist theater. This type of theater is successful because it can attract enormous publicity for the terrorist cause (Clarke & Newman, 2006, p. 43). Further, attacking flights from a flagship airline closely associated with a targeted country (such as Israeli airline El Al), is a public way of striking at the heart of adversaries by challenging their reputation and directly threatening their citizens. In sum, for ordinary criminals, publicity is generally to be avoided; for terrorists, it is a vital part of the criminal act. Thus, we hypothesize that situational characteristics that ought to increase the publicity of an aerial hijacking will be more likely to be perpetrated for terrorism purposes than for non-terrorism purposes.



## Terrorism and Organizational Resources

Another striking contrast between terrorist and non-terrorist offending behavior supported by past research is the difference in organizational resources associated with each type of crime. Many definitions of terrorism (Schmid & Jongman, 1988) require that attacks be committed by an organized group, not a lone operator. Thus, terrorist activity generally implies membership in a group with at least a loosely defined, enduring organizational structure. With the exception of gang-related and organized crime, such organizational structure is rarely found in common crimes. Thus, compared to the unstructured or loosely structured organizational arrangement that drives most common crimes, the operational structure of terrorist hijackings are likely to be far more organized and sustained. 5 10

Having an established organization implies the availability of internal resources, such as willing conspirators, money, or access to weapons, from which terrorists may draw. Clarke and Newman (2006) recognize the important role of group structure for orchestrating terrorist attacks. In fact, they insist that without organizational resources, the intricate logistics of the September 11th aerial hijackings would have been impossible. Only a well-coordinated and well-structured organization could have orchestrated the flight training classes, fake identity papers, and the timing of the four nearly simultaneous hijackings. Similarly, Wilson (2000) shows that most terrorist hostage-taking attacks (which include aerial hijackings and barricade-sieges) are carried out by more than one individual. Also, Merari (1999) argues that compared to hijackings by individuals for personal reasons, those that are conducted by terrorist groups are better planned, and involve more hijackers, more weapons (Clyne, 1973), and greater determination to carry out the crime. In short, compared to non-terrorist forms of hijacking, terrorist hijackings may be characterized by a higher level of organizational resources. Accordingly, we hypothesize that those situational characteristics that demonstrate a higher level of organizational resources will more likely be associated with hijackings that are undertaken for the purpose of terrorism. 15 20 25 30

## Situational Research in Aerial Hijacking

Although there have been several studies of aerial hijackings (Dugan et al., 2005; Enders & Sandler, 2006; Holden, 1986), we found two especially relevant because they adopted a situational approach similar to the one applied here. Merari (1999) examined attacks on commercial aviation using a dataset of aerial hijackings from 1947 to 1996 based on the Federal Aviation Administration (FAA), the Israeli Defense Force, and several terrorism research centers. He categorized 847 hijackings into two groups: those committed for personal interests, such as transportation to a non-scheduled destination, and those committed for political motives by terrorist groups, state agents, and criminal organizations. 35 40

He further divided the hijackings into four motivation categories: (1) escape  
 5 (transportation to a non-scheduled destination), (2) extortion (demands for  
 money or for a change in a state's foreign policy), (3) political protest, and  
 (4) mental illness (including hijackings that do not fit any obvious rational  
 scheme). Merari argued that the main purpose of the hijacking, whether for  
 10 political or personal motives ought to influence how the hijacking proceeds  
 and its outcome. He suggested that hijackings supported by organizations will  
 have greater capacity so that they will more easily be able to mobilize multi-  
 ple assailants, obtain firearms and explosives, perform reconnaissance and will  
 have an organizational memory that allows them to learn from experience. In  
 support, he found that hijackings committed by terrorist groups accounted for  
 15 the vast majority of the fatalities that occurred during aerial hijackings and  
 concluded that this was likely due to groups having greater access to more  
 lethal weapons such as firearms and explosives. He also found that compared  
 to hijackings committed by individuals, those committed by terrorist groups  
 were less likely to be thwarted. He suggested that this lower failure rate was  
 20 accounted for by the greater capability of terror groups to mobilize more oper-  
 atives, to utilize more or superior weaponry and to better plan for events.  
 Although he relied only on descriptive statistics, Merari demonstrated the  
 importance of several of the situational variables we examine here.

More recently, Miller (2007) developed a taxonomy of aerial hijackings based  
 25 on an open-source data set of 176 aerial hijackings from 1993 to 2003. After  
 performing content analysis to extract 18 situational hijacking characteristics,  
 he applied cluster analysis on those characteristics, which included duration of  
 the hijacking, whether there were injuries or fatalities, the weapons used,  
 demands made, size of the plane, whether the flight was international or  
 30 domestic, the number of hijackings, and the nationality of the hijackers. Miller  
 concluded that a four-group typology best described the data. He classified as  
 terrorist those hijackings that were performed by a group or individual that  
 claimed to be a part of an identified terrorist organization. These hijackings  
 were more likely to occur on domestic flights, with multiple perpetrators, with  
 35 firearms and/or explosives, were long, with a mean of 27 hours and a median  
 of nine hours, and had the highest likelihood of death to passengers. The sec-  
 ond group of hijackings, multiple armed hijackings, was quite similar to the  
 terrorism hijackings except that the stated demands of the hijackers were not  
 politically motivated but instead were aimed at diverting the plane to a non-  
 40 scheduled destination. These hijackings were also quite likely to result in  
 passenger deaths.

In contrast to the well-prepared hijackers of groups 1 and 2, the third group  
 of hijackers were less well prepared, usually acted alone, typically without  
 weapons, and if there were weapons present, they were less lethal weapons,  
 45 such as knives. This group was more likely to divert planes to unscheduled  
 destinations, the attacks were short in duration, and they did not usually result  
 in passenger fatalities. The final group of hijackings was the international trav-  
 eler hijackings in which passengers demanded that planes be diverted to

unscheduled destinations. These hijackers were usually unarmed or armed only with knives, although they often threatened to blow up aircraft. In these cases, passenger fatalities were rare. 5

Ultimately, Miller (2007) found that the most important distinguishing factors for the four groups were the specific hijacking modality and the motivation of the hijackers. The terrorism hijackings represented a distinct cluster such that this group clearly represented a unique phenomenon that ought to be predictable in terms of its situational characteristics. Further, because passenger deaths were most common in terrorist hijackings, there were important policy implications for law enforcement officials when confronting terrorist hijackings relative to the other three types. However, the sample for this analysis was relatively small (176 hijackings), and it spanned only a short time period (1993-2003)-which excludes the period of the greatest number of recorded hijackings in the late 1960s and early 1970s (Merari, 1999). 10  
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### Current Focus

In this paper, we examine whether publicity and organizational resource situational characteristics distinguish terrorist and non-terrorist aerial hijackings from 1948 to 2007 using what we believe to be the most comprehensive database on aerial hijackings yet assembled. Specifically, we seek to determine whether terrorist hijackings are distinguished by their reliance on greater publicity seeking and organizational resources. Based on the assumption that publicity will be more valuable to terrorist than non-terrorist hijackers, we hypothesize that compared to non-terrorist hijackings, terrorist hijackings will be more likely to occur in situations that generate more publicity. Based on the assumption that terrorist hijackings will have access to greater organizational resources, we hypothesize that compared to non-terrorist hijackings, terrorist hijackings will occur in situations which demonstrate greater organizational resources. 20  
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## Data and Methods

### Data

In order to apply situational perspectives to aerial hijacking, we began with a global database of hijackings from the Federal Aviation Administration (FAA), the Global Terrorism Database (GTD), the RAND-MIPT data, and the ITERATE data (see Dugan et al., 2005 for details). We define aerial hijacking as "situations in which perpetrators either seized control of an aircraft or clearly announced their intention to do so but were thwarted in their efforts" (Dugan et al., 2005, p. 1040). We extended the data described above by adding 113 mostly recent aerial hijackings from the Aviation Safety Network (ASN), an 35  
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archive of aerial accidents, crimes, and attacks. We also used the ASN data as well as open-source media reports, such as Reuters and the Associated Press, to correct and update 171 hijackings in the earlier dataset. These procedures resulted in a total of 1,019 hijackings from 1948 to 2007.

## Methods

In order to test our hypotheses, we use logistic regression analysis to predict the probability that hijackings were carried out for terrorist purposes:

$$P(\text{Terrorism}) = \frac{1}{1 + \exp(-\beta_0 - \beta_1 \text{Publicity} - \beta_2 \text{Organizational Resources} - \beta_3 \text{Controls})}$$

where *Publicity* is a vector of characteristics expected to either increase or decrease the publicity of the event, *Organizational Resources* is a vector of characteristics that demonstrate either high or low levels of available resources, and *Controls* includes variables that represent several rival explanations.

The dependent variable, *Terrorism*, is a dichotomous variable indicating whether the hijacking was carried out for terrorist purposes. The terrorist cases were identified by consulting open-source news material on each hijacking, the RAND-MIPT data, the ITERATE data, and the GTD.<sup>2</sup> The two most common motives for non-terrorist hijackings were transportation and extortion. Transportation hijackings involve perpetrators, sometimes with their families, taking control of an aircraft and demanding travel to a destination other than that on the flight plan—oftentimes, Cuba, the Soviet Union, or China. Extortion hijackers take control of the aircraft and demand money from authorities or the airline in return for the safety of the passengers and crew. Seventy-one hijackings were classified under more than one category. For example, a multi-purpose extortion and terror hijacking that occurred in the Philippines on 7 April 1976 involved a demand for \$300,000 and the release of numerous political prisoners (Federal Aviation Administration (FAA), 1983, p. 53). For analysis purposes, we considered any case that included terrorism as a motive to be a terrorist hijacking.

Publicity-related variables include US Origin, Capital City, Weekend, Summer, and Casualties. Given that the United States has become the widely recognized capital of the global media, we reason that compared to attacks elsewhere, attacks on the US would be especially likely to generate media publicity. US Origin (1 = yes; 0 = no) measures whether terrorist hijackings originated in the US or elsewhere.

Because capital cities are symbolic headquarters of the nations they represent, we expect that compared to hijacked flights from non-capital cities,

2. Research assistants independently identified terrorist hijackings and obtained 0.91 inter-rater reliability. All disagreements were discussed and reconciled.

hijacked flights departing from capital cities will generate more publicity and are, therefore, more likely to be terrorist events. To test this, we include in the model whether the flight originated in a capital city (1 = yes; 0 = no). 5

It is conceivable that when more recreational travelers, rather than business travelers, are the passengers on a hijacked plane, the publicity surrounding the event will be greater because the implied threat and the publicity are greater. To the extent that recreational travelers are more likely to choose flights on weekends than during the week, we explored the possibility that compared to non-terrorist hijackings, terrorist hijackings will be more likely to target weekend travel. Weekend is a dichotomous variable and is coded as a "1" for flights that originated on a Saturday or Sunday, "0" otherwise. Further, we extended this reasoning to the season during which the hijacked flight departed. The summer months are when recreation-related travel in particular is heavy (Office of Travel and Tourism Industries, 2007). On the assumption that such travel times might generate greater publicity for attacks, we expect that the increased volume and recreational orientation of summer and weekend travel will be more attractive to terrorist hijackers. Hence, we expect that compared to non-terrorist hijackings, terrorist hijackings will be more likely to occur during the summer months.<sup>3</sup> Summer is a dichotomous variable and is coded a "1" for hijackings that occurred in the months of June, July, and August, and "0" otherwise. 10 15 20 25

Finally, on the assumption that hijackings that involve passenger or crew casualties will attract more publicity than other hijackings, we examined whether passenger or crew casualties distinguished terrorist and non-terrorist hijackings. In general, we expect that compared to non-terrorist hijackings, terrorist hijackings will be more likely to include passenger and crew casualties (1 = yes; 0 = no). 30

The Organizational Resources vector includes Number of Hijackers (1-5 or more), and Weapon Type (coded as two dummy variables: 1 = one weapon, 0 = no weapon and 1 = multiple weapons, 0 = no weapon or one weapon). We hypothesize that, compared to hijackings by single offenders, hijackings perpetrated by multiple offenders require greater organizational resources and hence, are more likely to be terrorist than non-terrorist. The two measures of weapons are based on the assumption that possession of a weapon represents a higher level of resources than no weapon and that possession of multiple types of weapons requires even greater levels of organizational resources. Major types of weapons used in the hijackings examined here include firearms, knives, metal-based explosives, and liquid incendiaries. Examples of combinations of weapon types used to hijack planes include submachine guns, explo- 35 40

3. Coding the summer months for both the northern and southern hemispheres as "1" and the fall, winter, and spring as "0" produced no substantive changes in the results. Further, changing the variable to include the popular travel month of December produced no substantive change in the results. An additional model which included the summer variable and a dichotomous variable capturing whether the hijacking occurred in the month of December showed that all variables, including the original summer variable, had the same effects as reported here.

sives, and .45 caliber handguns; sawed-off shotguns and daggers; and flammable liquids and explosives.<sup>4</sup> We expect that compared to non-terrorist hijackings, terrorist hijackings will be more likely to include weapons relative to no weapons. We further expect that compared to non-terrorist hijackings, terrorist hijackings will be more likely to include more than one weapon type relative to no weapons.

We also include two control variables that might distinguish terrorist and non-terrorist hijackings. First, we add a dummy variable for whether the hijacking originated in a country that is already affected by a large amount of terrorism. In these countries, the hijacking might simply be another terrorist tactic used in an existing campaign of violence. Top Terrorism Country measures whether the flight departed from a country which in that year ranks within the top 75th percentile of countries to experience terrorism in the Global Terrorism Database (GTD; top 75th percentile = "1", "0" otherwise). We choose the GTD rankings because the database includes both domestic and international terrorism worldwide (LaFree & Dugan, 2007). Because hijackings occurred as early as 1948, we use the 1970 rankings for all of the hijackings that occurred between 1948 and 1969.<sup>5</sup> Year of the hijacking is a count from the year of the first aerial hijacking in the model (1948 is year 1) to the year of the last aerial hijacking in the model (2007 is year 60). Year-squared is the quadratic term for the year variable expressed as a count, and Year-cubed is the cubic term for the year variable expressed as a count. We control for the year of the hijacking allowing it to be non-linear, because the distribution of hijackings over time is non-linear. As shown below, the annual trend has a clear, parabolic shape with a possible cubic curve. We control for this flexible trend to better isolate the effects relevant to our hypotheses.

## Results

### Descriptive Statistics

Figure 1 shows the distribution of total hijackings and terrorist and non-terrorist hijackings over time. Perhaps the most striking feature of Figure 1 is how

4. We also experimented with adding specific weapon types to the models (e.g. firearms, explosives, knives), but none of these variations produced significantly different results. In fact, the magnitude of the effects of each individual type of weapon, such as explosives, on the likelihood of the hijacking being conducted for terrorism purposes remained similar to the magnitude of the operationalization of the single weapon type and the combination weapon type in our original model. All of the odds ratios ranged between 2.8 and 3.7. Further, the differences between the coefficients (e.g. firearms versus knives; knives versus explosives; explosives versus firearms) were not significantly different from one another using the test described by Paternoster, Brame, Mazeroles, and Piquero (1998).

5. This decision may introduce error into our model, however no other equally comprehensive, open-source data exists for the early years. Fortunately, the composition of the top quartile countries changes infrequently—about once per decade (LaFree, Dugan, & Fahey, 2007). Thus, we expect the resulting error to be relatively small.

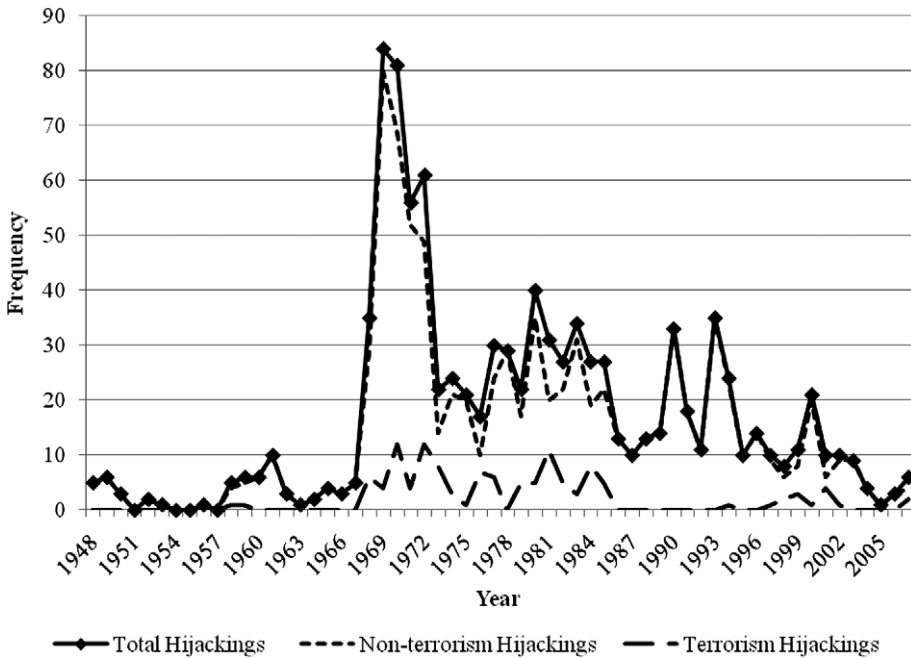


Figure 1 Aerial hijackings, 1948–2007.

uncommon terrorist hijackings were after the mid-1980s. In fact, the vast majority of the total hijackings trend line is accounted for by the non-terrorist hijackings. Terrorist hijackings never rise above 12 attacks per year. From 1948 to 1958, there are no terrorist hijackings. The first terrorist hijacking in our sample occurred in 1958 and no terrorist hijackings occurred between 1986 and 1993. Another period of no terrorist hijackings occurred between 2003 and 2006. The series ends in 2007 with two terrorist hijackings. In contrast, non-terrorist hijackings occur in every year except 1951, 1954, 1955, and 1957. Non-terrorist hijackings reached a peak in 1969 with 80 attacks. Non-terrorist hijackings began to decrease after the late 1960s with 69 hijackings in 1970, 52 in 1971, 49 in 1972, and a low of 14 hijackings in 1973, which may reflect in part the adoption of metal detectors in that year (Dugan et al., 2005).<sup>6</sup> Non-terrorist hijackings continue at a generally low level for the rest of the series. Overall, non-terrorist hijackings display a great deal of variation with a steep peak in 1969, followed by a rapid decline and then a more gradual decline through the end of the series. The correlation between terrorist and non-terrorist hijackings is positive and relatively strong ( $r = 0.58$ ;  $p < 0.000$ ), showing that although the precise values differ, the trends in terrorism and non-terrorist hijackings are clearly related.

6. These measures also included stationing law enforcement personnel at all passenger checkpoints and an agreement between the US and Cuba to prosecute individuals who hijacked planes to those countries (Dugan et al., 2005).



Based on the classifications used here, only 122 of the 1,019 (12.0%) total hijackings were conducted for terrorist purposes. An example of a terrorist hijacking included in this analysis is the hijacking of an El Al flight outbound from Rome, Italy to Tel Aviv, Israel by three members of the Popular Front for the Liberation of Palestine (PFLP) on July 23, 1968. The plane eventually landed in Algiers, and the hijacking resulted in a hostage standoff that lasted for 40 days, after which all of the hostages were freed (FAA, 1983). Non-terrorist hijackings include hijackings that were not conducted for terrorist purposes, including for transportation, for extortion, and for unknown purposes. There were 897 non-terrorist hijackings (88.0%) in the data. An example of a hijacking conducted for extortion purposes was a June 4, 1970 hijacking of a Trans World Airlines (TWA) flight outbound from Phoenix, Arizona to St. Louis, Missouri. The hijacker was armed with a pistol, a knife, and a container of unidentified liquid and demanded \$100,000 before the plane could land. The plane did eventually land at Dulles Airport outside of Washington, DC, and the hijacker managed to escape with the ransom money. Remarkably, he was subsequently captured when he returned to claim more ransom money (FAA, 1983). An example of a hijacking conducted for transportation to a non-scheduled destination occurred on July 1, 1970 on a National Airlines plane outbound from Las Vegas, Nevada to Tampa, Florida. The hijackers were armed and took over the plane after a stop in New Orleans and demanded transportation to Cuba (FAA, 1983). They were transported to Cuba and were never captured.

In Table 1, we present the frequency distribution of our independent variables, broken down by whether the hijacking was conducted for terrorism or non-terrorism purposes. We also present row percentages, reflecting the percentage of hijackings given the presence of specific characteristics, such as originating in the United States. Regarding the publicity variables, more than one-quarter of all global hijackings (275) originated in the United States. However, only nine of the terrorist hijackings originated in the United States while nearly a third (266) of non-terrorist hijackings originated there. Terrorist hijackings originated from Lebanon the most frequently (12), followed by the United States (9), India (6), Turkey (6), France (5), Colombia (5), and Venezuela (5). A total of 289 (28.4%) of the hijackings originated in capital cities. Nearly a quarter of the hijackings that departed from capital cities (66) were for terrorism purposes while only 56 (8%) of the terrorist hijackings departed from a non-capital city. Only 135 (13.2%) of the hijackings involved passenger or crew casualties. Twenty-nine of the hijackings (22%) that involved passenger or crew casualties were terrorist hijackings while 93 of the hijackings (11%) without casualties were non-terrorist hijackings.

According to Table 1, the vast majority of hijackings (80%, or 819) involved at least one weapon. Only 5.5% of hijackings conducted without weapons were terrorist hijackings while 23.7% of hijackings with multiple types of weapons were classified in our data as terrorist. The average number of hijackers per attack was 1.88. As the number of hijackers involved



Table 1 Descriptive statistics

Independent variables	Measurement	Terrorist hijackings	Non-terrorist hijackings
<i>H1: Publicity</i>			
		9	266
US-origin	0/1	3.3%	96.7%
	Reference	113	631
Non-US origin	Category	15.2%	84.8%
		66	223
Capital city	0/1	22.8%	77.2%
	Reference	56	674
Non-capital city	Category	7.7%	92.3%
		31	213
Weekend	0/1	12.7%	87.3%
	Reference	91	684
Weekday	Category	11.7%	88.3%
		33	235
Summer	0/1	12.3%	87.7%
	Reference	89	662
Other seasons	Category	11.9%	88.2%
		29	106
Casualties	0/1	21.5%	78.5%
	Reference	93	791
No casualties	Category	10.5%	89.5%
<i>H2: Organizational Resources</i>			
	Reference	11	189
No weapon	Category	5.5%	94.5%
		62	550
One weapon type	0/1	10.1%	89.9%
		49	158
Combination of weapon types	0/1	23.7%	76.3%
Number of hijackers	Count		
		26	602
1		4.1%	95.9%
		17	123
2		12.1%	87.9%
		28	63
3		30.8%	69.2%
		20	50
4		28.6%	71.4%

(Continued on next page)

Table 1 (Continued)

Independent variables	Measurement	Terrorist hijackings	Non-terrorist hijackings
5+		31 34.4%	59 65.6%
<i>Controls</i>			
Top terrorism country	0/1	43 10.4%	372 89.6%
Non-top terrorism country	Reference Category	79 13.1%	525 86.9%
		Mode	Minimum; maximum
Year of hijacking	Count	1969	1948; 2007

increases, the percentage of terrorist hijackings versus non-terrorist hijackings also increases. Overall, the frequency distributions of both the publicity and organizational resources measures show general support for our hypotheses. Finally, in terms of the control variables, 415 hijackings originated from top terrorism countries. Yet, similar proportions of terrorist and non-terrorist hijackings originated from both top and non-top terrorism countries. The modal year for hijackings was 1969, with 80 hijackings occurring in that year.

### Logistic Regression Results: Publicity Hypothesis

Table 2 shows the coefficients, standard errors, odds ratios, and predicted probabilities for the variables related to the two hypotheses and the control variables. Turning first to the publicity variables, we see that only one finding supports our hypothesis. As predicted, flights originating from a capital city are two and a half times more likely to be hijacked for terrorist than non-terrorist purposes. None of the other publicity measures supported our first hypothesis. Contrary to our predictions, flights originating in the United States are significantly *less* likely to be hijacked for terrorist purposes. In fact, a US flight has 0.84 times lower odds of being hijacked by terrorists than by non-terrorists. We also found no evidence that compared to non-terrorist hijackings, terrorist hijackings were more likely to result in passengers or crew being killed or wounded. Similarly, the timing of the flight and knowing whether flights originated on a weekend or during the summer months did not distinguish between terrorist and non-terrorist hijackings. In sum, our first hypothesis that characteristics that increased the publicity of the event could differentiate between terrorist hijackings and non-terrorist hijackings, was only supported by one of our five measures of publicity.

Table 2 Logistic regression predicting terrorist aerial hijackings from non-terrorist aerial hijackings ( $n = 1,019$ )<sup>1</sup>

	<i>B</i>	Se	OR	Change in predicted probability as variable moves from minimum to maximum <sup>2</sup>
<i>H1: Publicity</i>				
US origin	1.85	0.45	0.16	0.072
Capital city	0.916	0.24	2.50	0.105
Casualties	0.502	0.29	1.65	0.049
Weekend	0.273	0.25	1.31	0.024
Summer	0.171	0.26	1.19	0.015
<i>H2: Organizational Resources</i>				
One weapon type	1.113	0.39	3.05	0.057
Combination of weapon types	1.358	0.41	3.89	0.078
Number of hijackers	0.68	0.08	1.97	0.394
<i>Controls</i>				
Top terrorism country	0.837	0.28	2.31	0.093
Year of hijacking	1.492	0.33	4.45	
Year <sup>2</sup>	0.04	0.01	0.96	
Year <sup>3</sup>	0.001	0.000	1.000	

<sup>1</sup>The pseudo- $r^2$  in this analysis was 0.2767.

<sup>2</sup>The predicted probabilities were calculated by holding all dummy variables at their mode, and continuous variables at their mean.

### Organizational Resources Hypothesis

Table 2 shows much more consistent support for the second hypothesis, that 5 situational characteristics demonstrating a higher level of organizational resources are more likely to be perpetrated for terrorist than non-terrorist purposes. We find that when hijackers possessed a weapon, the odds of the hijacking being motivated by terrorism were three times higher. In addition, when the hijacker possessed more than one type of weapon during the hijack- 10 ing (relative to one or no weapons), the odds of the hijacking being perpetrated for a terrorist purpose increased by nearly four times. Further, flights hijacked by more than one perpetrator were also more likely to be hijacked for terrorist purposes. In fact, as the number of hijackers increased from 1 to 5, the probability of the hijacking being undertaken for terrorist pur- 15 poses increased by 39.4%. Thus, the level of organizational resources, measured here as the number of weapon types and the number of hijackers, significantly differentiated between terrorist and non-terrorist hijackings.

We note that all four of the control variables were also statistically significant. For example, whether the flight originated in a country that during the year of the hijacking was categorized in the top 75th percentile of non-hijacking terrorism more than doubled the odds of a given hijacking being perpetrated for terrorist purposes. The combination of the coefficient estimates for year, year-squared, and year-cubed shows that from 1948 to 2007, the probability of a hijacking being perpetrated for terrorist purposes increases, decreases, and then increases again, like an S-shaped curve.

## Discussion and Conclusions

In this paper, we applied a situational perspective to aerial hijacking using a newly available database of worldwide aerial hijackings. Two hypotheses were tested. First, we argued that compared to non-terrorist hijackings, terrorist hijackings will more likely be aimed at garnering publicity. Second, we examined whether compared to non-terrorist hijackings, terrorist hijackings involve a higher level of organizational resources.

The results of the first hypothesis were only partially consistent with our expectations. We argued that because hijackings on flights that originate from capital cities are likely to generate more publicity than hijackings of flights from more remote areas of countries, that capital city flights will be more strongly associated with terrorist hijackings. We found strong support for this conclusion in the analysis.

In subsequent analysis, we also considered the possibility that hijackings of flights originating from capital cities were simply due to the fact that in some countries, airports in capital cities might be the primary or only airport. The only nation we found with a single major, non-military airport in the entire country was Lebanon. All other nations, including small nations like the Dominican Republic, Jamaica, Qatar, and Fiji, all had more than one airport to serve the public.<sup>7</sup> This suggests that although smaller nations may have fewer airports outside their capital cities, this potentially alternative explanation fails to explain the entire association between capital city origin of the flight and whether the hijacking was perpetrated for terrorist purposes.

Contrary to our predictions, flights originating in the US were not more likely to be targeted by terrorist than non-terrorist hijackers. Altogether, our data include only nine terrorist-motivated hijackings originating in the United States during the 60 years spanned by the data—only 7.4% (9/122) of all terror-

7. Lebanon experienced 21 hijackings, 12 of which we classified as terrorist hijackings; all hijackings in Lebanon, regardless of type, departed from Beirut International Airport. We reran the analyses excluding the Lebanese hijackings and no substantive differences were observed in the capital city variable or the model in general. This supports our contention that although larger airports are often located in capital cities, particularly in smaller nations, this fact does not explain the observed connection between the capital city origination of the flight and whether the hijacking was perpetrated for terrorist purposes.

ist hijackings. Following the US, the countries with the most terrorist hijackings were Lebanon, India, and Turkey. The small odds of United States origin hijackings being terrorist reflects in part the large number of transportation hijackings, particularly to Cuba, that occurred in the United States during much of this period. In fact, 38% of all hijackings in the data with a transportation motive (229/608) originated in the United States. This finding could be measuring in part the geographic isolation of the United States with respect to continents like Europe, Asia, or Africa. The data show that since 1980, other than the 9/11 attacks, there was not a single terrorist-motivated hijacking that originated in the United States.

We also argued that because attacks with casualties, attacks on weekends, and attacks during summer vacation months should produce more publicity, they would be more strongly associated with terrorist than non-terrorist attacks.<sup>8</sup> However, none of these variables were significantly related to the type of hijacking. While we do not believe this is the case, we cannot rule out the possibility that the lack of significance of the weekend and summer variables is partly methodological: that since news cycles slow during summer months and the weekend, the media are therefore less likely to report hijacking stories, and that this may have offset any effect we might have otherwise observed.

Our second hypothesis regarding organizational resources was largely supported. Compared to hijackings with no weapons, hijackings with one weapon were more likely to have terrorist motivations. Similarly, compared to hijackings with no weapons or one weapon, hijackings with a combination of weapon types were more likely to be classified in our data as terrorist. We recognize that because the ability to use weapons might be less in situations with more effective security, it could be that this outcome is being driven in part by differential airport security. However, it is worth noting that if the results are being affected in part by unmeasured differences in security, it should have the effect of making our estimates for weapons more conservative. In any event, our findings suggest that if the hijackers use weapons (or multiple types of weapons) they are more likely to be terrorist hijackers. We also found that as the number of hijackers in an attack increased, the probability that the attack was motivated by terrorism significantly increased. These results likely reflect the higher level of resources available to attackers that are supported by organizations. The results may also be a sign of the level of planning and determination of terrorists, compared to non-terrorist hijackers. In general, these findings lend credence to the conclusion that compared to non-terrorist hijackings, terrorist hijackings are more likely to rely on group resources.

8. Although, we also expected that the number of casualties would be strongly correlated with whether the hijackers were armed (and whether they had multiple types of arms), in fact the connection between being armed and casualties was insignificant ( $r = 0.04$ ) and the connection between casualties and multiple weapon types was significant, but relatively small ( $r = 0.17$ ). We also found no evidence for a significant statistical interaction between multiple weapon types and casualties.

Three limitations should be emphasized. First, our situational measures were limited by the data available to us. Consequently, we had no specific  
 5 offender-level measures, particularly any measures that examined offenders' perceptions of their situations. Further, we had limited data on the characteristics of the groups and individuals who perpetrated the events, beyond whether their demands involved terrorist, transportation, or extortion motives. As such, we were unable to examine in greater detail the specific motives of  
 10 the perpetrators in the terrorist cases. We did attempt to recover additional information on terrorist motivations from the open-source media, but were unsuccessful. It is possible that there are salient differences in terms of specific motives among those cases we have classified as terrorist hijackings. Although such investigations are constrained by available information, future  
 15 data collection that gathers more detailed information on the specific motives of groups perpetrating terrorist hijackings would be useful. Relatedly, we also had limited data on the characteristics of the victims and the security levels at the originating airport. By excluding these variables, it is of course possible that some of the findings related to publicity and organizational resources  
 20 could be altered.

Second, we relied to a large extent on official sources for the aerial hijacking data and the limitations of official crime data are well-documented (Mosher, Miethe, & Phillips, 2002). However, we were able to supplement and cross-validate the official data with other datasets drawn from non-official,  
 25 open media sources such as the Aviation Safety Network and the GTD. In addition, we validated our data with original open-source media reports. Though our data are imperfect, to our knowledge, we have compiled the most comprehensive unclassified research data on aerial hijacking to date.

Third, our measures of publicity and organizational resources are imperfect  
 30 operationalizations of the underlying concepts. At the extreme, it is possible that these approximate measures may actually be tapping different concepts. For example, the US origin variable may be measuring, in part, the geographic isolation of the US in comparison to Europe or Africa. Future data collection and research efforts ought to concentrate on explicitly collecting data on the  
 35 individuals (and groups) who perpetrate these events in order to more directly measure the publicity and organizational resources associated with them.

Going forward, we believe that there is promise in adopting the situational perspective in criminology generally and with respect to aerial hijacking in particular. We have demonstrated that it is possible to use situational characteris-  
 40 tics to identify features of a given hijacking that make it more likely that the hijacking was committed by terrorists. These features reflect the idea that although the motivation to crime or terrorism may well be internal to individuals, individuals interact with situations in order to accomplish their objectives. In doing so, they make rational choices to obtain their goals, whether these  
 45 are extortion, transportation to another country, or political change. Thus, through their decision-making, actors provide clues to their motives. These situational clues could allow researchers to build models that help predict future

behaviors and that also allow officials to make more informative inferences about the intent of those who engage in aerial hijacking.

A major strength of the approach taken here is that we are measuring characteristics that policy-makers and law enforcement personnel would generally have at their disposal as a hijacking occurred. Part of the intrinsic value of a situational perspective is that it permits analysts to attempt to predict outcomes with information that is easily available. These observations reflect the usefulness of a situational perspective both in theory and in practice. That is, policy proscriptions may have more relevance with respect to making successful crimes harder as opposed to changing individual motivations (Clarke & Newman, 2006; Cornish & Clarke, 1986; Hirschi & Gottfredson, 2001). Such information can help guide the law enforcement response to an individual hijacking and can hopefully aid aviation security officials in revising their security screening procedures.

Overall, the policy and practical import of this work is to provide information to policy-makers and the general public so that they can more firmly evaluate prevention and intervention strategies associated with aerial hijackings. For some years now, the concept of an aerial hijacking has been inextricably tied to the *terrorist* aerial hijacking without reference to the extraordinary rarity of this subset of aerial hijackings. Further, since 9/11, this inextricable link between aerial and terrorist aerial hijackings has likely morphed into spectacular terrorist aerial hijackings. Our data suggest that this is not entirely the case. Worldwide, there have only been three terrorist aerial hijackings since 9/11, and no passenger or crew casualties were sustained in those three hijackings. In actuality, of the 34 hijackings since 9/11, 31 were perpetrated by non-terrorists. Of those, four involved passenger or crew casualties. In addition, none of the terrorist or non-terrorist hijackings since 9/11 originated in the United States. Further, beyond 9/11 and the stereotypes associated with that event, our results show that hijackings that originate from a capital city, from a country which is in the top 75th percentile of non-hijacking terrorism that year, or hijackings that originate from somewhere other than the US are particularly likely to be terrorist hijackings. These characteristics ought to be readily apparent to aviation security agents. If a plane with these characteristics is threatened by attackers, decision-makers ought to seriously consider the possibility that they are confronting a terrorist-motivated hijacking. Further, if there is some communication with the plane (either from pilots or passengers), information about the type of arms and the number of hijackers may also be obtained. This more specific information could aid aviation officials in determining their options in addressing the hijacking.

It may also be useful to know which characteristics do *not* differentiate between terrorist and non-terrorist hijackings. Aviation security decision-makers ought not to be distracted by ideas that passengers or crew are more likely to be killed or wounded in terrorist hijackings or that such hijackings are more likely to depart on a weekend or during the summer months. None of these characteristics seem to distinguish terrorist and non-terrorist hijackings.

Our goal in this research was to develop and test an empirical model to determine whether widely available situational variables can differentiate terrorist and non-terrorist hijackings. We framed it in the context of characteristics that increase the publicity of hijackings and that reflect greater organizational resources. Consistent with the argument that compared to non-terrorists, terrorists are more interested in publicity, we found that compared to non-terrorists, terrorists were more likely to target flights that originate in capital cities. Further, consistent with the argument that because terrorists generally have the support of organized groups, compared to non-terrorist attacks, terrorist hijackings were more likely to include either a single weapon or combinations of weapon types than no weapon and a larger number of perpetrators. We conclude that situational models are a potentially useful tool for distinguishing terrorist and non-terrorist aerial hijackings.

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