BUILDING A GLOBAL TERRORISM DATABASE

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April 27, 2006

This project was supported by Grant No. 2002-DT-CX-0001 awarded by the National Institute of Justice, Office of Justice Programs, U.S. Department of Justice. Points of view in this document are those of the authors and do not necessarily represent the official position or policies of the U.S. Department of Justice.

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EXECUTIVE SUMMARY

Although the research literature on terrorism has expanded dramatically since the 1970s, the number of studies based on systematic empirical analysis is surprisingly limited. One of the main reasons for this lack of cutting-edge empirical analysis on terrorism is the low quality of available statistical data. To address this lack of empirical data, the goal of the current project was to code and verify a previously unavailable data set composed of 67,165 terrorist events recorded for the entire world from 1970 to 1997. This unique database was originally collected by the PGIS Corporation's Global Intelligence Service (PGIS).

The PGIS database was designed to document every known terrorist event across countries and time and allows us to examine the total number of different types of terrorist events by specific date and geographical region. To the best of our knowledge this is the most comprehensive open source data set on terrorism that has ever been available to researchers. PGIS trained their employees to identify and code terrorism incidents from a variety of sources, including wire services (especially Reuters and the Foreign Broadcast Information Service), U.S. State Department reports, other U.S. and foreign government reports, U.S. and foreign newspapers, information provided by PGIS offices around the world, occasional inputs from such special interests as organized political opposition groups, and data furnished by PGIS clients and other individuals in both official and private capacities.

By a special arrangement with PGIS, the Principal Investigator arranged to move the original hard copies of the PGIS terrorism database to a secure location at the University of Maryland. In order to increase the efficiency of the data entry process, a web-based data entry interface was designed and made compatible with the database platform. Once the interface was completed, project staff tested its operation with two separate waves of randomly sampled incidents from the original PGIS data cards. Trained undergraduate research assistants then entered cases into the data entry interface. The initial data entry period lasted six months. During the latter part of this time period, we also began verifying entered data for accurate entry against the hard copy cards. The verification procedure has resulted in nearly 50 percent of the database verified for accurate entry.

Although the current report does not address any specific research question, we discuss at length both the strengths and weaknesses of the completed database. Strengths include its broad definition of terrorism and its longitudinal structure. Weaknesses of the database include potential media bias and misinformation, lack of information beyond incident specific details alone, and missing data from lost cards (data for the year 1993 were lost by PGIS in an office move).

Our data collection and analysis strategy has been two pronged. First, we sought to reliably enter the original PGIS data. This was the primary objective for the current grant and has now been completed. Not only have we employed a number of data entry quality control strategies throughout the data entry phase, including extensive training, documentation, tools built into the data entry interface, and pre-testing of the database

both with project staff and student data enterers, but we have also verified for accuracy about half of the total incidents entered. Second, we plan to continue to assess the validity of the PGIS data by comparing it to other sources, by internally checking records, and by continuously examining the database. This is essentially an ongoing project that will be greatly furthered by new projects we are planning with RAND and the Monterey Institute.

Comparing PGIS data directly to the two other major open source databases, RAND and ITERATE, is complicated by their differing structures. While PGIS includes both international and domestic cases, for the most part, RAND (prior to 1998) and ITERATE do not. The PGIS database includes both international and domestic terrorist events, but has no systematic way to distinguish which incidents fall into each category. We are exploring methods for making such comparisons with the RAND-MIPT database in a new project that is just getting under way.

We conclude the report with an in-depth review of the PGIS data via a descriptive analysis of key variables of interest. This analysis is intended to offer the reader greater detail concerning the variables contained in the database, thus no specific research questions are addressed here. We begin by describing the distribution of data within specific variables. Next we describe some of the initial trends shown in the analysis of these variables. Finally, we conclude with a discussion of future project directions and potential research questions that may be addressed using the PGIS data.

BUILDING A GLOBAL TERRORISM DATABASE

Although the research literature on terrorism has expanded dramatically since the 1970s (for reviews, see Babkina 1998; Mickolus and Simmons 1997; Prunkun 1995; Mickolus 1991; Schmid and Jongman 1988), the number of studies based on systematic empirical analysis is surprisingly limited. In their encyclopedic review of political terrorism, Schmid and Jongman (1988:177) identify more than 6,000 published works but point out that much of the research is "impressionistic, superficial (and offers) … far-reaching generalizations on the basis of episodal evidence." The authors conclude their evaluation by noting (p. 179) that "there are probably few areas in the social science literature in which so much is written on the basis of so little research." In fact, the research literature on terrorism is dominated by books with relatively little statistical analysis, many of them popular accounts of the lives of terrorists. By contrast, there are still relatively few studies of terrorism published in the most respected, peer-reviewed social science outlets.

One of the main reasons for this lack of cutting-edge empirical analysis on terrorism is the low quality of available statistical data. While several organizations now maintain databases on terrorist incidents,[1] these data sources face at least three serious

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[1] These include the U.S. State Department (2001); the Jaffee Center for Strategic Studies in Tel Aviv (see Falkenrath 2001); the RAND Corporation (see Jongman 1993); the ITERATE database (see Mickolus 1982; Mickolus et al. 1993); and the Monterey Institute of International Studies (see Tucker 1999).

limitations. First, most of the existing data sources use extremely narrow definitions of terrorism. For example, although the U.S. State Department (2001:3) provides what is probably the most widely-cited data set on terrorism currently available, the State Department definition of terrorism is limited to "politically motivated violence" and thus excludes terrorist acts that are instead motivated by religious, economic, or social goals.

Second, because much of the data on terrorism is collected by government entities, definitions and counting rules are inevitably influenced by political considerations. Thus, the U.S. State Department did not count as terrorism actions taken by the Contras in Nicaragua. By contrast, after the 1972 Munich Olympics massacre in which eleven Israeli athletes were killed, representatives from a group of Arab, African and Asian nations successfully derailed United Nations action by arguing that "people who struggle to liberate themselves from foreign oppression and exploitation have the right to use all methods at their disposal, including force" (Hoffman 1998:31).

And finally and most importantly, even though instances of domestic terrorism[2] greatly outnumber instances of international terrorism, domestic terrorism is excluded from all existing publicly available databases. Noting the exclusion of domestic terrorism from available databases, Gurr (in Schmid and Jongman 1988:174) concludes that "many, perhaps most of the important questions being raised cannot be answered adequately…." Falkenrath (2001) claims that the main reason for the exclusion of domestic terrorism from available databases is that many governments have traditionally

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[2] We use the term "domestic terrorism" throughout to signify terrorism that is perpetrated within the boundaries of a given nation by nationals from that nation.

divided bureaucratic responsibility and legal authority according to a domestic-international distinction (e.g., U.S. Justice Department versus U.S. State Department). But Falkenrath concludes (p. 164) that this practice is "an artifact of a simpler, less globally interconnected era." Some terrorist groups (e.g., al-Qaeda, Mujahedin-E-Khalq) now have global operations that cut across domestic and international lines. Others (e.g., Abu Nidal, Aum Shinrikyo, Kurdistan Workers' Party, and Popular Front for the Liberation of Palestine) have operations in multiple countries and hence, may simultaneously be engaged in acts of both domestic and international terrorism. In short, maintaining an artificial separation between domestic and international terrorist events impedes full understanding of terrorism and ultimately weakens counterterrorism efforts.

The Original PGIS Database

To address this lack of empirical data, we coded and verified a previously unavailable data set composed of 67,165 terrorist events recorded for the entire world from 1970 to 1997. This unique database was originally collected by the Pinkerton Corporation's Global Intelligence Service (PGIS). The collectors of the PGIS database aimed to record every major known terrorist event across nations and over time. This format allows us to examine the total number of different types of terrorist events by date and by geographical region. PGIS originally collected this information from multi-lingual news sources for the purpose of performing risk analysis for United States business interests. For example, individuals interested in the risk associated the moving their business to an international location could hire PGIS to run a risk analysis for the region of interest. In addition, PGIS produced annual reports of total event counts by

different categories, such as region or event type, and a narrative description of regional changes in terrorist event counts from the previous year. The database contains nine unique event types; seven of which were defined *a priori* by PGIS, including bombing, assassination, facility attack, hijacking, kidnapping, assault, and maiming (See Appendix A, Incident Type Definitions). PGIS later added two categories, arson and mass disruption, to fit unique cases they found during data collection.

To the best of our knowledge this is the most comprehensive open source data set on terrorism events that has ever been available to researchers. There are at least four main reasons for this. First, unlike most other databases on terrorism, the PGIS data include political, as well as religious, economic, and social acts of terrorism. Second, because the PGIS data were collected by a private business rather than a government entity, the data collectors were under no pressure to exclude some terrorist acts because of political considerations. Third, unlike any other publicly available database the PGIS data includes both instances of domestic and international terrorism starting from 1970. And finally, the PGIS data collection efforts are remarkable in that they were able to develop and apply a similar data collection strategy for a 28-year period.

To illustrate how consequential these coding differences are we compare terrorism event counts for 1997 between the PGIS database and the U.S. State Department terrorism database. In that year, the Department of State records 304 acts of international terrorism, which caused 221 deaths and 683 injuries. For the same year, the PGIS data reports on 3,523 acts of terrorism and political violence that claimed 3,508 lives and inflicted 7,753 injuries. Thus, the PGIS database includes nearly 12 times as many incidents as the State Department database for the same year.

PGIS trained their employees to identify and code all terrorism incidents they could identify from a variety of multi-lingual sources, including: wire services, such as Reuters and the Foreign Broadcast Information Service, U.S. State Department reports, other U.S. and foreign government reporting, U.S. and foreign newspapers, information provided by PGIS offices throughout the world, occasional inputs from such special interests as organized political opposition groups, and data furnished by PGIS clients and other individuals in both official and private capacities. Although about two dozen persons were responsible for collecting information over the years the data were recorded, only two individuals were in charge of supervising data collection and the same basic coding structure was used throughout the entire data collection period. The most recent project manager of the PGIS database was retained as a consultant on the NIJ project and assisted with development of the database interface and codebook and served as a consultant on data entry questions as they arose.

METHODS

By a special arrangement with the Pinkerton Global Intelligence Service (PGIS), the Principal Investigator arranged to move the 58 boxes of original hard copies of the PGIS terrorism database to a secure location at the University of Maryland. Once the data were transferred to the university campus, several steps were necessary before data entry could begin. First, we had to design a system for accurately encoding the data. This proved to be challenging because of the large size of the database and the budget limitations we faced. The large size of the database meant that for us to code the data within the usual time restrictions of the granting process, we were going to need a large

staff working to enter the data. The budget restrictions meant that we were going to be severely limited in terms of what we could pay data coders and also in terms of the equipment we could afford to purchase to do the data coding. We decided to solve the first of these budget restrictions by employing undergraduate volunteers and interns. Because we could not afford to equip a large computer lab with personal computers for data entry, we decided to develop a web-based data entry system that would allow a very large number of students to work on the database, using their own equipment, on a flexible schedule. This method also had the advantage of giving us a good deal of control over the data entry process: we had a computerized record of how much time all of our data coders were putting in and we could easily verify individual coding records for accuracy. Accordingly, we worked with computer experts at the University of Maryland to develop a web-based data entry interface.

Second, once we had developed the database codebook and data entry interface, we then had to pre-test both the codebook and interface for data entry problems. All pre tests were done by the PI, the Co-PI and the lead graduate students working on the project. Over the course of the two-month pretest period, we identified an array of problems with both our data entry codebook and the web-based system we were employing to record data. Most of these problems involved clarification of the data entry codebook language, such that data entry rules became increasingly detailed and specific. For example, we created specific rules for using the value “unknown.” In the case of fields indicating the number of persons killed and injured in an event, our data entry rules stated that “unknown” was to be chosen only if the field stated “unknown” on the data card. If the field was blank on the data card, it was assumed that the number killed or

injured was zero. In addition, we created automatic entry fields in the web-based interface to be automatically applied under specific circumstances. For instance, if the event type was entered as a bombing, and the bombing was entered as successful, then the field indicating that damages were incurred was automatically activated by the interface (i.e. the damages check-box was checked). Another example was in the case of kidnapping events. If an event was entered as a successful kidnapping, then the check-box indicating that persons were kidnapped in the course of the event was automatically checked. These revisions and additions to the codebook and interface were all made in the interest of increasing data entry reliability while decreasing data entry error.

Third, after we were confident in the quality of the data entry procedures, we had to develop and implement data entry training procedures. We added an extensive training manual (see Appendix B) to the data entry codebook for this purpose and conducted a full-day training session for an original group of approximately 70 undergraduate coders. Over time, training sessions were added as new students joined the project.

Finally, once data entry began, we faced the ongoing process of data verification. Our original plan was to verify a randomly selected 10% of the total cases in the sample. However, over the life of the grant, we have now reached a verification rate of nearly 50 percent.

Overview of the Data Collection Plan

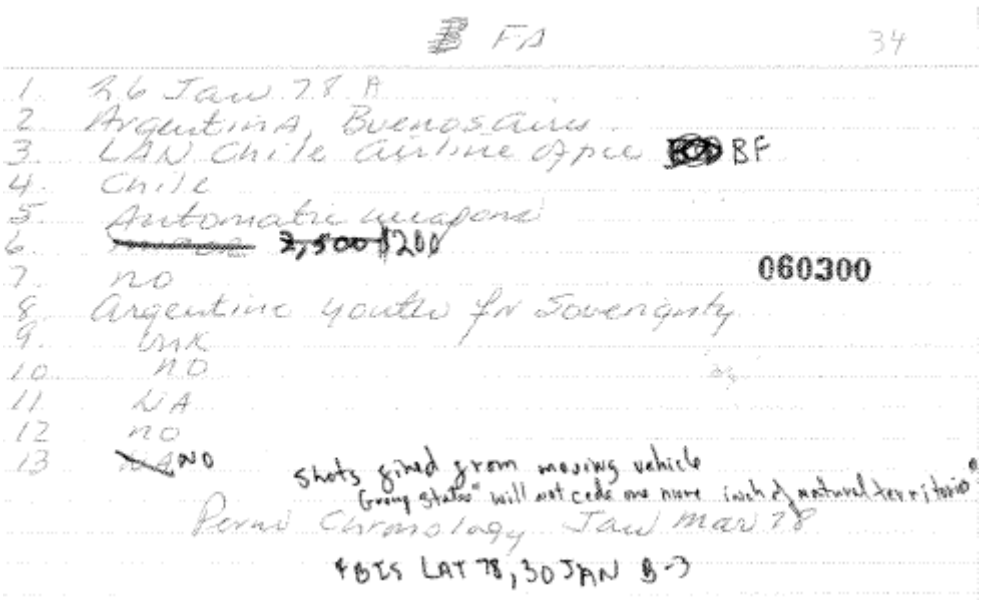
From the very beginning of this project, we envisioned data retrieval as a two step process. During the first step we made every effort to insure that we had accurately collected every bit of information available in the original PGIS data. This meant

designing a system for retrieving the data, training students to collect the data from the original file cards and an extensive verification procedure to make sure that the data were accurately captured. During this initial phase we concentrated on the reliability of our coding scheme in terms of capturing the original PGIS data. Second, once the PGIS data were reliably collected, our plans were to turn to the issue of how valid they were as a measure of terrorism. Our ongoing efforts to validate the PGIS data have consisted of efforts to compare the PGIS data to other open source databases and in many cases, to go back to original sources to check for the accuracy of interpretations in the original data set. Improving the validity of the PGIS data is an ongoing project.

Designing the Database and Web-Based Data Entry Interface

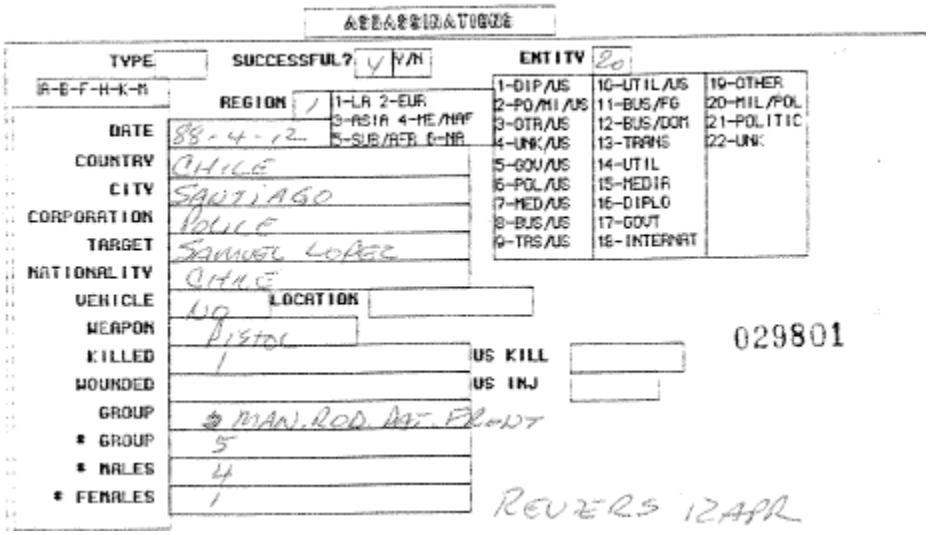
Although the same general coding system, using the same variables of interest, was used throughout the 28 years of PGIS data collection, the precise format used for data coding underwent three major changes. First, the initial data (from 1970 to mid-1985) were coded on *index cards* using a numbering system unique to each event type. We have re-produced one of these cards in Figure 1.

Figure 1. Sample PGIS Index Card



Second, starting in mid-1985 through 1988, the next system remained unique to event type, but used a field formatted card rather than a line numbered index card. We refer to this second card style as a *hybrid card* and include an example below.

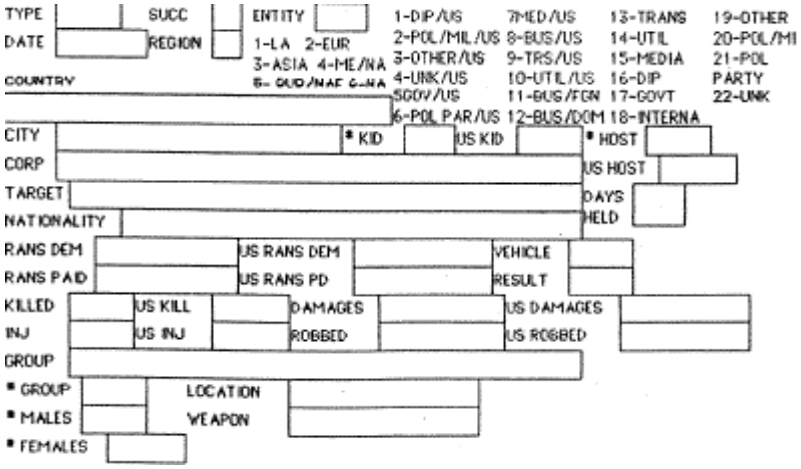
Figure 2. Sample PGIS Hybrid Card



Finally, the third system retained the field formatted card but differed in that it could be used for all event types. PGIS used this system for the remainder of the data

collection period, 1989 to 1997. We call this third type of card, a *generic* card and provide an example below.

Figure 3. Sample PGIS Generic Card



In order to increase the efficiency of the data entry process, the Co-Principal Investigators retained a computer network consultant from the University of Maryland's Office of Academic Computing Services to design a web-based data entry interface compatible with the Mircrosoft Access database platform. To reduce data entry errors, the data entry interface was designed to match the design of the generic incident card used by PGIS in their coding. In addition, drop down menus were used whenever possible to reduce errors. The interface strategy allowed data entry from any internet connected computer workstation through a secure website and login system. The interface design also allowed project managers to track and monitor data entry progress for all individuals entering data through a unique coder user identification number.

Once the interface was completed, project staff tested its operation with a random sample of incidents from the original PGIS data cards. The two Co-Principal Investigators, the consultant retained from PGIS, and four graduate students (hereafter

referred to as “project staff”) entered a proportionate sample of data taken from each of the original boxes of incident data containing only generic or hybrid cards; the PGIS index cards were integrated in the next testing phase. This sampling strategy resulted in 137 (0.2 %) cases pre-tested in the data entry interface. Results of the pre-test led to modifications of the entry interface as well as further specification of the data entry codebook (See Appendix B, Terrorism Data Entry Codebook). In the next round of testing, the project staff members entered a random sample of 1,000 (1.5 %) cases and integrated the index card coding format into the entry interface. Again, this testing led to further modifications of both the codebook as well as the data entry interface.

Data Entry

Recruitment. Undergraduate students from The University of Maryland were recruited in three waves of email advertisements, including the Honors Program mailing list, the Criminology and Criminal Justice Department major mailing list, and the general undergraduate mailing list. These mailings resulted in over 130 responses from interested students. All eligible students were asked to submit an application via email and were invited to participate in the data entry project through one of two possible routes. The first route was to work on the project in return for course credit through an Independent Study course; 17 students eventually registered for the course. The second was to work for the project as a paid intern research assistant; 41 students were initially employed as paid interns. Of these students, 38 continued throughout the full semester of data entry. Finally, data entry was also offered as a class project in one semester of

Criminology and Criminal Justice Research Methods; nearly 40 students participated in the project through this course.

Training. From the applications received, 70 undergraduate paid and volunteer students were invited to attend a five hour training course where the seven lead project staff explained the nature of the original PGIS data and how the data had been collected, explained the goals of the current project related especially to data entry, offered detailed explanations of the data-entry codebook including examples of data entry, and discussed administrative procedures for working on the project. Students at this initial session were trained only on the hybrid and generic PGIS cards. This decision was based on the assumption that these cards were the most straightforward to interpret. Given our initial emphasis on reliably capturing all PGIS data, student coders were trained to record every piece of information from each card they entered. Students were also asked to notify the project staff about all data entry problems or errors that they encountered. At the end of the training program, students were given time to practice data entry with project staff members available for questions in a campus computer lab. Each student was then asked to enter the same 50 test cases over within the following week. These test cases were specifically chosen from the PGIS data cards to be representative of the more complicated cases in the database. Only students who entered the 50 test cases with few problems were accepted to work on the project. We also developed at this stage a separate guideline review of data entry training to address the most common errors made in entering the 50 test cases (See Appendix C, General Data Entry Test Case Results). The project staff stressed to the students that all data entry mistakes should be identified by students without fear of penalty, that un-enterable cards should be set aside for review

and that any unusual or confusing data encountered should be brought to the attention of supervisory project staff. Each student was then asked to enter a minimum of 100 cases per week over the next two months.

Additional training for the PGIS index card coding format took place after the first month of data entry. Due to the event specific format of the index card coding system, students were trained in one of five separate training sessions and were assigned to enter only cards of a specific event type. There were seven event types defined a priori by PGIS including: assassination, killing a specified target; bombing, the intended destruction or damage of a facility through covert placement of bombs; facility attack, the intended robbery, damage or occupation of a specific installation; hijacking, assuming control of a conveyance; kidnapping, targeting a specific person in an effort to obtain a particular goal such as payment of ransom or release of a political prisoner; maiming, inflicting permanent injury; and assault, inflicting pain but not permanent injury (for complete definitions of these event types, see Appendix A).

Most of the students were trained to enter assassinations, bombings or facility attacks because these incident types are more frequent in the database. Two students were extensively trained to enter hijacking and kidnapping cases because although these cases were less frequent, they contained the most complex information to be entered. In kidnapping and hijacking cases, information for the variable fields was often found within additional notes recorded by the initial data coder; thus students entering these data needed to pay careful attention to accurately record all information into the appropriate variable fields. Although students did not have the opportunity to practice entry with the index cards most students reported that the index card system was easier

for data entry than the generic or hybrid format. This was likely due to the fact that each type of event (i.e. bombings, assassinations, facility attacks, etc.) shares similar types of tactics and information including weapons used, types of targets and the amount of detailed information recorded (e.g., assassination cards often contained names, occupations and ages of the specific individuals targeted, whereas bombings typically included more general target types such as political party offices).

Students who remained with the project after the end of the project's first academic year were next trained to enter incident cards stapled together by PGIS. Stapled cards indicated cases where multiple cards represented one unique incident. These cases were more complex than others and called for careful attention to detail and review because many relied upon different original information sources, thus creating conflicting information from differing accounts of a single event. As there is currently no standard method for assessing the reliability of the variety of news sources used in the database, for these cases, students were asked to record all information from both cards by first choosing the information from the latest original source date for entry into the data fields and secondly including discrepant information from other sources in an additional note section of the database. These data entry rules were developed on the assumption that media accounts of an event are likely to become more precise and accurate over time as the aftermath of the event unfolds (for example as death tolls are taken). In cases where the "latest source date" rule did not resolve the conflict (e.g. both sources share the same date but contain discrepant information), students were told to use the information from the most complete data card (e.g. the majority of the fields contained information) for entry into the variable fields and retaining the discrepant

information from the other source(s) in the additional note section of the database. In this way, all of the information is captured in the database and can be furthered compared against other sources in the future using a verification procedure. Most of the discrepancies involved the specific number of persons killed or injured, usually differing by no more than five, or the precise location of an event (i.e. neighboring cities or towns).

Original data entry spanned approximately five months, from February 2003 through July 2003. During the latter part of that time period, we also began verifying the accuracy of the entered data by comparing the entered information against the hard copies of the cards.

The verification procedure. Verification was defined as a complete review of the incident card details as entered into the data entry interface. Thus, in order for an incident in the database to be coded as verified, at least two separate project staff members have reviewed the entry in its entirety and agreed that it is accurately entered. As a quality control measure, project staff initially developed a strategy of verifying a random sample of at least ten percent of the total entered data (at minimum 6,716 incidents). The verification process involved first correcting any data entry errors of which the student who originally entered the data was aware (i.e. those cases students had set aside as problematic). Next, using random number generation software, ten of the original set of 100 cases were taken as a ten percent random sample for verification. This procedure, in addition to others discussed later, eventually led to a far higher proportion of verified cases than the minimum ten percent originally planned (see Table 1).

Table 1. Number of Incident Cards Verified

Verified	Frequency	Percent	Cumulative Frequency	Cumulative Percent
0	36941	55.00	36941	55.00
1	30224	45.00	67165	100.00

For the first round of verification, project staff verified two sets of student-entered data (each set is approximately 100 incident cards). Based on the results of the initial verification process, only students with 90 percent accuracy in their data entry were invited to verify data. To ensure that systematic data entry errors were found and corrected, each verifier was assigned to specific students (i.e. verifier "John" verifies all of student "Sally's" data entry). When systematic mistakes were found, verifiers were told to review *all* of the student data coder's sets of cases. Thus, in cases where systematic mistakes were found, all of the cases entered by that particular student were verified. Students who made a significant number of random mistakes, defined as greater than nine mistakes in a set of 100 cards, were removed from the data entry assignment and all of their data entry was also verified. Fewer than ten students were removed from entry based on these criteria, and all of their entry was verified by a second party. This procedure, in addition to the over-sampling used in the random selection verification discussed previously, explains in large part why we eventually verified a much larger proportion of cases than we had originally planned to do.

EVALUATING THE PGIS DATA

Although every effort was made, from data entry eligibility requirements and applicant screening to extensive data verification and cleaning, to ensure that our coding

of the PGIS data was as complete and accurate as possible, nevertheless, the resulting database has both strengths and weakness—many of which were beyond our control. Strengths of the database include its broad definition of terrorism and its longitudinal structure. Weaknesses of the database include potential media bias and misinformation, lack of information beyond incident specific details alone, and missing data from a set of cards that were lost during an office move of PGIS. We review some of these strengths and weaknesses in the next section of this report.

Database Strengths

In reviewing our work on these data over the past three years, we believe that the database has four major strengths.

First, the PGIS data are unique in that they included domestic as well as international terrorist events from the beginning of data collection. This is the major reason why the PGIS data set is so much larger than any other currently available open source databases. In a review, Alex Schmid (1992) identified 9 major databases that count terrorist events, and reports that each of these databases contains less than 15 percent of the number of incidents included in the PGIS data.

Second, PGIS had an unusually sustained and cohesive data collection effort. Thus, the PGIS data collection efforts were supervised by only two main managers over the 27 years spanned by the data collection effort. We believe that this contributes to the reliability of the PGIS data.

Third, we feel that there are advantages in the fact that the PGIS data were collected not be a government entity but by a private business enterprise. This meant that

PGIS was under few political pressures in terms of how it classified the data being collected.

And finally, the definition of terrorism employed by the original PGIS data collectors was exceptionally broad. Definitions of terrorism are a complex issue for researchers in this area. In fact, compared to most areas of research in criminology, researchers studying terrorism spend an exceptional amount of time defining it. Thus, many of the most influential academic books on terrorism (e.g., Schmid and Jongman 1988; Hoffman 1998) devote their first chapters to definitions of terrorism. The reasons for the difficulty are not hard to see. As Fairchild and Dammer (2001:281) note, "one man's terrorism is another man's freedom fighter." And in fact one of the commonly-cited challenges to the empirical study of terrorism (Falkenrath 2001:165) is that the various publicly-available databases have used differing definitions of terrorism.

A major reason that we were drawn to the PGIS data is that the definition of terrorism it employed throughout the data collection period is especially inclusive:

> the threatened or actual use of illegal force and violence to attain a political, economic, religious or social goal through fear, coercion or intimidation.

Compare this definition with the ones used by the U.S. State Department:

> premeditated, politically motivated violence perpetrated against noncombatants targeted by subnational groups or clandestine agents, usually intended to influence an audience;

and the Federal Bureau of Investigation (FBI):

> the unlawful use of force or violence against persons or property to intimidate or coerce Government, the civilian population, or any segment thereof, in furtherance of political or social objectives.

Neither the State Department nor the FBI definition of terrorism includes threats of force. Yet as Hoffman (1998:38) points out, "terrorism is as much about the threat of violence as the violent act itself." Many, perhaps most, hijackings involve only the threatened use of force (e.g., "I have a bomb and I will use it unless you follow my demands"). Similarly, kidnappers almost always employ force to seize the victims, but then threaten to kill, maim or otherwise harm the victims unless demands are satisfied. Note also that the State Department definition is limited to "politically motivated violence." The FBI definition is somewhat broader, including social along with political objectives as fundamental terrorist aims. However, the PGIS definition also includes economic and religious objectives. For example, an economic objective for a terrorist group might be to kidnap a foreign national in order to acquire a ransom to pay for continued terrorist activity.

Unlike the State Department, whose mandate is to focus on international terrorism (i.e., that involving the interests and/or nationals of more than one country), the PGIS data are not limited to international incidents. To underscore the importance of this difference consider that two of the most noteworthy terrorist events of the 1990s—the March 1995 nerve gas attack on the Tokyo subway system and the April 1995 bombing of the federal office building in Oklahoma City, both lack any known foreign involvement and hence were purely acts of domestic terrorism.

Based on coding rules originally developed in 1970, the persons responsible for collecting the PGIS database sought to exclude criminal acts that appeared to be devoid of any political or ideological motivation and also acts arising from open combat between opposing armed forces, both regular and irregular. The data coders also excluded actions taken by governments in the legitimate exercise of their authority, even when such actions were denounced by domestic and/or foreign critics as acts of "state terrorism." However, they included violent acts that were not officially sanctioned by government, even in cases where many observers believed that the government was openly tolerating the violent actions.

In sum, we regard the fact that these data were collected by a private corporation for a business purpose as an important advantage over other data sets currently available. Because the goal of the data collection was to provide risk assessment to corporate customers, the database was designed to err on the side of inclusiveness. The justification was that being overly inclusive best serves the interest of clients—an employee of a corporation about to move to Colombia would be concerned about acts of violence against civilians and foreigners, even if these acts were domestic rather than international, threatened rather than completed, or carried out for religious rather than political purposes. While there is at present no universally accepted definition of terrorism, the definition used to generate the PGIS data is among the most comprehensive that we have been able to identify.

Weaknesses of Open Source Terrorism Databases

But while the PGIS data has some important strengths, it is important to recognize that it also has important weaknesses, most of which are shared by other open source databases as well. Three types of weaknesses are especially important.

First, all the major open source terrorism databases (ITERATE, MIPT-RAND and PGIS) rely on data culled from news sources, thus these databases may be biased in favor of the most newsworthy forms of terrorism (Falkenrath 2001). In addition, using media accounts as a primary source makes compiling attacks that were averted by authorities or that were unsuccessful a more uncertain task (Falkenrath 2001). Although the PGIS database includes events that were prevented by authorities whenever that information was available, it is certain that some potential terrorist incidents never came to the attention of the media and thus are excluded. A related issue is that the PGIS database includes incidents covered by the media where the perpetrator remains unidentified. Without information concerning the perpetrator of the event it may be difficult to accurately classify the incident as terrorism. Finally, various media accounts of similar terrorist incidents may contain conflicting information and there are no measures of reliability in news reporting that allow researchers to discern which source to choose as the most accurate.

Second, while there are multiple databases containing information on the characteristics of terrorism incidents, there is a considerable lack of information on other important issues associated with terrorism. For example, Schmid and Jongman (1988) highlight the fact that there is a scarcity of data on terrorist organizations and terror utilized by states against its citizens. Open source databases, including the one created by

PGIS also lack information on the "psychological characteristics, recruitment, and careers of members of terrorist movements" (Jongman 1993:28). There are also no "broadly-based data sets with coded information on the outcome of terrorist campaigns or on government responses to episodes of domestic terrorism" (Jongman 1993:28). Of course, the lack of data on terrorist groups is mainly explained by their clandestine nature. The media also tends to focus on terrorism employed by non-governmental insurgents rather than state terrorism. Overall, the reason for the large quantity of information on the characteristics of sub-state terrorism incidents is because this information is more readily available from media sources. Thus, it is important to recognize that the data captured in open source terrorism databases are limited and are appropriate for only certain types of studies. As Fowler (1981:13-14) points out:

> While none of the data-collection efforts attempt to gather information on all forms of terrorism, these databases should be not considered 'samples' of terrorist incidents in the statistical sense. This is an important distinction. Within the scope of terrorist acts defined for each database, and within technological and human limits, the data, in principle, comprise the actual 'universe' of like terrorist acts. Terrorist databases are more like census databases.

One way we intend to confront these challenges is to construct a dataset of comparable scope to the PGIS data, including both the time span and the countries found within PGIS, which accounts for economic, social and political variables associated with the use of terrorist tactics. Although much has yet to be completed, the development of this dataset is currently in progress.

Finally, after the project began, we encountered a very specific limitation of the PGIS data. At some point when the PGIS data were moved between offices, most of the original data for the year 1993 were simply lost. Although we spent a good deal of time checking leads with former employees of PGIS, we were unable to recover these missing data.

COMPARISONS ACROSS DATABASES

To date, there are three major statistical terrorism databases publicly accessible to researchers: (1) the International Terrorism Attributes of Terrorist Events database (ITERATE) compiled by Edward Mickolus, (2) the MIPT-RAND database (RAND) compiled by the RAND Corporation, and (3) the PGIS database. These databases are similar in that each uses the individual terrorist event as the unit of analysis (Fowler 1981), however, the databases vary in the type (international vs. domestic terrorism incidents) as well as extent (number of incidents, variables, time frame) of terrorism data they collect.

Previous research has addressed some of the problems associated with terrorism databases (see Falkenrath 2001, Schmid and Jongman 1988, Hoffman 1998 and Jongman 1993; LaFree and Dugan 2004) and offered a few limited comparisons among them (see Fowler 1981, Schmid and Jongman 1988 and Jongman 1993). Yet, there has been relatively little analysis done on whether different open-source terrorism databases are actually measuring the same events. It is also unclear whether, how and why the terrorist events included in one database may differ from those in another database.

But doing specific empirical comparisons between the PGIS data and the ITERATE and RAND data are complex because of their very different underlying structures. Most importantly, the PGIS database includes both international and domestic terrorist events, but has no systematic way to distinguish which incidents fall into each category. By contrast, both RAND and ITERATE compile incidents that are exclusively international during the comparable time span of 1970 to 1997. Thus, without being able to clearly distinguish the international and domestic PGIS events, comparing event counts between PGIS and the other two major databases is misleading. As we mention below, we are currently embarking on a new project funded by NIJ in which we will address this issue by developing a data analysis plan that will allow us to merge the PGIS and RAND data.

Terrorism Databases

The ITERATE database contains over 12,000 international terrorism incidents, from 1968 until the present (Mickolus 2003). Edward Mickolus, a former CIA analyst, presents the data in both a chronological narrative format as well as a computerized empirical format with approximately 150 variables, readily amenable to statistical analyses. The ITERATE dataset has been used in multiple groundbreaking empirical studies of terrorism (e.g., Sandler and Scott 1987, Cauley and Im 1988, Enders and Sandler 1993, Brophy-Baermann and Conybeare 1994, and Enders and Sandler 1999). The large size and scope of the ITERATE database, as well as the fact that it has been widely available to researchers has made it the most widely used of the open source terrorism databases (Hoffman and Hoffman 1995:178).

The RAND database contains over 8,000 international terrorism incidents from 1968 until 1997 (RAND 2003). Beginning in 1998, and continuing through the present, the RAND database began including incidents of domestic terrorism as well. Over 6,700 domestic and international incidents were collected from 1998 to the present, amounting now to a total of over 15,200 incidents (RAND 2003). The RAND corporation is an independent, non-profit think tank, which undertakes a wide range of contract research, primarily for branches and agencies of the U.S. government (Hoffman and Hoffman 1995:178). The RAND terrorism database has enabled RAND to be

> a world leader in quantitative analyses of terrorism since the early 1970s…producing a renowned series of publications providing annual chronologies of international terrorism, analyses of trends in terrorist activity, tactics and targets, and responses and counter-measures (Hoffman and Hoffman 1995:178).

The amount of analyzable quantitative data available to the public, however, is limited by the format of the RAND database. Statistics on the number of victims killed and injured, type of weapon used, country where the incident occurred, region of the world, group responsible, type of incident and date can be easily calculated. Yet, other common variables found in the ITERATE and PGIS databases, such as the number of terrorists killed and injured or the number of Americans killed and injured, cannot be publicly accessed for calculation by country. Moreover, RAND possesses a substantial amount of additional data related to terrorism that are not made publicly available (Ellis, personal correspondence, 2003). Nevertheless, RAND's online database chronology is

the most easily accessible and user friendly for developing simple summary statistics on the aforementioned variables.

For many years the U.S. State Department (STATE) has also maintained a database on international terrorism incidents. Yearly reports highlight trends in terrorism and present summary statistics on a few variables (U.S. State Department 2001). However, the chronological narrative format of the STATE database limits its applicability for in-depth empirical analyses. Thus, it is not surprising that we were unable to identify a single published empirical analysis of the STATE data. Although STATE is "one of the most widely cited data sets on terrorism currently available" the lack of publicly available data that are empirically analyzable greatly limits the utility of these data (LaFree and Dugan 2002:1-2).

Terrorism database definitions. As we have already seen, the definitions of terrorism vary among the three databases, which in turn greatly affects their scope and content (Fowler, 1981). The definitions employed by each of the databases are contrasted below in Table 2.

Table 2. Definitions of Terrorism Used in Major Terrorism Databases.

ITERATE	"International/transnational terrorism is the use or threat of use, of anxiety inducing extranormal violence for political purposes by any individual or group, whether acting for or in opposition to established government authority, when such action is intended to influence the attitudes and behavior of a target group wider than the immediate victims and when, through its location the mechanics of its resolution, its ramifications transcend national boundaries" (Jongman 1993:29-30)
RAND	"Terrorism is defined by the nature of the act, not by the identity of the perpetrators nor the nature of the cause. Terrorism is violence, the threat of violence, calculated to create an atmosphere of fear and alarm. These acts are designed to coerce others into actions they would otherwise not undertake or refrain from taking actions that they desired to take. All terrorist acts are crimes. Many would also be violations of the rules of war, if a state of war existed. This

	violence or threat of violence is generally directed against civilian targets. The motives of all terrorists are political, and terrorists actions are generally carried out in a way that will achieve maximum publicity. The perpetrators are members of an organized group, and unlike other criminals, they often claim credit for their acts. Finally, terrorist acts are intended to produce effects beyond the immediate physical damage they cause having long-term psychological repercussions on a particular target audience. The fear created by terrorists, for example, may be intended to cause people to exaggerate the strength of the terrorists and the importance of their cause, to provoke governmental overreaction, to discourage dissent, or simply to intimidate and thereby enforce compliance with their demands." (Hoffman and Hoffman 1995:182)
PGIS	"The threatened or actual use of illegal force and violence to attain a political, economic, religious or social goal through fear, coercion or intimidation" (PGIS 2003)

The most notable difference here is that the ITERATE and RAND (only from 1968 until 1997) databases contain only international terrorism incidents. Recall that the PGIS database does not specifically define or distinguish between international and domestic terrorism; this problem currently complicates efforts to make direct comparisons to other databases.

We argue that focusing only on international or transnational terrorism is problematic. Perhaps most importantly, scholars estimate that international terrorism accounts for only five to ten per cent of total terrorist events world-wide (Hoffman and Hoffman 1995:180; LaFree and Dugan 2002:2). As we have already noted above, the exclusion of domestic terrorism from other databases is one of their main weaknesses because "many, perhaps most of the important questions being raised cannot be answered adequately…." (Gurr in Schmid and Jongman 1988:174). Moreover, the traditional separation between domestic and international terrorism incidents "tends to confuse the understanding of terrorism, and its rigid application tends to weaken counter terrorism

efforts" (Falkenrath 2001:164). Windsor (1989:273) sums up this viewpoint when he asks, "is there such a category as international terrorism?" The databases' definitions of international terrorism are shown in Table 3.

Table 3. Definitions of International Terrorism Used by Terrorism Databases

ITERATE	"International/transnational terrorism… its ramifications transcend national boundaries" (Jongman 1993:29-30)
	"Transnational terrorist events include the agents, victims, territory, or institutions of two or more nations" (Enders, Sandler and Cauley 1990:83).
	"Incidents originating in one country and terminating in another are transnational, as are incidents involving the demands made of a nation other than the one where the incident is staged…transnational terrorism does not cover the vast number of incidents that do not cross political boundaries" (Cauley and Im 1988:27).
RAND	"International Terrorism: Incidents in which terrorists go abroad to strike their targets, select domestic targets associated with a foreign state, or create an international incident by attacking airline passengers, personnel or equipment" (RAND 2003).
	"International terrorism, defined here as incidents in which terrorists go abroad to strike their targets, select victims or targets that have connections with a foreign state (e.g. diplomats, foreign businessman or offices of foreign corporations), or create international incidents by attacking airline passengers, personnel and equipment" (Hoffman and Hoffman 1995:182).
PGIS	"Because we made no distinction between domestic and international terrorism, we defined neither. Had we done so, we probably would have adopted the State Department's definition of international terrorism and considered domestic terrorism anything lacking the involvement of any country or group not indigenous to the country in which the act occurred" (Barber, email correspondence, 2003).

As shown in Table 3, the ITERATE database uses the term "transnational" terrorism interchangeably with international terrorism. Fowler defines transnational terrorism as "acts committed by basically autonomous non-state actors against territory or nationals of some foreign country" (Fowler 1981:11). Milbank (1976) addresses the

difficulty in distinguishing transnational and international terrorism and claims that transnational terrorism is simply sub-state terrorism that is not sponsored by a nation. Yet, according to Ellis (personal correspondence, 2003) transnational terrorism has a somewhat different definition:

> the term transnational terrorism is often used to describe organizations such as Osama bin Laden's Al Qaeda network, that include militants of multiple nationalities and that operate in many countries at once. It is also sometimes used synonymously with international terrorism, or terrorism that involves the citizens or territory of more than one country.

Ellis (personal correspondence, 2003) concludes that: "The main utility of 'transnational terrorism' today would appear to be using it in reference to groups the current Administration intended when it mentioned terrorist groups 'of global reach.'" As with the definition of terrorism itself, definitions of international and transnational terrorism are subjective and may vary over time.

Defining international terrorism is also dependent on how 'nation' is defined in each database. PGIS, RAND and ITERATE each used different sources to create their unique country lists for inclusion in their database (see Appendix D, Sources Used to Create the Database Country Lists). For example, PGIS, RAND and ITERATE each include entities whose legal existence as countries are in dispute (Mickolus 2003). Thus, PGIS and RAND include "Kashmir" in its list of "countries," and PGIS, ITERATE and RAND include "Northern Ireland." PGIS and ITERATE also include as countries Palestine, Sri Lanka, Kurdistan, Corsica, Chechnya, Cabinda and Sikkim, which are all regions of a larger internationally recognized country that is also included in the database

(for a full listing of countries contained in each database, see Appendix E). Of course, by including regions of recognized countries as well as the countries themselves, the RAND and ITERATE databases are also including select incidents of domestic terrorism, even though domestic terrorism is not recognized in their own decision and coding rules.

Mickolus (2003:8) recognizes the inclusion of some domestic terrorism in the ITERATE database:

> while many of these attacks are considered to be domestic terrorism such attacks are included if terrorists traverse a natural geographical boundary to conduct attacks on the metropole, e.g. Northern Irish attacks on the main British island…and attacks within Israel by Palestinian.

Yet, Mickolus never defines a "natural geographic boundary." Moreover, applying this logic elsewhere would seem to imply that we include separate counts for all the regions of countries that are separated by a natural geographic boundary. For example, should Hawaii or Alaska be considered its own country? Ellis (personal correspondence, 2003) explains why RAND chose to consider Northern Ireland and Kashmir as separate countries:

> The decision was to isolate contested regions with high volumes of attacks, which might skew the results of researchers attempting to study other terrorist patterns in the country. It is a bit like looking at a graph of international terrorist lethality over time and not being able to separate out the spike on 9/11 (which is a bit of an outlier). A researcher would have a difficult time immediately gauging whether 2001 was particularly bloody

year or if it was really just a big attack and everything else remained relatively stable.

Therefore the RAND database includes attacks where terrorists from Northern Ireland cross over to England to carry out their attacks. Yet, RAND would not count the act if the terrorists were crossing over from Wales because RAND does not count Wales as a distinct country. The point is that the RAND and ITERATE databases selectively include domestic terrorism in certain countries as well as only a portion of that country's domestic terrorism. This condition creates bias in their documentation of both international and domestic terrorism.

Prior Research Comparing Terrorism Databases

There is a limited amount of literature that directly compares open source terrorism databases. Fowler (1981) examined the RAND, PGIS and ITERATE terrorism databases along with five others and describes their differing functions, problems and structures. He concludes that the lack of rigor in incident sampling and reliance on chronologies are the greatest weaknesses facing these databases. Although his work provides a foundation for the study of terrorism databases, Fowler does not present any detailed statistical comparisons. Nevertheless, Fowler offers an excellent early descriptive examination of open-source terrorism databases.

Schmid and Jongman (1988) identified 14 databases related to terrorism and violent conflict, although only three of these databases extend beyond 1970, and only one (ITERATE) explicitly measures terrorism. Like Fowler, Schmid and Jongman offer brief narratives on each database rather than providing summary statistics. While they do offer

some useful critiques of ITERATE and the other databases, they offer no systematic statistical comparisons.

Jongman (1993) identifies seven event-based terrorism databases: the PGIS database (referred to as "Risks International"), the U.S. State Department Database, ITERATE, RAND, a database called Imprimis constructed by the Foundation for the Study of Terrorism in London, a database called COMT compiled by the Center for the Study of Social Conflicts in Leiden, a database assembled by the Jaffee Center for Strategic Studies, and a database created by the Central Intelligence Agency. These databases vary greatly in the range of years covered. The most comprehensive of the databases are PGIS, ITERATE, and STATE.

For his most comprehensive comparison, Jongman (1993) looks at the trends in the databases' incident totals using the year as the unit of analysis. However, he cautions that simply totaling incidents by year and then comparing the databases may be problematic—due to many of the same database compatibility issues that we have already discussed (Jongman 1993:26). Jongman also compares the PGIS, STATE and ITERATE databases by region for the time period 1968 to 1987. However, the countries constituting the subjective regions are not uniform across the databases, nor are there data from each of the databases for each region, or for the entire span of years. Jongman (1993) also offers some comparisons by year and country using the STATE, ITERATE and COMT databases. Yet the time span is only six years, from 1980 until 1985, and he includes only five West European countries. Overall, the biggest limitation of Jongman's comparison of terrorism databases is that he does not conduct any statistical tests to determine the size and significance of comparisons between the databases.

Comparing PGIS, ITERATE and RAND. In summary, there is currently no valid way to systematically compare event counts from the PGIS terrorism data to databases that focus only on international events (especially ITERATE and RAND). This is a topic that we plan to explore in greater detail in future research. To make the data sets more comparable for such an analysis, we must first define decision rules to exclude domestic terrorism incidents from the each of the three databases. Second, we must collect the missing data from the year 1993. Once these steps are completed, we could analyze more accurately international incidents from 1970 to 1997. Of course, instead of merely comparing yearly total event counts, future projects should also compare the databases on a number of other critical variables, including number killed, number injured and region in which the event occurred. As mentioned earlier, with NIJ funding, we are just embarking on a project to do this with the RAND-MIPT data. We will also continue to work on these issues with ongoing projects at the National Center for the Study of Terrorism and Responses to Terrorism.

THE PGIS DATABASE

In the next section we offer a more in-depth review of the PGIS data via a descriptive analysis of several key variables of interest. We begin by describing the distribution of data for a set of specific variables. Next we describe some of the initial trends shown in the analysis of these variables. Finally, we conclude with a discussion of future project directions using the PGIS data.

Incidents by Year

We begin our review of the PGIS database with event counts by year. The greatest number of events was recorded in 1992 and the fewest in 1972. From their yearly reports, PGIS documented a total of 4,954 events in the year 1993, however the hard copies of the 1993 data were lost and thus could not be entered in the current database.

Table 4. Distribution of Incidents for Years 1970-1997.

Year	Frequency	Percent
1970	266	0.40
1971	264	0.39
1972	172	0.26
1973	290	0.43
1974	359	0.53
1975	532	0.79
1976	685	1.02
1977	1210	1.80
1978	1463	2.18
1979	2686	4.00
1980	2729	4.06
1981	2628	3.91
1982	2431	3.62
1983	2808	4.18
1984	3437	5.12
1985	2848	4.24
1986	2780	4.14
1987	3084	4.59
1988	3625	5.40
1989	4302	6.41
1990	3921	5.84

1991	4757	7.08
1992	5268	7.84
1993[a]	13	0.02
1994	3659	5.45
1995	3969	5.91
1996	3456	5.15
1997	3523	5.25

[a] Most data were missing for 1993.

Terrorist Groups

There are currently 3,099 distinct terrorist groups in the PGIS data. However, project members continue to work to consolidate the group list by combining cases where one group uses multiple names or various alternative name spellings. In addition, some group names listed in the database are given as generic descriptions of actors, such as "rebels" or "student protesters." Researchers are defining decision rules using dummy variable coding to incorporate these types of groups as well.

Type of Attack

Recall that PGIS defined seven event types *a priori* and later added two additional types (arson and mass disruption) after data collection had begun. In table 5 we show the number of each type of event coded in the data.

Table 5. Distribution of Incidents by Type of Attack.

Type	Frequency	Percent
Bombing	**27310**	**40.66**
Facility Attack	**23941**	**35.65**
Assassination	**12301**	**18.31**
Kidnapping	**2864**	**4.26**

Assault	**303**	**0.45**
Hijacking	**274**	**0.41**
Maiming	**155**	**0.23**

Table 5 shows that bombings and facility attacks were by far the most common, jointly accounting for more than 75 percent of all incidents. The next most common event type was the assassination, account for over 18% of total incidents. Kidnappings were far less common, account for a little more than 4% of total events. Aerial hijackings, maimings and assaults all accounted for less than 1% of total cases. The two new categories added by PGIS to the database after data entry began were used very infrequently in subsequent years, accounting jointly for a total of only 17 cases.

Country

The database includes 202 distinct countries (See Appendix F for the distribution of incidents by country). The country listing also includes separately Northern Ireland from the rest of the United Kingdom and Corsica from France. In addition, the political circumstances of other countries have changed over time. In every case of political change, we have tried to match the incident to the country name in effect at the time of the incident. For example, prior to October 3, 1990 all German incidents were classified as occurring in either East Germany (GDR) or West Germany (FRG). We similarly treated cases separately from North and South Yemen, until they officially merged on May 22, 1990. Prior to the dissolution of the Soviet Union in 1991, incidents are marked as happening in the Soviet Union. We also included a dummy variable to indicate whether the country was ever part of the Soviet Union; a designation that applies to

Armenia, Azerbaijan, Belarus, Estonia, Georgia, Kazakhstan, Kyrgyzstan, Latvia, Lithuania, Moldova, Russian, Tajikisan, Turkmenistan, Ukraine, and Uzbekistan. Other countries whose boundaries changed over time include Yugoslavia which was subdivided into Slovenia in January of 1990, Croatia on June 25, 1991 and Bosnia in March of 1992; and Czechloslavakia which became the Czech Republic and Slovakia on January 1, 1993.

Incident Date

The PGIS data include the month, day and year of each incident. However, for some incidents, the day is missing while for others, the day and month are missing. Of the 67,165 incidents analyzed for this report, only 679 (1.01%) did not include the exact day, and 24 (0.04%) did not include the exact day or month of the attack. In some cases, this imprecision follows the actual events accurately. For example, one of the cases in our database is a 1974 case involving a prosecutor from Genoa, Italy who was kidnapped by the Red Brigades and was eventually killed. Although this incident has a precise start date and date, its time structure is distinct from a bombing or an assassination which can be assigned to a single time. We have been examining the time fields in the data for the past year and in many cases, our research staff has been able to determine the reasons for missing information and in some cases correct the information. We continue to do this whenever possible.

Success

According to the original PGIS data collection effort, success of a terrorist strike was defined according to the perceived details of the event. For example, in a typical

successful bombing, the bomb detonates and destroys property and/or kills individuals, whereas an unsuccessful bombing is one in which the bomb is discovered and defused or detonates early and kills the perpetrators. The PGIS data collectors did not try to judge success in terms of the larger goals of the perpetrators. For example, a bomb that exploded in a building would be counted as a success even if it did not succeed in bringing the building down. Based on this relatively narrow definition of success, about 92% (59,815) of the incidents in the PGIS data were coded as successful.

Region

The PGIS data divided all events into one of six regional categories based on the country or territory in which the incident took place. Table 6 shows the distribution of countries and territories within the six regions.

Table 6: Countries by Region

Region	Countries/Territories
North America	Canada, the French territory of St. Pierre and Miquelon, and the United States
Latin America	Anguilla, Antigua and Barbuda, Argentina, Aruba, Bahamas, Barbados, Belize, Bermuda, Bolivia, Bonaire, Brazil, Cayman Islands, Chile, Colombia, Costa Rica, Cuba, Curacao, Dominica, Dominican Republic, Ecuador, El Salvador, Falkland Islands, French Guiana, Grenada, Guadeloupe, Guatemala, Guyana, Haiti, Honduras, Jamaica, Martinique, Mexico, Montserrat, Nicaragua, Panama, Paraguay, Peru, Puerto Rico, Saba, St. Barthelemy, St. Eustatius, St. Kitts and Nevis, St. Lucia, St. Maarten, St. Martin, St. Vincent and the Grenadines, Suriname, Trinidad and Tobago, Turks and Caicos, Uruguay, Venezuela, and the Virgin Islands (British and U.S.)
Europe	Albania, Andorra, Armenia, Austria, Azerbaijan, Belgium, Bosnia-Herzegovina, Bulgaria, Byelarus,

	Croatia, Czech Republic, Denmark, Estonia, Finland, France, Georgia, Germany, Gibraltar, Greece, Greenland, Hungary, Iceland, Ireland, Italy, Kazakhstan, Kyrgyzstan, Latvia, Liechtenstein, Lithuania, Luxembourg, Macedonia, Malta, Isle of Man , Moldova, Monaco, Netherlands, Norway, Poland, Portugal, Romania, Russia, San Marino, Serbia, Montenegro, Slovak Republic, Slovenia, Spain, Sweden, Switzerland, Tajikistan, Turkmenistan, Ukraine, United Kingdom, and Uzbekistan
Middle East and North Africa	Algeria, Bahrain, Cyprus, Egypt, Iran, Iraq, Israel, Jordan, Kuwait, Lebanon, Libya, Morocco, Oman, Palestine, Qatar, Saudi Arabia, Syria, Tunisia, Turkey, United Arab Emirates, and Yemen
Sub-Saharan Africa	Angola, Benin, Botswana, Burkina Faso, Burundi, Cameroon, Cape Verde, Central African Republic, Chad, Comoros, Congo, Djibouti, Equatorial Guinea, Eritrea, Ethiopia, Gabon, Gambia, Ghana, Guinea, Guinea-Bissau, Ivory Coast, Kenya, Lesotho, Liberia, Madagascar, Malawi, Mali, Mauritania, Mauritius, Mozambique, Namibia, Niger, Nigeria, Reunion, Rwanda, Sao Tome and Principe, Senegal, Seychelles, Sierra Leone, Somalia, South Africa, Sudan, Swaziland, Tanzania, Togo, Uganda, Zaire, Zambia, and Zimbabwe
Asia	Afghanistan, Australia, Bangladesh, Bhutan, Brunei, Cambodia, China, Cook Islands, Fiji, French Polynesia, Guam, Hong Kong, India, Indonesia, Japan, Kiribati, Laos, Macao, Malaysia, Maldives, Marshall Islands, Micronesia, Mongolia, Myanmar, Nauru, Nepal, New Caledonia, New Zealand, Niue, North Korea, Northern Mariana Islands, Pakistan, Palau, Papua New Guinea, Philippines, Samoa (U.S.), Singapore, Solomon Islands, South Korea, Sri Lanka, Taiwan, Thailand, Tonga, Tuvalu, Vanuatu, Vietnam, Wallis and Futuna, and Western Samoa

Table 7 gives the distribution of events across regions. The table shows that the Latin American region (including the Caribbean), was by far the most common region for terrorist events, accounting for more than two-fifths of all events. Following Latin American, Europe and the Middle East/North African region were about half as common,

each accounting for another one-fifth of all events. These two regions were followed closely by Asia. Many fewer events were attributed to Sub-Saharan Africa, whose regional total was just under six percent.

Table 7. Distribution of Incidents by Region of the World.

Region	Frequency	Percent
Latin America	**27793**	**41.38**
Europe	**12832**	**19.11**
Asia	**12529**	**18.65**
Middle East/North Africa	**9043**	**13.46**
Sub-Saharan Africa	**3998**	**5.95**
North America	**968**	**1.44**

Target Type

Target type provides a general description of the suspected target of the attack. The target type distribution is shown in Table 8. The entity field refers to the type of organization or interest group represented by the specific target attacked. For example, a bomb attached to an electrical pole would be coded as a "utility" entity. PGIS identified 22 different categorizations of entity, including separate categorization of entities representing U.S. targets and interests.

Table 8. Distribution of Incidents by Target Type.

Entity	**Frequency**	**Percent**
Police/Military	15492	23.07
Government	10185	15.16
Domestic Business	9959	14.83
Political Party	4437	6.61
Transportation	4180	6.22

Utilities	3700	5.51
Media	1472	2.19
Foreign Business	1463	2.18
Diplomat	1366	2.03
International	487	0.73
Other—Non US	5013	7.46
US Business	1068	1.59
US Police/Military	463	0.69
US Diplomat	412	0.61
US Other	408	0.61
US Government	124	0.18
US Utilities	84	0.13
US Media	41	0.06
US Transportation	18	0.03
US Political Parties	5	0.01
US Unknown	70	0.1
Unknown	6718	10.01

Number of Perpetrators

The number of perpetrators involved in incidents was collected for the 8,515 cases in which it was known. Of those, the average number of perpetrators per incident was 184, however, the most common number of perpetrators per event was two.

Weapons Used

The type of weapon used was recorded in 63,953 cases (95.2%). The data entry interface was designed to accept up to four different categories of weapon used in each incident in order to account for multiple weapon types used in a single event. We have coded the specific information in these fields into 21 general weapon categories. For

example, specific weapon details in the database such as automatic pistols, submachine guns, AK-47's, M-16's and others were categorized as "Automatic Weapons." Table 9 shows the total distribution of weapon categories by combining all four of the weapon fields from the database.

Table 9. Distribution of Incidents by Weapon Type.

Weapon Used	Total Frequency
Explosives/Bombs/Dynamite	26143
Automatic Weapons	15304
Handguns	6869
Incendiary	6033
Unknown Gun Type	3685
Grenades	1674
Rockets	922
Knives	912
Rifle/Shotgun (non-automatic)	462
Blunt Object	410
Sharp Objects Other Than Knives	225
Fire	185
Gasoline or Alcohol	70
Vehicle	54
Hands, Feet, Fists	40
Suffocation	32
Rope or Other Strangling Devises	30
Chemical	29
Poisoning	22
Fake Weapons	18
Other	834
Unknown	3692

Number of Fatalities

Fatalities were reported in 24,022 (35.8%) incidents. Among the incidents in which someone was killed, the average number of persons killed was five per event. The largest number of fatalities in one event, 1,180, occurred on April 13, 1994 when Hutu Tribal members attacked the Tutsi Tribe with automatic weapons and machetes in Gikoro, Rwanda.

Table 10. Total Number of People Killed.

Total Number Killed	Frequency	Percent	Cumulative Frequency
0	42195	62.82	42195
1-50	24702	36.81	66897
51-100	198	0.25	67095
101-150	36	0.01	67131
151-200	11	0.01	67142
201-250	7	0.00	67149
251-300	9	0.01	67158
301-350	2	0.00	67160
351-400	3	0.00	67163
401-450	1	0.00	67164
1180	1	0.00	67165

Number of U.S. Fatalties

U.S. nationals were killed in only 131 (0.2%) incidents. The greatest number of U.S. nationals killed in one event is 239 and took place in Beirut, Lebanon when a suspected Islamic group drove a bomb into the U.S. Marine Base command center on October 23, 1983. The second greatest number of U.S. casualties took place on December 21, 1988 when an unknown group bombed a Pan Am Boeing 747 in the

United Kingdom. The explosion killed a total of 259 persons aboard the aircraft, 187 of which were U.S. nationals, and 11 persons in the town of Lockerbie. Finally, the third most deadly attack was the Oklahoma City Bombing of April 19, 1995, where 167 people were killed and more than 400 wounded.

Table 11: Total Number of U.S. Fatalities

Number of US Nationals Killed	Frequency	Percent	Cumulative Frequency
1	95	72.52	95
2	19	14.50	114
3	3	2.29	117
4	3	2.29	120
5	4	3.05	124
7	1	0.76	125
11	1	0.76	126
19	1	0.76	127
30	1	0.76	128
31	1	0.76	129
167	1	0.76	130
187	1	0.76	131
239	1	0.76	132

Number of Wounded

Persons were injured in 13,498 (20.1%) incidents. Of those incidents, on average ten persons were injured per incident. The greatest number of people wounded in one event is 100,000. According to the data, this event took place in the La Mar province of Peru on June 25, 1983 when members of the group *Sendero Luminoso* attacked a Colombian vocational school. The second greatest injury count, 5500, occurred in Tokyo

with the release of sarin nerve gas into the subway system on March 20, 1995. Twelve people were also killed in this event.

Table 12. Total Number of People Wounded.

Total Number Wounded	Frequency	Percent	Cumulative Frequency
0	53118	79.09	53118
1-50	13669	20.37	66787
51-100	288	0.39	67075
101-150	40	0.02	67115
151-200	20	0.02	67135
201-250	12	0.00	67147
251-300	5	0.00	67152
301-350	1	0.00	67153
351-400	2	0.00	67155
600	1	0.00	67156
671	1	0.00	67157
700	1	0.00	67158
800	1	0.00	67159
999	2	0.00	67161
1100	1	0.00	67162
1272	1	0.00	67163
5500	1	0.00	67164
100000	1	0.00	67165

Number of U.S. Wounded

According to the PGIS data, U.S. nationals were wounded in 168 (0.3%) incidents. The greatest number of U.S. nationals injured in one event took place on April 19, 1995 with the Oklahoma City Bombing. Reports indicated that over 400 people were injured in this attack. The second greatest number of U.S. nationals injured in one event

was 109. This event took place in Saudi Arabia when an unknown group detonated a truck bomb near the U.S. military barracks of the Saudi airbase located in the city of Dhahran. This attack occurred on June 25, 1996, killing 19 U.S. nationals and injuring 386 people, 109 of whom were U.S. nationals.

Table 13. Total Number of Wounded U.S. Nationals.

Number of U.S. Nationals Wounded	Frequency	Percent	Cumulative Frequency
1	102	60.36	102
2	24	14.2	126
3	8	4.73	134
4	5	2.96	139
5	1	0.59	140
6	3	1.78	143
7	4	2.37	147
8	2	1.18	149
9	1	0.59	150
10	4	2.37	154
11	1	0.59	155
12	1	0.59	156
14	1	0.59	157
15	2	1.18	159
17	1	0.59	160
18	1	0.59	161
19	1	0.59	162
30	1	0.59	163
48	1	0.59	164
50	1	0.59	165
64	1	0.59	166
75	1	0.59	167
109	1	0.59	168

400	1	0.59	169

Kidnappings

Kidnappings occurred in 4% of the cases. On average, three persons were kidnapped per incident. The largest number of individuals kidnapped in one event was 107. The Revolutionary United Front of Sierra Leone kidnapped seven nuns and 100 local townspeople in Kambia on January 25, 1995. The group later released all 107 of those kidnapped.

Nationality

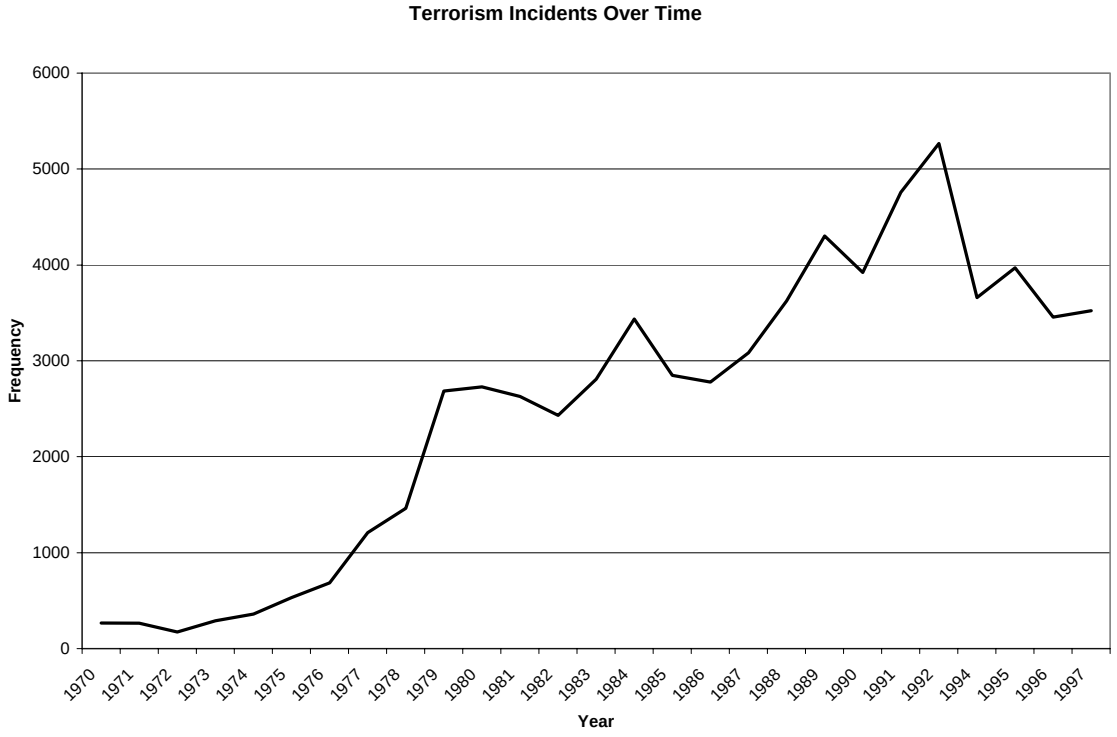
The data entry interface allowed for designation of up to three target nationalities in the event that targeted victims were of differing nationalities. We have combined the three nationality fields in Appendix G to present the distribution of terrorist incidents by nationality of the target. Of the 191 nationalities recorded in the database, the top three most frequently targeted nationalities were Colombian (n=5,777), Peruvian (n=5,684), Salvadoran (n=5,394). U.S. nationals were the fourth most frequent targets in the database (n=3,140).

DESCRIPTION OF PGIS DATABASE

In the next part of this report we provide a general overview of some of the major characteristics of the PGIS data. There are a total of 67,165 terrorism incidents reported in the dataset. Figure 4 shows how these incidents are distributed over time. If we assume that the collectors of the PGIS data were consistent over the entire period, then

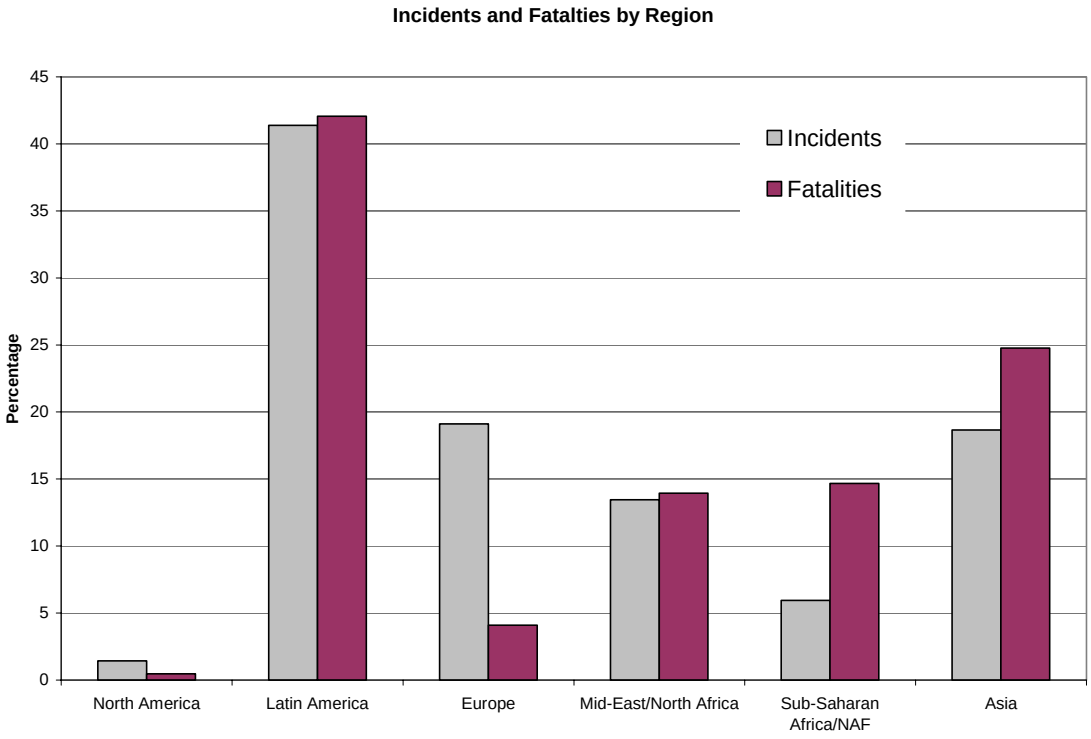
the pattern reveals a fairly steady increase in attacks that peaks in 1992 at 5,268 events world-wide. Up through 1976 attacks by terrorist groups were much less frequent. There were fewer than 1,000 incidents each year world-wide. However, in 1977, incidents nearly doubled from 685 to 1,210. From 1978 to 1979 we see evidence that events nearly doubled again rising to 2,686 from 1,463. The number of terrorist events continues a broad increase until 1992, with smaller peaks in 1984, at approximately 3600 incidents, and 1990, with about 4200 events. After the global peak in 1992, the number of terrorist incidents declines to approximately 3500-4000 annual incidents until the end of the data collection period in 1997.

Figure 4. Terrorism Incidents Over Time.



To better understand the distribution of terrorism events and lethality, we calculated the distribution of incidents and fatalities according to their region.[3] Figure 5 shows that more terrorism and terrorism-related fatalities occur in Latin America than in any other region. In fact, Latin America experiences more than twice as many terrorism attacks than any other region of the world. Europe and Asia are nearly tied at second, each accounting for about 20 percent of the world's total terrorism events (19.11 and 18.65 percent, respectively). The Mid-East/North Africa region follows with less than 15 percent (13.46) of the incidents, and Sub-Saharan Africa and North America account for the fewest terrorism events (5.95 and 1.44 percent, respectively).

Figure 5. Incidents and Fatalities by Region.



[3] The composition of countries within each region was determined by PGIS.

Figure 5 also shows that the distribution of fatalities by region differs from that of the incidents. While Latin America remains the leader in fatalities as well as in the proportion of attacks, Asia has the second highest percentage of fatalities by region, accounting for nearly 25 percent of all terrorism-related fatalities (24.77). Figure 5 also reveals that while Europe is second in the proportion of attacks, it suffers relatively few fatalities as a result of these incidents, averaging only .44 deaths per incident. This rate is especially low compared to that for Sub-Saharan Africa which averages 5 deaths for every terrorism attack. Thus, while the Sub-Saharan African region accounts for a relatively small proportion of total terrorist attacks during this period, when there were attacks in this region, they tended to be deadlier. The reasons for these differences remain to be explained, although part of the explanation may simply be ready and proximate access to medical care across regions.

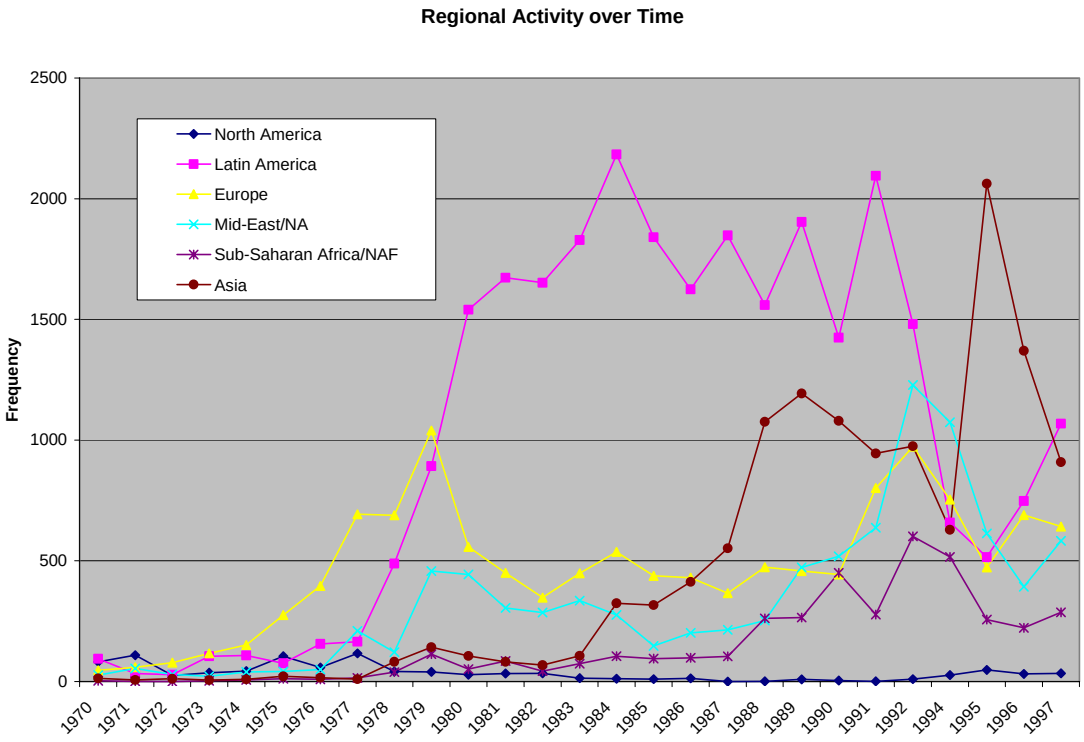
Table 14. The Average Number of Fatalities per Terrorism Attack.

Region	Fatalities per Attack
North America	**0.65**
Latin America	**2.06**
Europe	**0.44**
Mid-East, North Africa	**2.10**
Sub-Saharan Africa	**5.00**
Asia	**2.69**

We next examine the distribution of terrorism activity for each region over time. Figure 6 shows the frequency of terrorist events by region. What is perhaps most evident from disaggregating these rates by region is that the rise in terrorism from the middle 1970s until 1992 is in large part driven by terrorist events in Latin America. Latin

America experienced a large increase in the number of terrorist events in the late 1970s but then rates remained high but fairly stable until a drop in 1994. The steady increase in the overall world-wide terrorism rates are driven by the relatively recent increase in the frequency of attacks in Asia and Sub-Saharan Africa. Figure 6 shows that compared to other regions, North America has experienced a relatively small proportion of terrorist attacks during this period.

Figure 6. Terrorism Activity over Time by Region

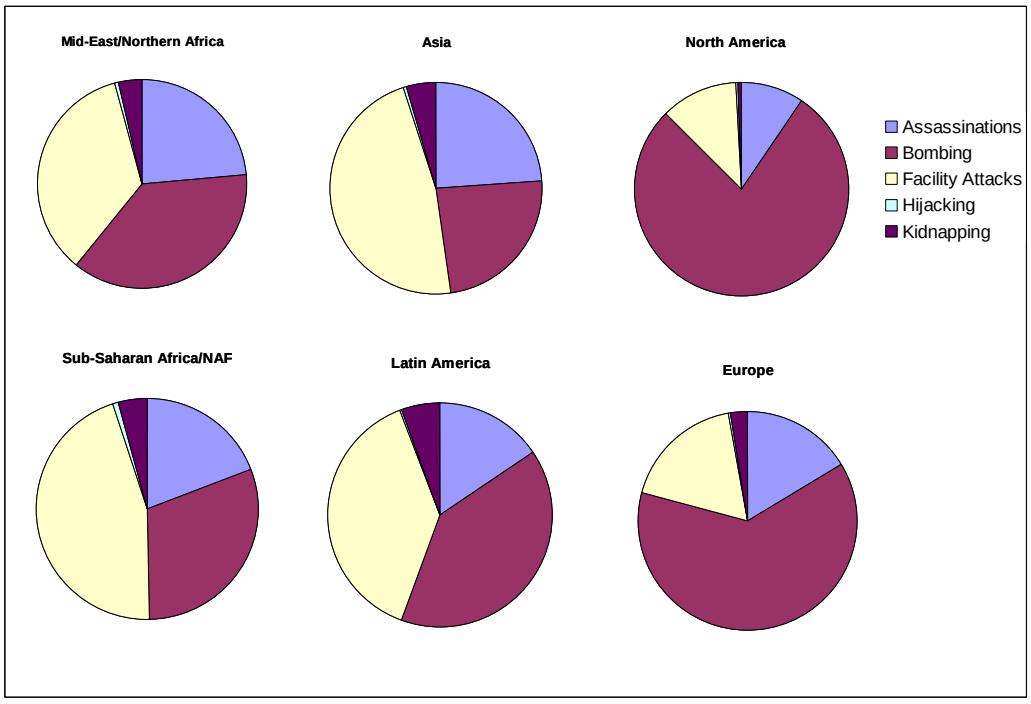


In Figure 7 we show the types of terrorist tactics by region. While the five most common tactics (i.e., assassinations, bombing, facility attacks, hijacking and kidnapping) were common in all six regions, there were substantial differences across regions in the distribution of terrorist tactics. For example, terrorist attacks in North America and Europe relied on bombs much more than facility attacks. By contrast, terrorists in Asia

and other regions relied less on bombs but were more likely to engage in facility attacks. In all regions of the globe, terrorists were less likely to rely on kidnappings and hijacking than on bombings, facility attacks and assassinations.

Of course these patterns may be partly due to risk management strategies. As noted above, facility attacks are riskier than bombings. While both events can use bombs, for an event to be classified as a facility attack instead of a bombing, perpetrators must be present during the attack. An event is classified as a bombing when the bomb is set well before the explosion allowing the perpetrators sufficient time to be away form the area. Thus, Figure 7 suggests that compared to terrorists in non-Western regions and Latin America, terrorists in Europe and North America may be more risk adverse.

Figure 7. Distribution of Terrorism Tactics by Region.



The next series of figures examines the individual countries within each region that are most likely to be struck by terrorism. We begin by describing those countries in

the hardest hit region, Latin America and conclude by describing those in the region with the fewest attacks, North America. Figure 8 shows the distribution of incidents and fatalities for the six countries that were most commonly targeted in Latin America. Combined, these countries represent 83 percent of the total Latin American events and 77 percent of total Latin American fatalities. It is apparent that the countries of Colombia, Peru, and El Salvador stand out as the three countries most likely to be targets of terrorist attacks during this period. In fact, nearly two-thirds of all Latin American terrorist attacks and fatalities in the PGIS data occur in one of these three countries. Chile ranks a distant fourth among countries in Latin America with just over eight percent of all Latin American incidents. Moreover, the Chilean events were less lethal than in the three countries with higher attack rates, representing only 0.4 percent of the terrorism-related deaths for the region.

Figure 8. Latin American Incidents and Fatalities.

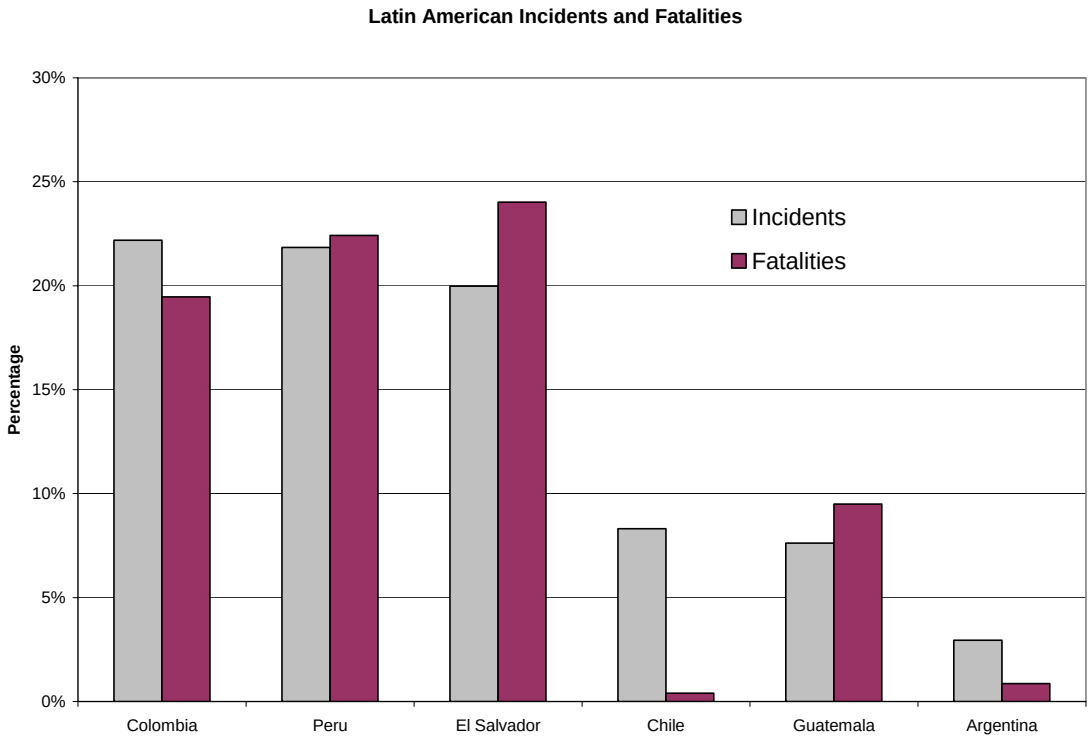
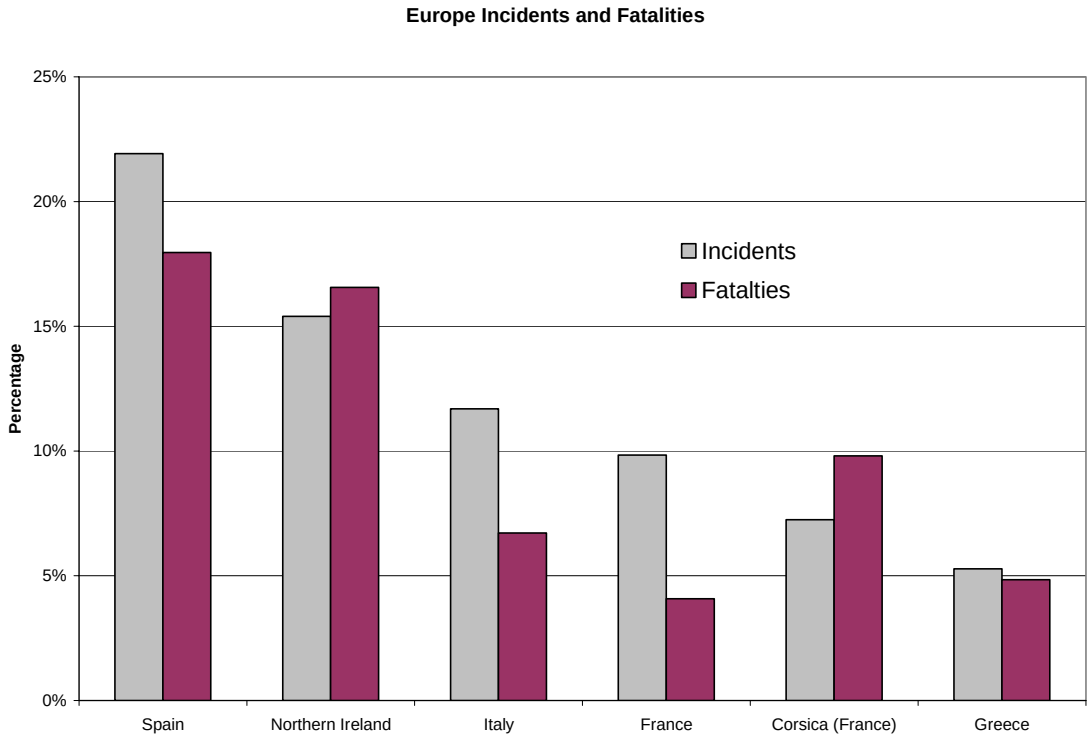


Figure 9 shows the same distribution for the six most frequently targeted countries in Europe. As noted above, PGIS separated Northern Ireland from the rest of the United Kingdom and Corsica from France because of their high concentration of violence. Seventy-one percent of total European terrorism events occur in one of the six countries shown in Figure 9. More than 20 percent of all European terrorist attacks in the PGIS data occurs in Spain. The next highest concentration of activity is in Northern Ireland, then Italy, France, Corsica, and Greece. For the most part, the highest concentration of terrorism-related fatalities for Europe follows a similar distribution. The main differences are that Corsica rates third instead of fifth in fatalities, and France rates sixth instead of fourth. Given the distribution of incidents, a disproportionately low percentage of fatalities occur in Spain, Italy, and France, while a disproportionately high percentage of fatalities occur in Northern Ireland and particularly in Corsica. The

concentration of fatalities in Greece is fairly consistent with the concentration of incidents in Greece.

Figure 9. European Incidents and Fatalities.



Turning now to Asia, the top six countries are home to 87.9 percent of all Asian terrorist events included in the PGIS data. We see from Figure 10 that the distributions of incidents and fatalities differ dramatically. While India ranks highest for the percentage of total terrorism incidents at nearly 24 percent, Sri Lanka ranks highest for fatalities. More than 35 percent of all terrorism-related fatalities in Asia take place in Sri Lanka while that country only accounts for approximately 18 percent of all Asian terrorism events. A closer investigation of the distribution of deaths in Sri Lanka reveals that, nearly 60 percent of the incidents led to at least one fatality. The average incident in Sri Lanka claimed the lives of five persons. About 12 percent led to ten or more fatalities

and seven incidents resulted in more than 100 deaths. Figure 10 also reveals that Pakistan and Bangladesh have disproportionately fewer fatalities compared to incidents. Still, Pakistan averages 1.6 fatalities for each incident while Bangladesh averages less than one percent. Japan has the lowest percentage of terrorism events among these six Asian countries with fewer than 5 percent of total incidents and less than one percent of the terrorism-related fatalities.

Figure 10. Asian Incidents and Fatalities.

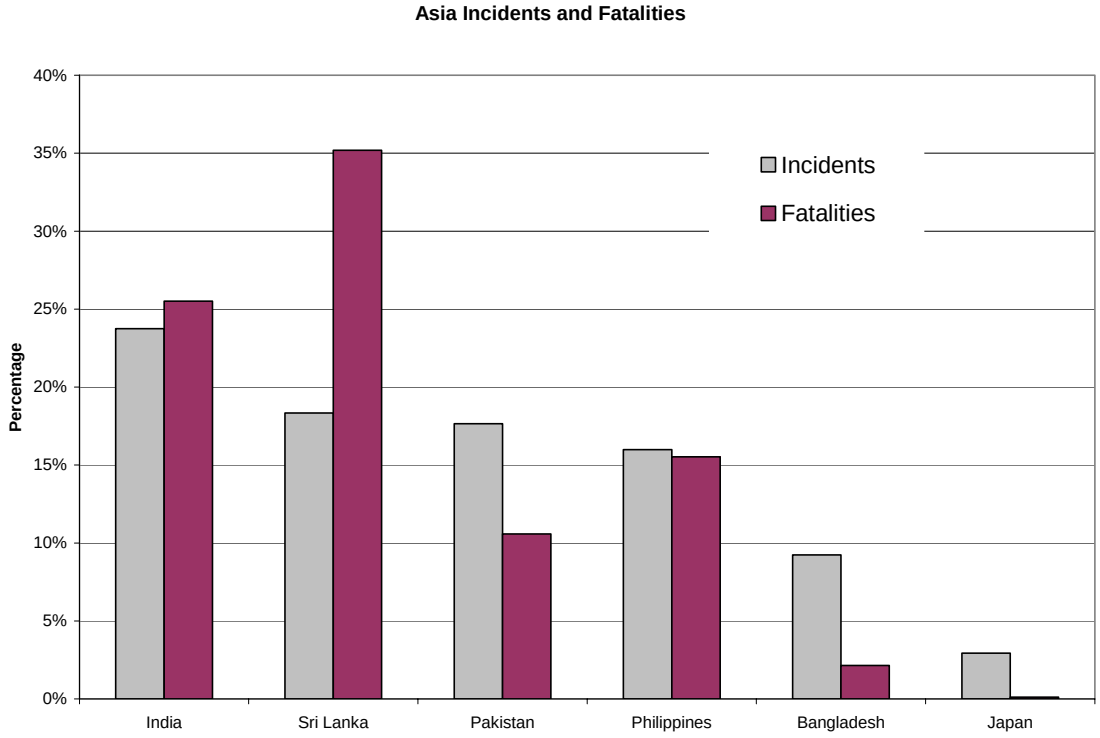
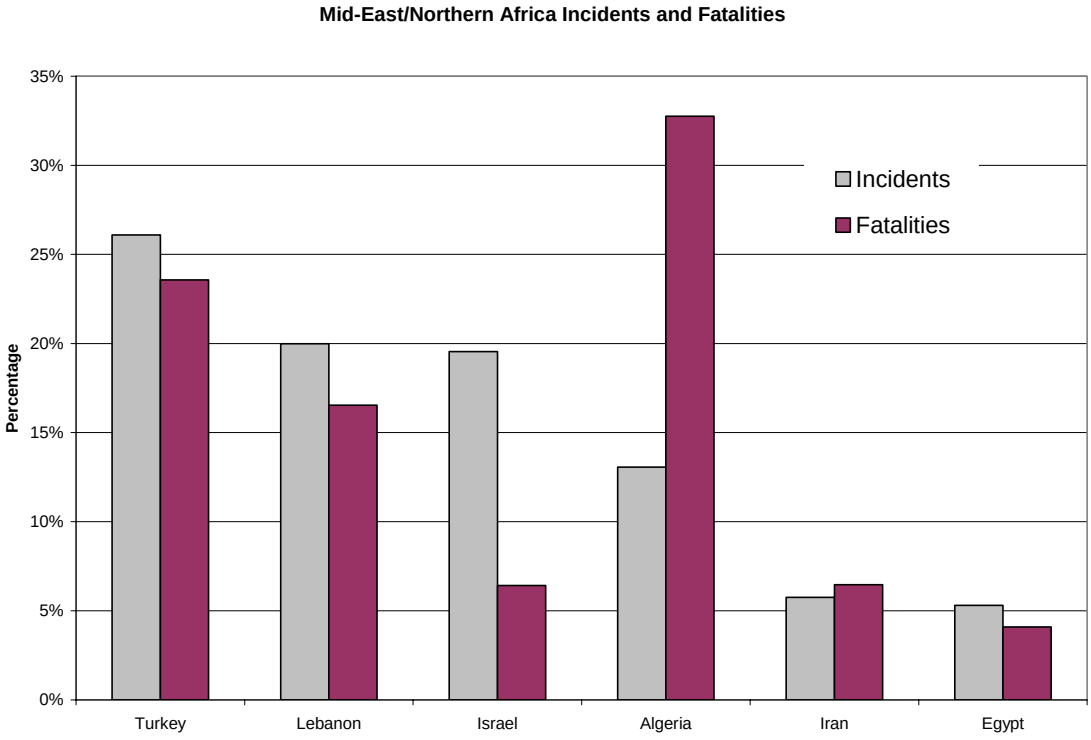


Figure 11 shows the distribution of both incidents and fatalities among the six hardest hit countries in the Mid-East and Northern Africa. These countries account for nearly 90 percent of all terrorist incidents in that region. Figure 11 also shows an especially high number of fatalities in one of the top six countries: Algeria averages five fatalities for every terrorism incident. A closer look at the distribution of Algerian

terrorist-related deaths shows that more than 75 percent of all incidents had at least one fatality, 11 percent had more than ten, and three incidents had more than 200 fatalities. By contrast, Turkey, Lebanon, and Israel have the largest number of events, accounting for more than 65 percent of all attacks in this region. Israel, however, has disproportionately fewer fatalities compared to the other two countries, averaging only 0.66 deaths per incident.

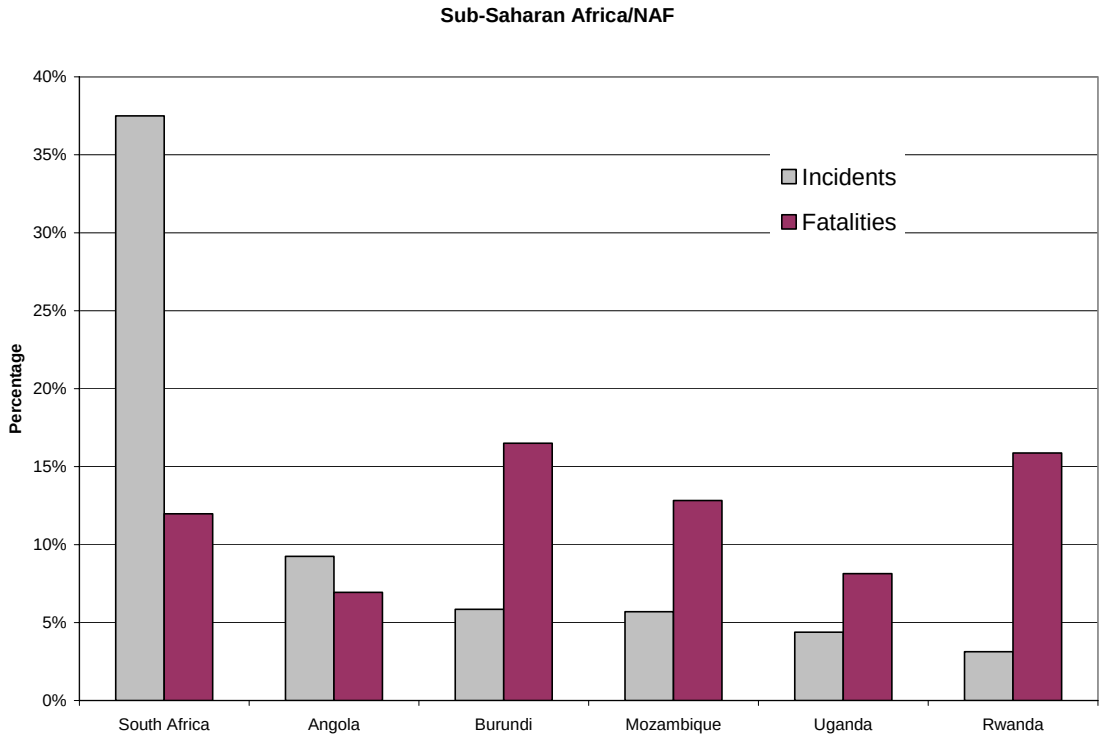
Figure 11. Mid-Eastern and Northern African Incidents and Fatalities.



Turning now to Sub-Saharan Africa, we see in Figure 12 that South Africa accounts for the largest total proportion of terrorist activity in that region (37.5 percent). The next most common target was Angola which experiences less than 10 percent of the region's total terrorist strikes during this period. Compared to the other regions we have examined, terrorist events are less concentrated at the national level for Sub-Saharan

Africa: the top six countries account for less than 66 percent of total terrorist strikes. The picture is somewhat different for fatalities. Here Burundi replaces South Africa as the country with the highest rank, averaging 14 deaths per incident. Fatalities are next highest in Rwanda, averaging more than 25 per incident—the highest average for all Sub-Saharan African countries. Thus, while South Africa has the highest level of activity overall, the incidents in Angola, Burundi, Mozambique, Uganda, and Rwanda cause greater loss of life on average.

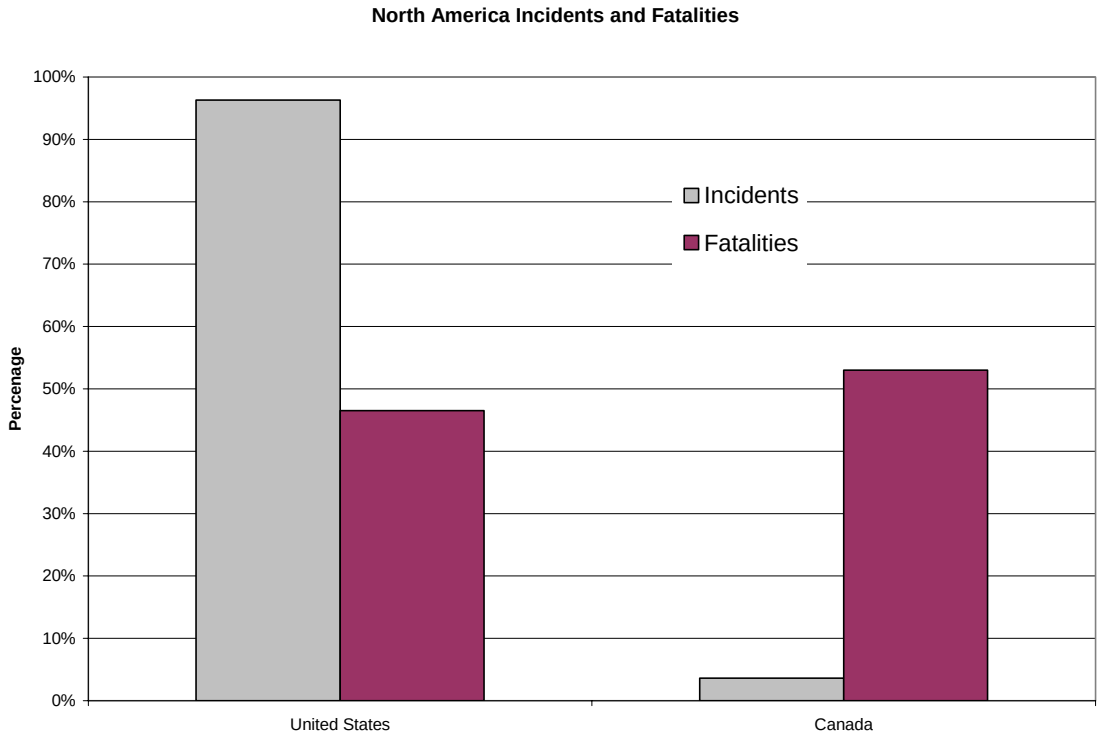
Figure 12. Sub-Saharan African Incidents and Fatalities.



Finally, turning to the last region, Figure 13 shows the two countries of North America. This region accounts for 953 events in the PGIS data between 1970 and 1997 (excluding 1993), making it the region with the fewest attacks in the data. We should also point out that Figure 13 is somewhat misleading because the Canadian figures are

greatly skewed by the tragic 1985 bombing of Air India Flight 182 by Sikh Separatists that resulted in 329 deaths. Otherwise, there were only 7 fatalities as a result of the other 34 Canadian incidents. Most incidents took place in the United States, with less than 5% occurring in Canada.

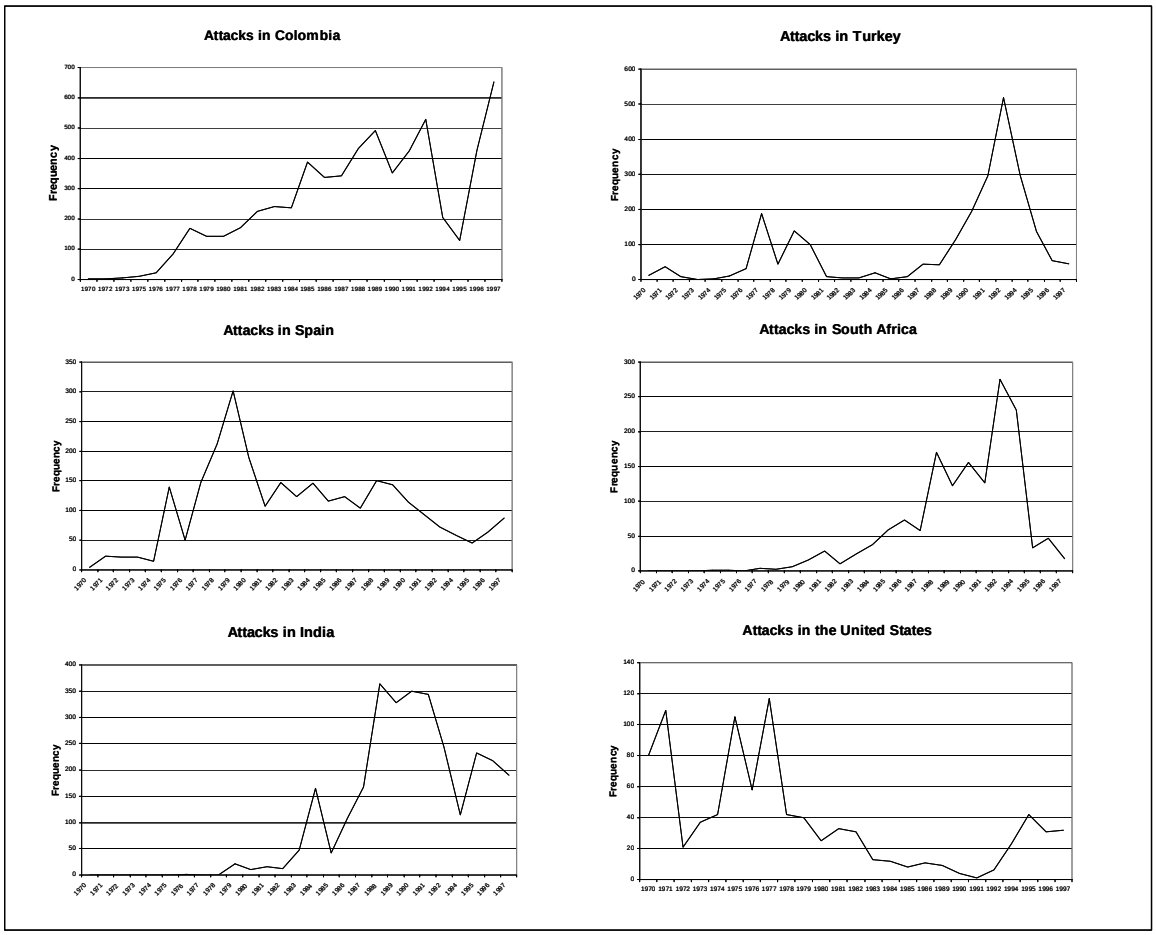
Figure 13. North American Incidents and Fatalities.



We now turn to the distribution of incidents over time. In Figure 14, we show the patterns of attack for the country with the largest number of incidents from 1970 to 1997 in each region. The six countries with the highest number of total terrorist incidents are Colombia, Turkey, Spain, South Africa, India and the United States. Interestingly, each country has very distinctive trends. Colombia, India, and South Africa had relatively few terrorism attacks in the early 1970s but then experienced dramatic escalation in later years. Other countries showed a more distinctive 'boom and bust' pattern. That is, the

number of terrorist occurrences in Spain and the United States appear to have peaked in the late 1970s but then declined during the 1980s, with later smaller peaks occurring in the 1990s. In fact, until the early 1990s, the United States had relatively few terrorism incidents in the PGIS data. Unlike the United States and Spain, Turkey had at least two peaks in terrorism activity, first in the late 1970s and then again and more dramatically in the early 1990s.

Figure 14: Terrorism Activity over Time for Selected Countries



The distinct trends across countries lead us to look also at patterns of terrorism group activity within each country. In the next six figures, we identified each country's most active groups and then graphed their temporal trends over the same period to be

compared to the country's trend. We also graphed the patterns of terrorist incidents where the attacking group was unknown. Figure 15 presents this comparison for Colombia. We graphed the frequency of attacks for the National Liberation Army (ELN), the Revolutionary Armed Forces of Colombia (FARC), the 19th of April Movement (M-19), Narco-Terrorists, and unknown attackers. Overall, it appears that the peaks in the mid to late 1980s can be explained by the heightened activity of these four groups. The two most recent peaks in the early and late 1990s seem to be driven by the rising frequency of terrorist activities where no group claims responsibility.

Figure 15. Terrorism Activity in Colombia over Time for Select Groups.

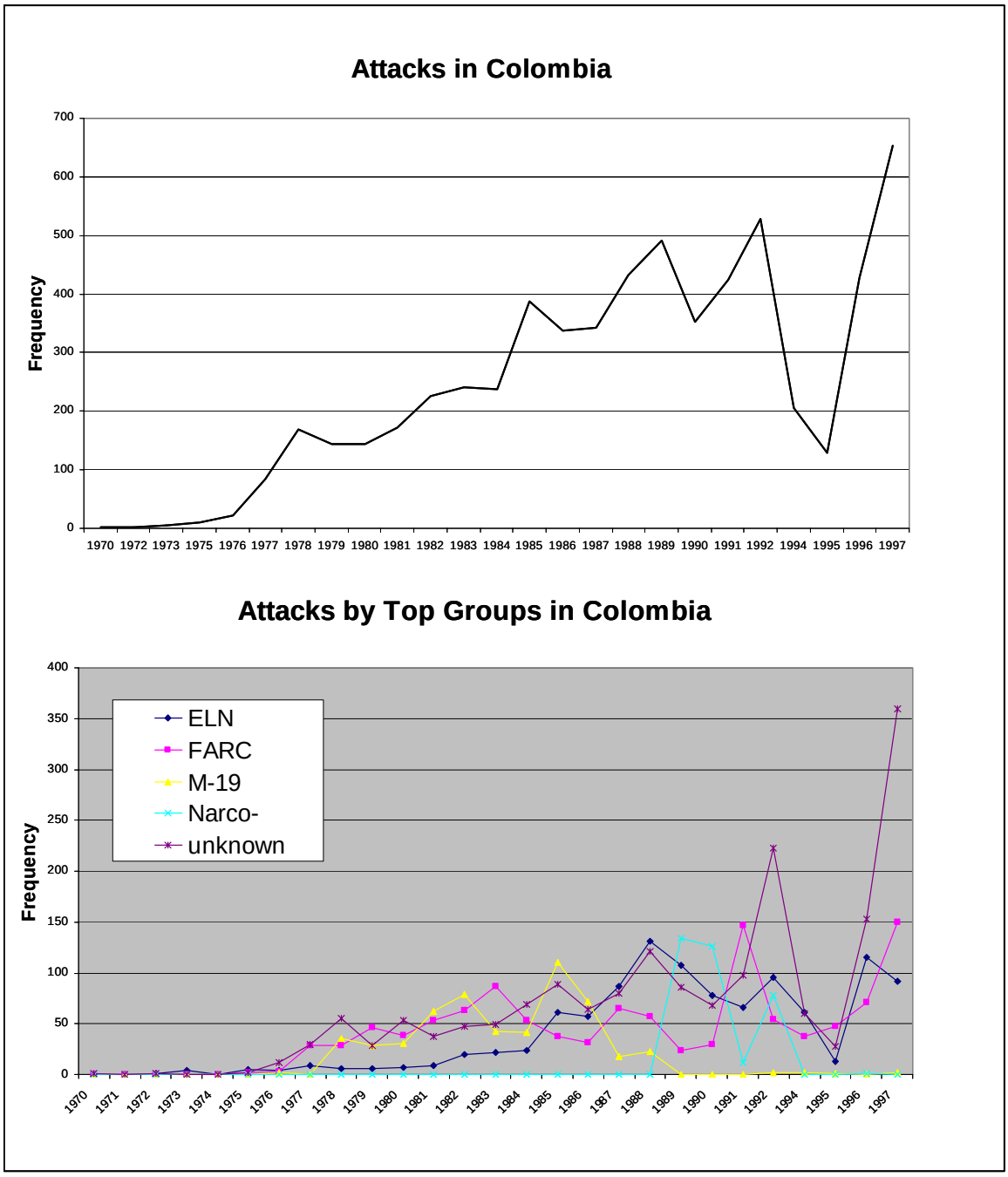
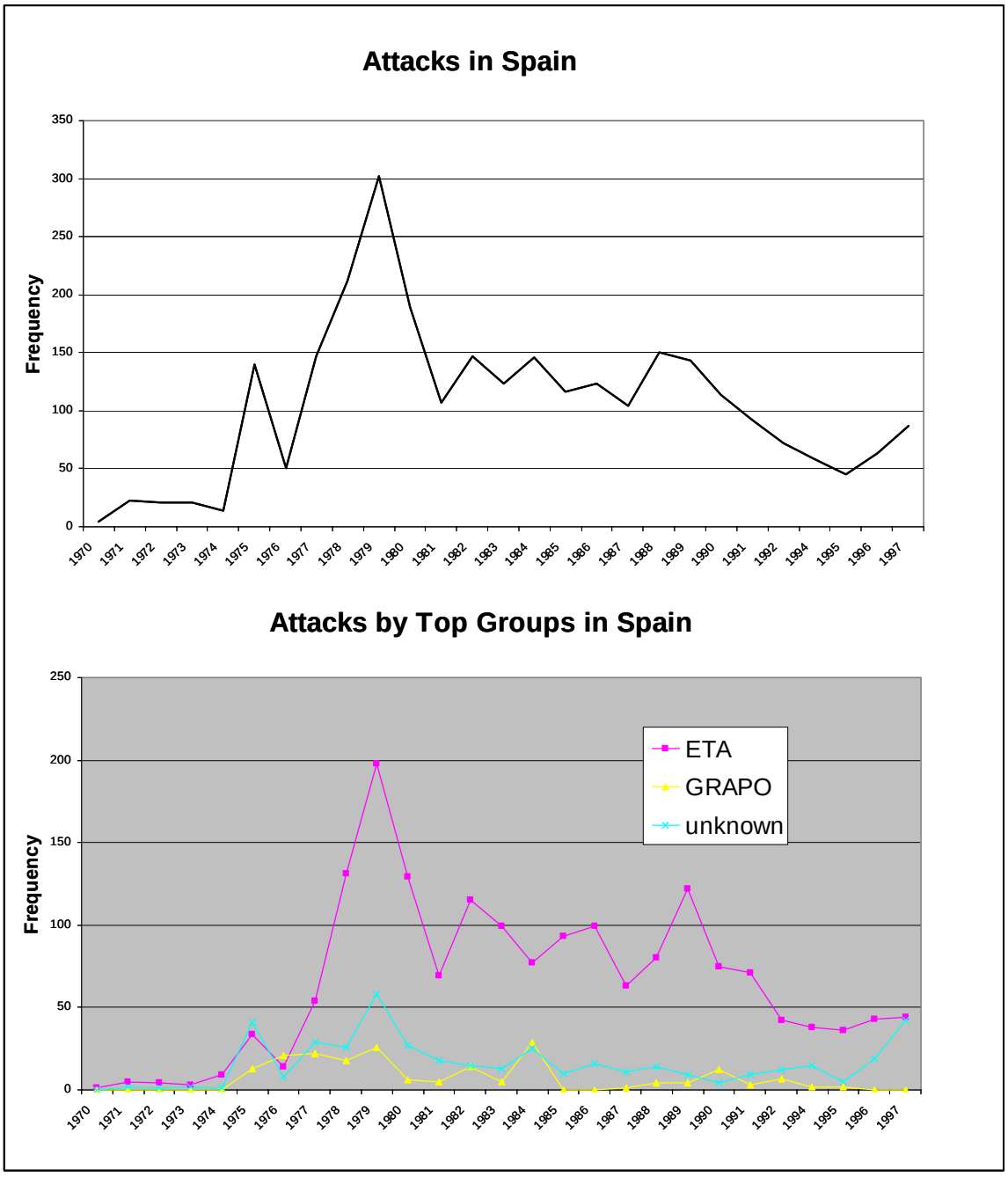


Figure 16 shows the patterns of activity for the Basque Fatherland and Liberty group (ETA), the First of October Anti-Fascist Resistance Group (GRAPO) and attacks where no one claims responsibility. Overall, attacks in Spain peak sharply between 1974 and 1981. This is followed by a gradual decline with some fluctuation. The pattern of

activity by ETA strongly resembles the general trend, indicating that the overall pattern of terrorism in Spain is a driven almost entirely by ETA. Attacks perpetrated by GRAPO also increase in the mid- to late-1970s and then gradually decline reaching rates near zero after 1984. The number of attacks where no group claims responsibility follows a similar pattern with the exception of a sharp increase in 1996 and 1997. Compared to the high frequency of activity by ETA, relatively few attacks were perpetrated by GRAPO or unknown attackers.

Figure 16: Terrorism Activity in Spain over Time for Select Groups



Turning now to Figure 17, the frequency of terrorist attacks in India and terrorist group activity in India, we see that terrorism attacks in India do not reach above 100 incidents a year until 1984, which is a year of rapid increase in the number of these events. After approaching 175 events that year, the number of attacks drops back down to 50 in 1985 before beginning a rapid and dramatic increase. This increase reaches its

peak in 1989 at approximately 360 attacks before again declining. At the end of the data collection period, the number of terrorist events in India hovers between 100 and 250 annually. When we examine the patterns for Bodo Militants, the Gurkha National Liberation Front (GNLF), Sikh Extremists, and unknown attackers, we see that the most active group is the Sikh Extremists. In the years when these groups were active (the period between 1983 and 1993), their total number of annual attacks ranged from 10 to 130. Attacks by assailants that did not claim responsibility constitute the next most important "group" of terrorists. The number of attacks in which the assailants were unknown varies dramatically across the data collection period but reaches a peak of 160 incidents in 1988. Attacks by Sikh Extremists and unknown assailants make up the bulk of the attacks in the massive increase in Indian terrorist events between 1987 and 1994. Finally, Bodo Militants and the GNLF perpetrate few incidents between 1970 and 1997. They each peak at approximately 40 incidents in 1989 and 1988, respectively. Following the late 1980s, the activity of the GNLF quickly declines, and they perpetrate no or few incidents afterwards. Bodo Militants decline to fewer than 20 annual terrorist events by 1997.

Figure 17. Terrorism Activity in India over Time for Select Groups.

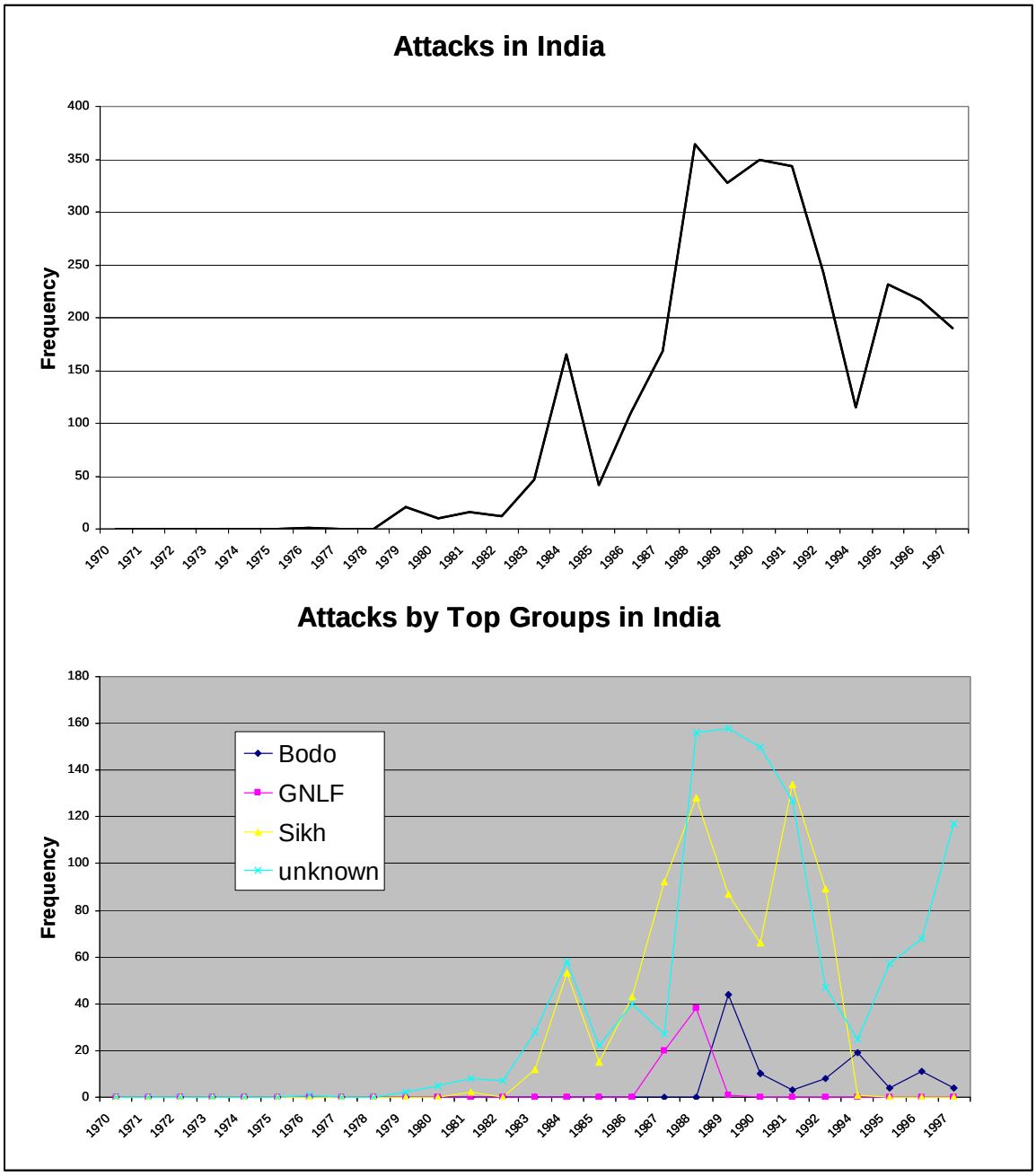


Figure 18 presents Turkish trends in both overall incidents and incidents perpetrated by particular groups. Interestingly, each overall peak in terrorist activity (from 1970 to 1997) can be attributed to the attacks of either Dev Sol, the Kurdistan Workers Party (PKK), Tigray People's Liberation Front (TPLF), or unknown attackers. Whereas heightened levels of terrorist activity in the late 70s and early 80s seemed to

come at the hands of unknown groups, the more recent spike in Turkish terrorism can be largely explained by the attacks of the Kurdistan Workers Party (PKK).

Figure 18. Terrorism Activity in Turkey over Time for Select Groups.

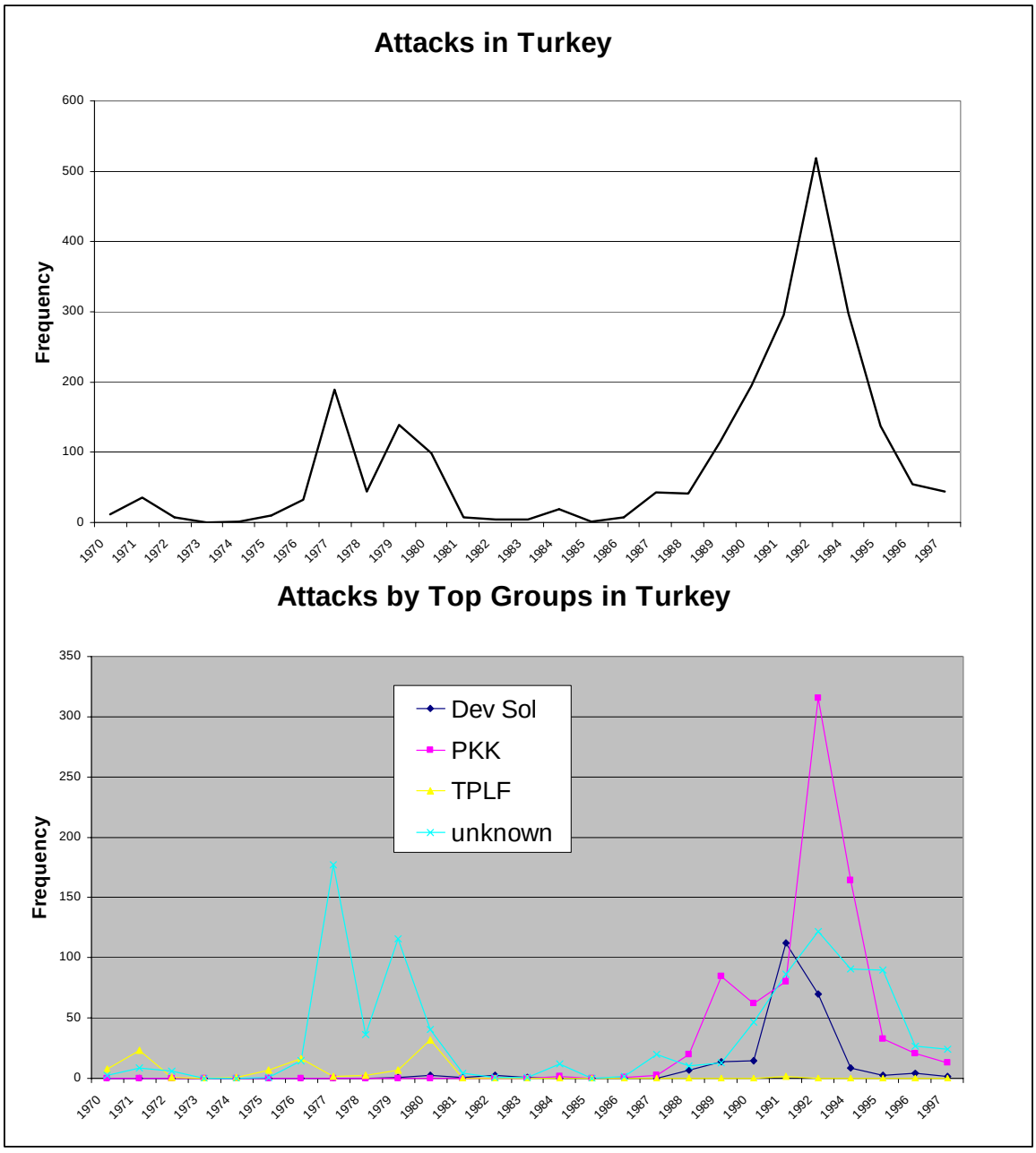


Figure 19 presents the patterns of attack in South Africa for African National Congress (ANC), the Inkatha Freedom Party (IFP), and unknown attackers. What stands

out the most here is that while ANC was responsible for most of the terrorism activity where a specific group claimed responsibility, there are far fewer ANC incidents than those where no specific group claims responsibility. This pattern of change is likely due to important social and political events that were taking place in South Africa during the late 1980s through the mid 1990s. The decline in terrorist activities by the ANC and IFP occurred at a time when the apartheid system was being dismantled. The ANC, which had been banned in 1960, was given status as an official political organization in 1990 and officially ended the use of violence. Additionally, the IFP became a legitimate political party in 1990. The significant rise in terrorist activities of unknown groups occurred during the period of South Africa's transition to democracy and the surge in violence is most notable around the year 1994, which is the year of the first free elections in the country. According to the report of the South Africa Truth and Reconciliation Commission (1999), which was tasked with investigating human rights abuses during the apartheid era, the increase in violence during this period was, in part, an attempt by various unidentified groups to disrupt the negotiations that were taking place. After the elections and the institution of majority rule in South Africa, there was a significant decline in terrorist activity.

Figure 19. Terrorism Activity in South Africa over Time for Select Groups.

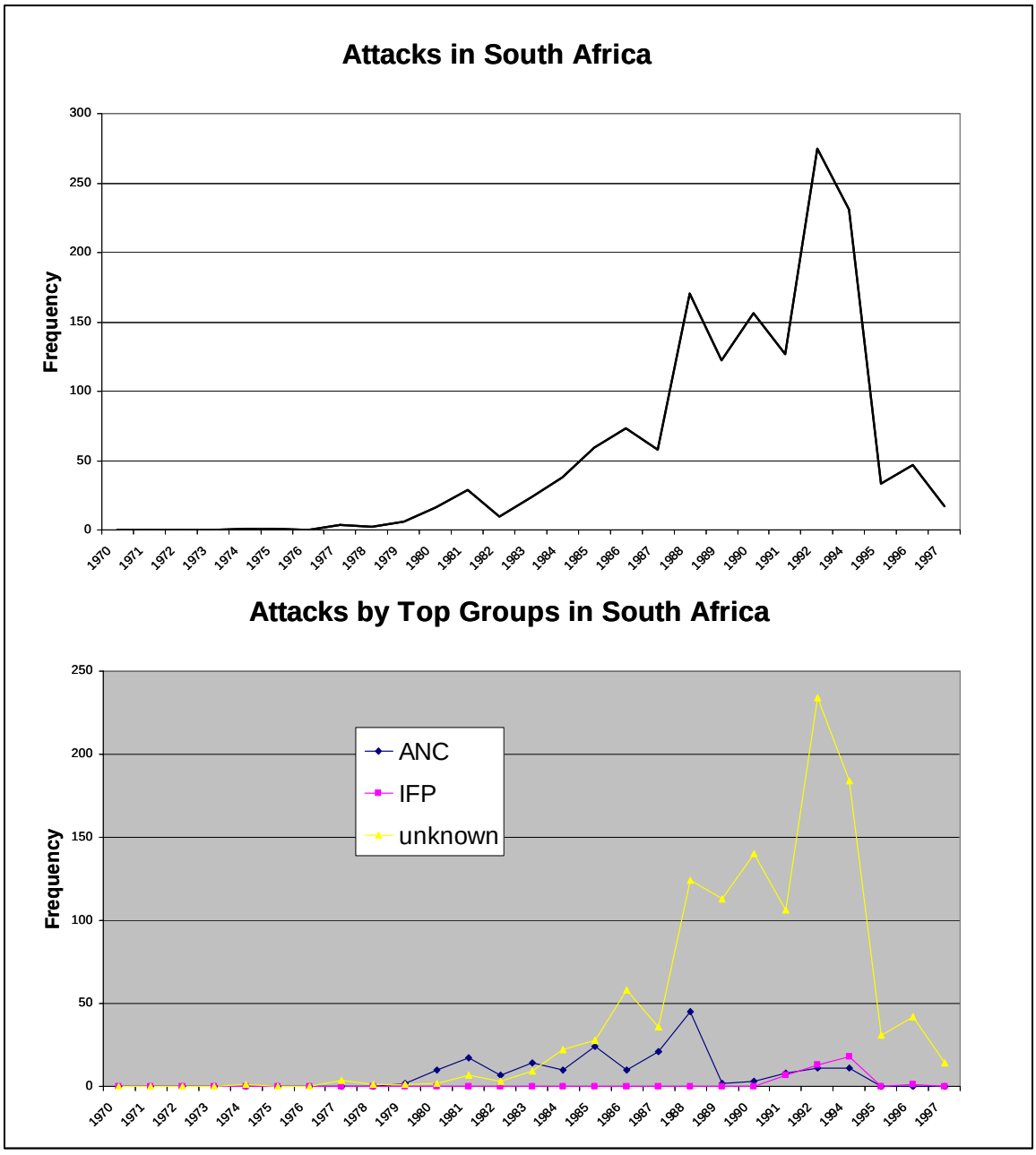
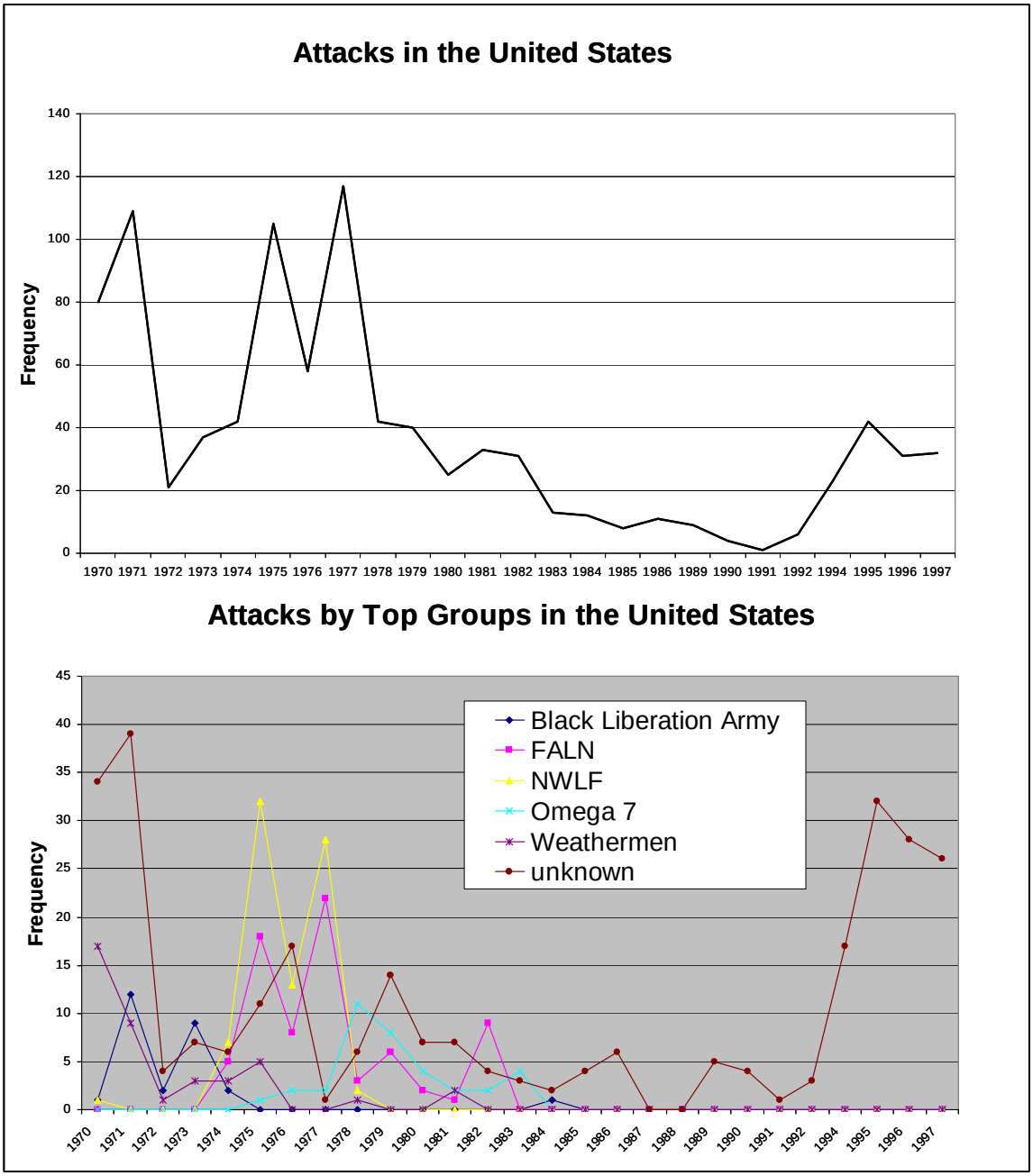


Figure 20 presents the trends for five groups in the United States as well as that for events where no group claims responsibility. Aside from the latter group, most of the U.S. terrorism trends appears to be accounted for by the Black Liberation Army, the Armed Forces of Puerto Rican National Liberation (FALN), the New World Liberation Front (NWLF), Omega 7, and the Weathermen. These attacks were most common

between 1970 and 1980 and relatively uncommon since the 1980s. However, there was a large upswing in events where no specific group claimed responsibility in the 1990s.

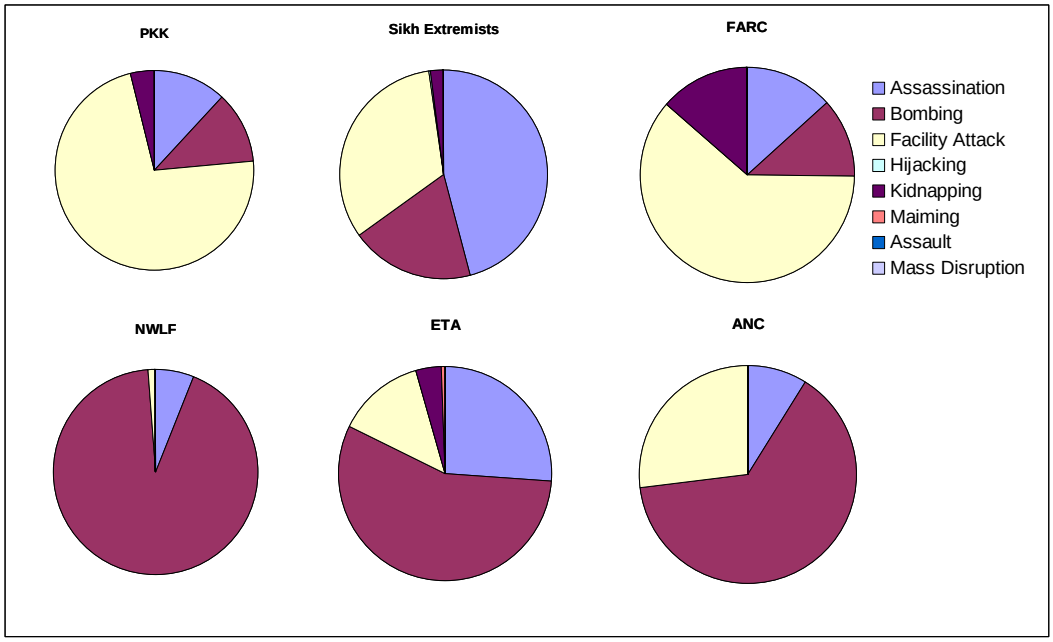
Figure 20. Terrorism Activity in the United States over Time for Select Groups.



In the next part of the report we turn to the most active group for each of these six most active countries. Figure 21 shows the distribution of tactics for each of the six

groups. According to Figure 21, group preferences for the use of certain types of tactics do emerge. Keeping in mind that facility attacks are more dangerous for offenders than are bombings, we see that FARC, PKK and Sikh Extremists rely most heavily on this high risk activity. By contrast, the NWLF, ETA and ANC are more likely to attack using bombs. Assassination remains a common secondary tactic, but Sikh Extremists are more likely than the other groups to assassinate their targets. Other groups appear to have preferences for certain types of attacks as well. For example the FARC showed the highest use of kidnapping of the six groups examined. Some tactics were used only infrequently by all groups. According to these data, maimings and hijackings are used rarely, with only the ETA and NWLF engaging in these activities at all.

Figure 21. Tactics Used by Select Groups Worldwide.



FUTURE PROJECTS AND DIRECTIONS

Now that we have finished computerizing the original PGIS data, we are planning several projects that build on the database. The main emphasis of the current NIJ funding was to accurately computerize the original PGIS database. For the most part, we think we have been successful at doing this. However, now that we have computerized the PGIS data, we are finding that it has two fundamental characteristics with important implications for how it is used. First, as we have argued throughout this paper, the PGIS data are the most extensive of all the existing open source terrorism event databases. Our work on the database over the past three years has not changed this original impression. But second, for any given category of incidents, the PGIS data invariably includes information that is incorrect or excludes information that should be included. This situation is well illustrated by the most advanced of our projects building on the PGIS data.

A Study of Aerial Hijackings

Our study of global aerial hijackings is scheduled to be published within the next few months in the journal Criminology (see Appendix H). It is worth commenting briefly on this paper, because it is likely to be typical of the research related to the PGIS database. Using a rational choice theoretical framework, we employ continuous-time survival analysis to estimate the impact of several major counter hijacking interventions on the hazard of differently motivated hijacking attempts and logistic regression analysis to model the predictors of successful hijackings. Some of the interventions examined use certainty-based strategies of target hardening to reduce the perceived likelihood of

success while others focus on raising the perceived costs of hijacking by increasing the severity of punishment. We also assess which specific intervention strategies were most effective for deterring hijackers whose major purpose was terrorism related. We found support for the conclusion that new hijacking attempts were less likely to be undertaken when the certainty of apprehension was increased through metal detectors and law enforcement at passenger checkpoints. We also found that fewer hijackers attempted to divert airliners to Cuba once that country made it a crime to hijack flights. Our results support the contagion view that hijacking rates significantly increase after a series of hijackings closely-clustered in time—but only when these attempts were successful. Finally, we found that the policy interventions examined here significantly decreased the likelihood of non-terrorist but not terrorist hijackings.

For the hijacking paper we developed a database that combines information from the PGIS data, from the Federal Aviation Administration, and from the RAND-MPIT data. Based on these sources, we were able to develop a database of 1,101 attempted aerial hijackings that occurred around the world from 1931 to 2003. The PGIS data were especially critical for allowing us to classify whether specific aerial hijackings were conducted by terrorist organizations. However, we also found that it was necessary to carefully check the accuracy of the PGIS data on a case by case basis. For these reasons, we are already convinced that the next phase of research using the PGIS data should move to creating a new database that uses the PGIS data as a platform, but continues to incorporate corrected and new information.

In hindsight this should not be too surprising. Imagine a group of researchers tasked with developing a new "Uniform Crime Reports" for the United States based on a

sample of police department records at a given point in time. Such an imaginary group would encounter information that was sometimes incorrect and sometimes missing. Moreover, the information would continue to evolve as new intelligence came to light (e.g., a particular homicide was really a suicide or vice versa). This analogy is pretty close to the situation we are facing with the PGIS data.

Moving Beyond the PGIS Data

As we conclude this NIJ project, we are of course thinking ahead to a series of related research projects for the future. We conclude by briefly describing six main research directions that we plan to explore with the PGIS data. First, we plan to geocode the data and use geographic mapping techniques to display spatial and temporal patterns of terrorist activity. Our major goal here will be to create regional and world-wide maps depicting numbers and rates of terrorist events around the world. We will also identify those countries with known terrorist cells. Point maps will be constructed to identify both the locations of incidents and the groups responsible for carrying out attacks. Recently introduced exploratory spatial data analysis techniques (ESDA) provide social scientists with new tools for distinguishing between random and non-random spatial patterns of events (Anselin 1998). While most of these ESDA methods are cross-sectional, Cohen and Tita (1999) have devised methods for extending static cross-sectional views of the spatial distribution of events to consider dynamic features of changes over time in spatial dependencies. This methodology will be used to identify innovative forms of new activity and to demonstrate patterns of adoption by other terrorist organizations.

These methods will also allow us to distinguish between *contagious diffusion* between adjoining units and *hierarchical diffusion* that spreads broadly through commonly shared influences. In the context of terrorism, contagious diffusion might suggest that terrorist organizations or cells grow through direct recruitment of individuals living in neighboring territories. By contrast, hierarchical diffusion might suggest that such groups form instead through commonly shared influences that are geographically dispersed. For example hierarchical diffusion might be based on reactions to favorable media portrayals of terrorists (see Enders and Sandler 1999 for a discussion of "copycat" terrorist incidents).

Second, we plan to use econometric time-series methods to describe important features of terrorist event trends globally and across geographic units. This aspect of the analysis will rely primarily on techniques developed by economists for the study of business cycles. Time series variables can be decomposed into two components: a trend component (that is, a general, long-term increase or decrease in the level of a variable over time), and a cyclical component that represents short-term, yet noticeable, deviations from the general trend (Stock and Watson 1988). Attention to trend components is especially important here because earlier research suggests that terrorist activity is cyclical in nature (Enders 1995). Standard procedures will allow us to classify trends as stationary (constant mean, variance, and autocovariance), trend stationary (stationary with a deterministic trend), or difference stationary (random walk) (Enders 1995; Nelson and Plosser 1982; LaFree and Drass 2001a). A variety of statistical techniques exist for separating trend and cyclical components from a time series (they are referred to as detrending or filtering techniques). They vary in the assumptions they make about the

trend and cyclical components, and about the relationship between the two components (see Canova 1994 for a review).

Once trend components are isolated, we can address questions about similarities and differences in characteristics of terrorism (e.g., hijackings, politically or religiously motivated events) and cycles across geographic units (i.e., cities, nations, or regions). Further, spectral analysis will allow us to identify underlying cycle components, providing information about localized upswings ("booms") and downswings ("busts") in terrorist activity during a given period (LaFree and Drass 2001b). By computing the correlations between cyclical components across geographic units, we can examine whether terrorist cycles are generally synchronous or asynchronous over time (see Backus and Kehoe 1992, for an example of this kind of comparative analysis of econometric indicators). Further, we can date the turning points associated with changes in the cyclical patterns (Canova 1994) to identify similarities and differences in the timing of waves across geographical space.

Third, another strategy will be to merge data from secondary sources with the terrorism database to estimate the effects of political, economic, and social indicators on terrorism outcomes. Then we can estimate the effects of these variables on the likelihood and frequency of terrorist events. Three theoretical models identified from prior research will help guide this part of the analysis: grievance, mobilization and control. For example, our analysis of grievance models will examine the effects of economic inequality, demographic distress, and lost political autonomy. Similarly, our analysis of control models will examine the impact of passive and active responses to terrorism (e.g.,

the erection of technology-based barriers, instituting stricter laws and penalties, increasing resource commitments, retaliatory raids, and covert actions).

Fourth, because the data will be structured with repeated measures of geographic units over time, to answer some research questions, we will use standard methods of longitudinal analysis. We plan to estimate the impact of predictive variables such as those listed above while controlling for unobservable within state time-invariant effects that vary across geographic boundaries (see Hausman and Taylor 1981 for a description of estimation methods using panel data). Another approach to estimating effects of repeated measures is to model the data hierarchically. By using a hierarchical modeling framework, we can estimate the coefficient parameters documenting within-time variation and across-time variation (Bryk and Raudenbush 1992, for an overview of multi-level linear models, see Goldstein 1987).

Fifth, we also recognize that terrorist events may themselves lead to political, economic, and social instability (Enders and Sanders 1993), and hence, changes in grievances, mobilization and control. To test for simultaneous relationships between terrorist events and the independent variables we plan to disentangle causal relationships by relying on the temporal ordering of the data and by estimating systems of simultaneous equations.

One method for testing the possible channels of causation between terrorist events and alternative explanatory variables will use the concept of Granger causality (Granger 1969). Empirical research based on this concept tests for causality by examining the time pattern of the variations in two related series. The assumption behind these tests is that if *x* causes *y*, then we should see changes in *x preceding* changes in *y*. For example, in this

research, we would expect changes in state condition (e.g., a political insurrection or an economic collapse) to typically come before changes in terrorist activity. More formally, some variable *x* does not Granger cause *y* if $f(y_t \mid y_{t-1}, x_{t-1}) = f(y_t \mid y_{t-1})$; where f(.) denotes the density function for *y*. Tests of Granger causality can be expanded to include variables lagged beyond the preceding time period.

We plan to conduct Granger causality tests on our panel data set of terrorist activity to uncover the causal relationship between terrorist events and a variety of state-level political, economic and social indicators. Because these tests are commonly carried out on a single time series, adapting them to panel data requires dealing with a set of complex econometric problems. For example, a panel data extension would require running a regression of the form:

$$y_{it} = c + \alpha_1 y_{it-1} + ... + \alpha_T y_{it-T} + ... + \beta_1 x_{it-1} + ... + \beta_T x_{it-T} + \eta_i + \varepsilon_{it}.$$

Because the inclusion of a lagged dependent variable biases coefficient estimates (Hsiao 1986), we will consider several solutions proposed in the literature. Anderson and Hsiao (1981) have argued that first-differencing the above equation and then instrumenting lagged differences on y's on lagged levels of y would eliminate the bias of panel estimators. An alternative approach suggested by Arellano and Bond (1991) is to estimate the independent variable first-differenced equation with a generalized method of moments estimator, which can take into account the autocorrelation in first-differenced residuals. Arellano and Bover (1995) and Blundell and Bond (1998) discuss other approaches.

We will also estimate simultaneous systems by using two-stage least squares and generalized method of moments tests (Pindyck and Rubinfeld 1998; Johnston 1984). For

example, to disentangle relations of causation between terrorism and state condition, we must estimate a system of two equations:

$$stc = \delta_0 + \delta_1 ter + \phi x + \eta z + \varepsilon$$
$$ter = \alpha_0 + \alpha_1 stc + \beta x + \gamma w + u$$

where *stc* is a specified measure of state condition, *ter* is terrorist activity, *x* is a vector of variables that have an effect on both *ter* and *stc*, *z* is a vector of variables that have an effect on *stc* but not *ter*, *w* is a vector of variables that has an effect on *ter* but not *stc*, and ε and *u* are independent and identically distributed disturbance terms.

Prior to estimating the above models, we will first need to establish the optimal units of temporal and spatial aggregation that identify predictive patterns in the data and highlight important distinctions across events. However, we also recognize that any attempt to aggregate the data temporally will be arbitrary and could mask variation that is important for theory and policy. For example, by using a 12-month dividing line, a terrorist event immediately following government turnover would be equated to an attack eleven months later. One approach to addressing this issue is to study instead the number of days between terrorist events, using a continuous-time multi-event hazard model (Cox and Oakes 1984; Allison 1984).

And finally, additional future projects can further explore the likely non-linear patterns of terrorist events by considering concepts explaining the acceleration or deceleration of activity. For instance, Schelling (1971) shows "white flight" behaves as a tipping point phenomena such that when a given neighborhood reaches a particular concentration of African Americans, white flight increases inevitability and precipitously. Applied here, tipping points could be described as that critical point in a region when

periodic terrorist activity accelerates to high frequencies of heavily concentrated violence. Other concepts worth exploring are threshold models (Granovetter 1978; Wallace 1991), contagion effects (Crane 1991, Loftin 1986), epidemic theories (Crane 1991), diffusion models (Burt 1987, Granovetter and Soong 1983, Pitcher, Hamblin, and Miller 1978), and bandwagon effects (Granovetter 1978; for review, see LaFree 1999).

REFERENCES

Allison, P. D. (1984). Event History Analysis. Beverly Hills, CA: Sage Publications.

Anderson, T. and C. Hsiao (1981). "Estimation of Dynamic Models with Error-Components Journal of the American Statistical Association 76: 598-606.

Anselin, L. (1998). "Exploratory Spatial Data Analysis in Geocomputational Environment." In Geocomputation: A Primer, edited by P. Longley, S. Brooks, R. McDonnell, and B. Macmillian. New York: John Wiley & Sons.

Arellano, M. and S. Bond (1991). "Some Tests of Specification for Panel Data: Monte Carlo Evidence and an Application to Employment Equations." Review of Economic Studies 58: 277-297.

Arellano, M. and O. Bover (1995). "Another Look at the Instrumental-Variable Estimation of Error-Components Models." Journal of Econometrics 68: 29-52.

Babkina, A.M. (1998). Terrorism: An Annotated Bibliography. Commack, NY: Nova Science Publishers.

Backus, D.K. and P. Kehoe (1992). "International Evidence on the Historical Properties of Business Cycles." American Economic Review 82: 864-888.

Barber, H. (2003). Conversations with on multiple occasions between 9/02 and the present. Mr. Barber was the former head of the PGIS Global Intelligence Service's database.

Blundell, R. W. and S. R .Bond (1998). "Initial Conditions and Moment Restrictions in Dynamic Panel Data Models." Journal of Econometrics 87: 115-143.

Brophy-Baermann, B. and J. C. Conybeare (1994). "Retaliating against Terrorism:

Rational Expectations and the Optimality of Rules versus Discretion." American Journal of Political Science 38: 196-210.

Bryk, A. S. and S. Raudenbush (1992). Hierarchical Linear Models. Advanced Quantitative Techniques in the Social Sciences Series. Newbury Park, CA: Sage Publications.

Burt, R. S. (1987). "Social Contagion and Innovation: Cohesion Versus Structural Equivalence" American Journal of Sociology 92:1287-1335.

Canova, F. (1994). "Detrending and Turning Points." European Economic Review 38:614-23.

Cauley, J. and E. Im (1988). Intervention Policy Analysis of Skyjackings and Other Terrorist Incidents. The American Economic Review 78: 27-31. Papers and Proceedings of the One-hundredth Annual Meeting of the American Economic Association.

Cohen, J. and T. George (1999). "Spatial Diffusion in Homicide: An Exploratory Analysis" Journal of Quantitative Criminology 15:451-493.

Cox, D. R. and D. Oakes (1984). Analysis of Survival Data. London: Chapman & Hall.

Crane, J. (1991). "The Epidemic Theory of Ghettos and Neighborhood Effects on Dropping Out and Teenage Childbearing" American Journal of Sociology 96:1126-1159.

Ellis, C. (2003). Research and Program coordinator for the RAND-MIPT terrorism database. Email correspondence on 4/10/03 and the week of 11/9/03 and 11/16/03.

Enders, W. (1995). Applied Econometric Time Series. New York: John Wiley.

Enders, W. and T. Sandler (1993). "The Effectiveness of Anti Terrorism policies: A Vector–Autoregression Intervention Analysis." American Political Science Review 87: 829-44.

Enders, W. and T. Sandler (1999). "Transnational Terrorism in the Post-Cold War Era." International Studies Quarterly 43:145-167.

Enders, W., T. Sandler and J. Cauley (1990). "UN Conventions, Technology and Retaliation in the Fight Against Terrorism: An Econometric Evaluation." Terrorism and Political Violence 2:83,23.

Fairchild, E. and H.R. Dammer (2001). Comparative Criminal Justice Systems. Belmont, CA: Wadsworth /Thomson Learning.

Falkenrath, R. (2001). "Analytic Models and Policy Prescription: Understanding Recent Innovation in U.S. Counterterrorism." Journal of Conflict and Terrorism 24:159-181.

Federal Bureau of Investigation (1997). Report on Terrorism in the United States. U.S. Government Printing Office.

Fowler, W. W. (1981). Terrorism Databases: A Comparison of Missions, Methods and Systems. RAND publication, Santa Monica CA.

Goldstein, H. I. (1987). Multilevel Models in Educational and Social Research. London: Oxford University Press.

Granger, C. W. J. (1969). "Investigating Causal Relations by Econometric Models and Cross-Spectral Methods." Econometrica 37: 424-38.

Granovetter, M. (1978). "Threshold Models of Collective Behavior" American Journal of Sociology 9:166-179.

Granovetter, M. and R. Soong (1983). "Threshold Models of Diffusion and Collective Behavior." Journal of Mathematical Sociology 9:165-179.

Hausman, J. A. and W.E. Taylor (1981). "Panel Data and Unobservable Individual Effects" Econometrica 49:1377-1398.

Hoffman, B. (1998). Inside Terrorism. New York, NY: Columbia University Press.

Hoffman, B. and D.K. Hoffman (1995). "The Rand-St Andrews Chronology of International Terrorism, 1994." Terrorism and Political Violence 7:178-229.

Hsiao, C. (1986). Analysis of Panel Data. Cambridge: Cambridge University Press.

Jaggers, K. and T. R. Gurr (1995). "Tracing Democracy's Third Wave with the Polity III Data." Journal of Peace Research 32:469-82.

Johnston, J. (1984). Econometric Methods. New York: McGraw-Hill, Inc.

Jongman, A.J. (1993). "Trends in International and Domestic Terrorism in Western Europe, 1968-88," Pp. 26-76 In Western Responses to Terrorism, edited by A. P. Schmid and R.D. Crelinsten. London: Frank Cass.

LaFree, G. (1999). "Declining Violent Crime Rates in the 1990s: Predicting Crime Booms and Busts." Annual Review of Sociology 25:145-68.

LaFree, G. and K. Drass (2001a). "Are National Crime Rates Converging? Evidence for Homicide Victimization Rates, 1956 to 1994," unpublished manuscript, University of Maryland.

-----. (2001b). "Crime Booms and Busts among Nations: Evidence for Homicide Victimization Rates, 1956 to 1998," unpublished manuscript, University of Maryland.

LaFree, G. and L. Dugan (2002). "The Impact of Economic, Political, and Social

Variables on the Incidence of World Terrorism, 1970 to 1997." NIJ Grant Proposal 1-41.

-----. (2004). "How Does Studying Terrorism Compare to Studying Crime?" Pp. 53-74 in M. DeFlem, ed. Terrorism and Counter-Terrorism: Criminological Perspectives. New York: Elsevier.

Loftin, C. (1986). "Assaultive Violence as a Contagious Social Process" Bulletin of the New York Academy of Medicine 62:550-555.

Mickolus, E. F. (1982). International Terrorism: Attributes of Terrorist Events, 1968-1977. (ITERATE 2). Ann Arbor, MI: Inter-University Consortium for Political and Social Research.

------. (1991). Terrorism, 1988-1991: A Chronology of Events and a Selectively Annotated Bibliography. Boulder, CO: Westview Press.

------. (2002). "How Do We Know We're Winning the War Against Terrorists? Issues in Measurement." Studies in Conflict and Terrorism 25:151-160.

------ (2003). "ITERATE 1968-2003 Codebook"

Mickolus, E.F., T. Sandler, J.M. Murdock, and P. Fleming (1993). International Terrorism: Attributes of Terrorist Events 1988-91 (ITERATE 4). Dunn Loring, VA: Vineyard Software.

Mickolus, E.F. and S.L. Simmons (1997). Terrorism, 1992-1995: A Chronology of Events and a Selectively Annotated Bibliography. Westport, CT: Greenwood Press.

Milbank, D.L. (1976). International and Transnational Terrorism: Diagnosis and Prognosis, Central Intelligence Agency, Washington, D.C.

Nelson, C. R. and C. Plosser (1982). "Trends and Random Walks in Macroeconomic Time Series." Journal of Monetary Economics 10:139-162.

PGIS (2003). PGIS Global Intelligence Services Annual Risk Assessment Reports, years 1985-1997.

Pindyck, R.S. and D.L. Rubinfeld (1998). Econometric Models and Economic Forecasts, 4th ed. Boston: Irwin McGraw-Hill.

Pitcher, B.L., R. L. Hamblin, and J. L. L. Miller. (1978). The Diffusion of Collective Violence." American Sociological Review 43:23-35.

Poland, J. (1988). Understanding Terrorism. Englewood Cliffs, NJ: Prentice Hall.

Prunkun, H. W. (1995). Shadow of Death: An Analytical Bibliography on Political Violence, terrorism, and Low-Intensity Conflict. Lanham, MD: Scarecrow Press.

RAND (2003). RAND terrorism chronology website. http://db.mipt.org/rand_tc.cfm

Sandler, T. and J.L. Scott (1987). "Terrorist Success in Hostage Taking Incidents: An Empirical Study." The Journal of Conflict Resolution, 31: 35-53.

Schelling, T.C. (1971). "Dynamic Models of Segregation" Journal of Mathematical Sociology 1:143-186.

Schmid, A.P. (1992). "Terrorism and Democracy." Terrorism and Political Violence 4:14-25.

Schmid, A.P. and A.J. Jongman (1988). Political Terrorism: A New Guide to Actors, Authors, Concepts, Databases, Theories and Literature. Amsterdam: North-Holland Publishing Company.

Stock, J.H. and M.W. Watson (1988). "Variable Trends in Economic Time Series." Journal of Economic Perspectives 2:147-74.

Tucker, J.B. (1999). "Historical Trends Related to Bioterrorism: An Empirical Analysis." Emerging Infectious Disease 5:498-504.

United States Department of State (2001). "Introduction: Patterns of Global Terrorism, 2000." http://www.state.gov/s/ct/rls/pgtr.

Wallace, R. (1991). "Social Distintegration and the Spread of AIDS: Threshold for Propagation along 'Sociogeographic' Networks" Social Science & Medicine 33:115-1162.

Windsor, P. (1989). Book Review of Current Perspectives of International Terrorism in Terrorism and Political Violence 1:272-276.

APPENDIX A: INCIDENT TYPE DEFINITIONS

INCIDENT TYPE DEFINITIONS

For purposes of the Pinkerton Risk Assessment Services (PRAS) data base, terrorism is defined as the threatened or actual use of force and violence to attain a political, religious or social goal through fear, coercion and intimidation. Information contained in the PRAS data base relates only to significant incidents of terrorism and other forms of political violence. Criminal acts devoid of any political or ideological motivation are not recorded in the data base, nor are acts arising from open combat between opposing armed forces, both regular and irregular.

Incidents of terrorism and other forms of political violence included in the PRAS data base are categorized by type of activity. Categories used are: (1) assassination, (2) assault, (3) bombing, (4) facility attack, (5) hijacking, (6) kidnapping, and (7) maiming. Information in the data base regarding the amount of damage, theft, or ransom is based upon governmental/corporate statements, press reporting on the subject, or a reasonable estimate when possible. All foreign currency figures have been converted to dollars based upon the exchange rate prevailing at the time of the incident.

Information contained in the data base is derived from foreign and US government reports, police reports, foreign/domestic media reports and Pinkerton sources. Data relating to damage, persons killed and wounded, and hostages taken are dependent upon the accuracy of such reporting. In many nations, governmental policies preclude the publication of such data. Accordingly, the figures cited for these categories can give only a relative approximation of actual human and material losses.

ASSASSINATION:

The objective of the act is to kill a specific person or persons. Normally the victim is a personage of note, a policeman, government official, etc. The key is - what was the objective of the act? For example, an attack on a police jeep usually is a facility attack, but an attack against a single police officer on a post is an assassination, i.e., the aim was to kill that specific man. Some incidents of this nature will be judgment calls and may be categorized either as assassinations or facility attacks. Generally, when the attack is against a jeep full of police, a police post, a military outpost, military vehicles, etc., it is coded as a facility attack. In an assassination, the thrust is concerning an identified person or persons rather than several unknowns, as would be the case in an attack on a police vehicle occupied by several persons or against a police/military post.

ASSAULT:

The objective of the act is to inflict pain or injury upon the victim(s), but not cause loss of life or permanent ill effect such as maiming. Normally involves the use of some type of weapon, including such basic devices as stones, bricks, sticks, etc. Often occurs as the result of political, religious, ethnic and other factional disputes. For the purposes of the PRAS data base, does not include acts of a purely personal or criminal nature.

BOMBING:

The objective of the act normally is destruction/or damage of a facility through the covert placement of bombs. The action is clandestine in contrast to a facility attack. Normally, the identity of the perpetrator(s) is not known at the time, although claims of responsibility often follow. The devices are usually placed at night or at least covertly and detonate after the bombers have departed. Bombings do not involve taking a facility or installation by attack and then placing bombs. In contrast to a facility attack, which often is aimed at physically taking over the installation, a bombing is designed simply to destroy or damage it. The clandestine nature of bombing separates it from facility attacks, as does the fact there is no intention to take the installation or occupy it, or to take hostages. The target of a bombing often is unoccupied or its occupants asleep.

FACILITY ATTACK:

The objective of the act is to rob, damage or occupy a specific installation. The term installation includes towns, buildings and in some cases, as mentioned previously, vehicles. Thus a bank robbery is a facility attack although all its guards may have been killed. The objective in such an action was robbery of a facility, not killing the guards. The occupation of a town, wherein persons may be killed or wounded, also is a facility attack since the objective was to take the town (installation), not to kill or wound persons. Again, it is the objective of the operation that is the determining factor. The idea or objective of the operation is important if, for example, bombs are left behind by the attackers. In such a case, the bombing of the building was not the aim - the aim was to take it over by assault. Bombs were left to do additional damage and/or cause disruption to facilitate the escape of the attackers. Facility attacks may be carried out using automatic weapons, explosives, incendiaries, etc. Normally, a multi-member team is involved. The operation is carried out openly - in contrast to the covert placement of bombs at night. Hostages may be taken, but this is not the primary objective of the act.

HIJACKING:

The objective of the act is to assume control by force or threat of force of a conveyance such as an aircraft, boat, ship, bus, automobile or other vehicle for the purpose of diverting it to an unprogrammed destination, obtain payment of a ransom, force the release of prisoners, or some other political objective.

KIDNAPPING:

The objective of the act is to obtain payment of a ransom, force the release of political prisoner(s), or achieve some other political objective. If the person is killed in the course of the kidnapping process, this does not make it an assassination. It still remains a kidnapping. Kidnapping is aimed at a specific person(s). A facility attack against a bank, wherein hostages may be taken, is not a kidnapping because the hostage-taking is incidental to the primary objective.

MAIMING:

The objective of the act is to inflict permanent injury, disfigurement, or incapacitation upon the victim(s) but not cause loss of life. "Kneecapping" and castration are examples of maimings. For the purposes of the PRAS data base, does not include acts of a purely personal or criminal nature.

APPENDIX B: GLOBAL TERRORISM PROJECT DATA ENTRY GUIDE

February 2003

General Guidelines and Suggestions

1. The web interface has been designed to look just like the actual incident card, with slight modification. The web page can be accessed at http://www.ccjs-terrorism.umd.edu.
2. All coding should be done using Explorer rather than Netscape. The ideal resolution for your monitor is 1024×768 (unless you have a large monitor); at lower resolution the interface will be too wide for the monitor. (You can change the resolution by going to Start → Settings → Control Panel → Display → Settings → Screen Area → 1024×768).
3. In general, we want to accurately record every bit of information from each of the original files on terrorist events. If there is any information that does not clearly fit in the pre-coded categories on the interface, we have left room later in the survey to type this information. Be sure to always collect every bit of information from every card.
4. Please bring any coding problems to the attention of staff. We realize that you will run into problems and that mistakes will be made, and we want to discourage you from hiding those mistakes. If you cannot read something on the incident card and have to make a guess (or are unable even to make an educated guess), you should highlight the problem area on the card (by circling or highlighting it), make a note

about how you dealt with the problem, and then bring the incident card to a staff member.

5. There are some fields on the web interface that you must complete, and you will receive an error message if you advance to the next page without completing these required fields. You can simply hit the "back" button on your browser, fill in the required field(s), and then submit the page again. If you realize that you submitted a page but made a mistake on an entry, do not go back to change it. You should only go back to the previous page if you receive an error message, otherwise you cannot go back. You should highlight the problem area on the incident card, make a note about what mistake you made, and then bring the incident card to a staff member.
6. In some fields on the web interface, you will be asked to type word for word what appears on the incident card. If you run out of text space (for example, some fields only accommodate 25 or 50 characters), you should put a single "*" at the end of the line, and then re-type the account in full on the notes page, indicating what original field this information belongs in. For example, suppose you are entering data on the extent of damage from a bombing in the "damage" field on page 2, but do not have enough text space to fully enter the data. At the end of the line, you should include "*," which will serve as a flag for staff that the information is continued on page 3 in a note box. Then, in the note box, you should type "Damages: [text]" followed by the full account of damages. This will give staff an idea as to where the information originally belongs.

Interface Pages

PAGE 0: LOGIN

The first page is the login page. Each coder will be issued an ID and a password. You will be prompted to enter your ID and password at the beginning of each coding session. Be sure to keep your ID and password confidential.

PAGE 1: IDENTIFYING INCIDENT INFORMATION

Incident ID: (numeric) Each incident will be stamped with a unique ID on the right-hand side of the card, which will contain six digits. It is not necessary to enter leading 0's, for example, an incident with ID "000140" will simply be entered in as "140."

Incident type: (drop-down) The incident type is located in the top left corner of the incident card in the "type" box (it will often be handwritten at the top of the card, as well). There are seven incident types that you will encounter:

1) Assassination (A)
2) Assault (AT)
3) Bombing (B)
4) Facility attack (FA)
5) Hijacking (HJ)
6) Kidnapping (K)
7) Maiming (M)

Of these, you will find that bombings, facility attacks, and assassinations are the most common. The incident type will be entered using a drop-down menu. An easy way to enter this information is to highlight the field and hit the first letter of the incident type. This will select the incident. For example, if you are entering a bombing incident, you may simply hit "B" when you move to this field, and it will select "Bombing."

Incident date: (drop-down) The incident date is located in the "date" box on the incident card, and will also be entered using a drop-down menu. Be cautious when entering the date from the incident card, since it is written differently on different cards. For example, a terrorist incident that occurs on December 15, 1997 may be written "97-12-15" (year, month, day) on some cards, but "12-15-97" (month, day, year) on others. On our coding interface, the incident date will be entered in a month-day-year format. **Note**: In the rare instance where a complete date is not given on an incident card, you should select a value of "0" from the drop-down menu.

PAGE 2: INCIDENT DETAILS

Successful: (yes/no) This indicates whether the terrorists were successful in their attempt, and is written in the "succ" box on the incident card, with "Y" indicating yes and "N" indicating no. **Note**: If there is no indication on the incident card about whether or not the incident was successful, you should assume that it was, and mark "Y," unless there is obvious evidence that it was not successful, for example, a bombing in which the explosive was defused, an assassination in which there are no fatalities.

Entity: (drop-down) This indicates the nature of the target, and is a numeric code entered using a drop-down menu. There are 23 possible categories for the entity.

0) I. Cards
1) Dip/US
2) Pol/Mil/US
3) Other/US
4) Unk/US
5) Gov/US
6) Pol Par/US
7) Med/US
8) Bus/US
9) Trs/US
10) Util/US
11) Bus/Fgn
12) Bus/Dom
13) Trans
14) Util
15) Media
16) Dip
17) Govt
18) Interna
19) Other
20) Pol/Mi
21) Pol Party
22) Unk

In the rare case in which no entity is provided on the incident card, you should select “22” for unknown from the drop-down menu. You should ignore the “I. Cards” field to the right of the entity field for the time being. (These will be used later, when we begin coding incidents that took place prior to 1985, when a different coding method was used.)

Region: (drop-down) This indicates the region of the world where the incident occurred, and is a numeric code located in the “region” box on the index card. You will enter this number using a drop-down menu. Once you select the drop-down field, you may simply type the number of the region and it will appear in the field. There are seven possible regions:

0) Unknown
1) Latin America (LA)
2) Europe (EUR)
3) Asia
4) Middle East or North Africa (ME/NA)
5) Sub-Saharan Africa (SUB/NAF)
6) North America (NA)

In the rare case in which no region is provided on the incident card, you should select “Unknown” from the drop-down menu.

Country: (drop-down) This indicates the country where the terrorist incident took place, and is written in the “country” box on the incident card. The country is entered using a drop-down menu. The drop-down list is exhaustive, but if a country is written on the incident card that is not contained in the list, you should select “Not in list” for the

country, and then write the name of the country in the text box immediately below that says “If not in list.” When you submit the incident to the database, the drop-down list will automatically be updated to include the country. However, please be sure that you have checked carefully for the country before you add a new country to the list, as it will produce duplicate countries. **Note**: For this drop-down menu and all others in the coding interface, you may find it useful to first type in the first letter of the nation you are looking for instead of scrolling through the whole list. For example, by typing in “T,” you will be taken directly to the first country beginning with T in the list (Taiwan). Hitting “T” repeatedly will scroll through the T’s.

City: (text) City should be typed in as it appears on the incident card. **Note**: In many incidents that occur in Latin-American countries, the city name will be followed by “department,” which simply means that it is a municipality. For example, an incident in Colombia may occur in “Cesar dept.” In other cases you will find some physical description of a location in the city box (for example, “near the River Orinoco” or “near the Trans-American Highway”). In these cases, you should type the description exactly as it appears on the incident card.

Vicinity: (checkbox) Just to the right of the city field is a checkbox that says “Vicinity.” This is to indicate that the incident took place near or just outside of the named city. For example, an assassination that takes place just outside of Lima, Peru may say “Near Lima” or “outside of Lima” or “20 miles south of Lima” on the incident card. In this case, you would type “Lima” for city and then check the vicinity box. You may enter the data word for word in a comment box on the next page.

State: (drop-down) The state field will remain "grayed out" unless you select the United States from the country drop-down list. When this happens, you will be prompted to select the specific state in which the incident occurred from a drop-down menu. If the State is unknown, choose this option from the beginning of the drop-down menu.

Hostages: (checkbox & numeric) These fields (# host, US host) record the number of hostages that were taken during a hijacking. They will remain grayed out unless the incident type that you enter on the previous page is a hijacking. In this case, the small box for hostages will be checked, and you will be prompted to type in the total number of hostages that were taken during the hijacking, followed by the number of hostages that were U.S. nationals (if this information is available). If the number of hostages is unknown, make sure the box is checked, but then leave the "# host" field blank.

Remember that "# host" refers to the total number of hostages taken regardless of whether they are U.S. nationals. For example, if there were three hostages taken and all three were U.S. nationals, you would enter "3" for # host and "3" for US host. Note also that the number that you type in the "US host" field should always be less than or equal to the number that you type in the "# host" field. **Note**: If you code an incident that is not a hijacking, but hostages were taken (e.g., a facility attack), you should be sure to check the small box first, and then begin entering data about the number of hostages. In all hostage cases, you will be prompted to enter the number of days the hostages were held (or the number of hours). Note that the data that you type in these fields will not be saved in the database if they are grayed out, so be sure that the small box is checked.

Kidnappings: (checkbox & numeric) These fields (#, # US) record how many people were kidnapped and the amount of time that they were held until released (if they were released at all). They are treated the same as the fields for hostages described above. If the incident type is a kidnapping, the small box will be checked and you will be prompted to enter the relevant data from the incident card about the total number of kidnapees and the number of kidnapees that were U.S. nationals. As above, if the number of kidnapees is unknown, make sure the box is checked, but then leave the "#" field blank.

Also, you will be prompted to enter the number of days or hours that the kidnapees were held prior to release. As above, the total number kidnapped should include the total number of U.S. nationals kidnapped. Thus, the total number of U.S. nationals kidnapped should never be larger than the total number kidnapped.

Targets: Target information should be entered just as it appears on the incident card. The web interface accommodates up to three different types of targets, but in most cases, there will be only a single target. The important determination is whether any of this information differs for multiple targets. Suppose, for example, that there is a kidnapping of five Catholic priests in Colombia. Usually, this will be coded as a single target, with "Catholic Church" being the corporation, "priests" being the target, and "Colombia" being the nationality. Suppose, however, that four priests are Colombian and one American. In this case, you would code two targets, with "Catholic Church" being the corporation for both targets, "priest" being the target for both, but "Colombia" being the nationality for one and "United States" the nationality for the other. So, if the corporation, target, and nationality are the same for all targets, only a single line will be

entered. If, on the other hand, the corporation, target, or nationality differs for any of the targets, they should be treated as more than one type of target and entered accordingly. The actual number of targets is unimportant here, just the number of different types of targets.

Corporation: (text) This is the name of the corporate entity or agency that was targeted. You should type word for word what is contained in the "corp" box on the incident card.

Target/Occupation: (text) This is the specific person, building, installation, etc. that was targeted, and is a part of the corporation entered above. You should type what is contained in the "target" box exactly as it appears on the incident card. However, if the target is multiple victims (e.g., a kidnapping or assassination), you should record only the first name in this field, and then record the remaining names in the handwritten notes section under "Victim Names."

Nationality of target: (drop-down) This is the nationality of the target that was attacked, and is not necessarily the same as the country in which the incident occurred, although in most cases it will be. If the nationality is the same as the country, you can simply check the box that says "Same nationality as above," in order to save you time from locating the country in the list again. If you check the same nationality box, the interface will automatically substitute the same nationality as you entered for where the incident occurred—even though it will not be visible on the screen.

As in the earlier question about the nation where the incident occurred, if the nationality is not in the drop-down menu, you should select "Not in list" from the drop-down menu, and then type the nationality in the box that says "Nationality not in list."

As before, please make sure that the nation is not on the pull down menu before adding a new nation to the list, as it will produce duplicate entries.

At the bottom of the target section is the question, “If more than three targets, are they different nationalities?” You may not enter data on more than three types of targets, however, if you encounter an incident with more than three, you should respond to this question by selecting yes or no. For example, the recent terrorist attack in Bali involved victims from many different nations. In this case, we would attempt to code the three most common nationalities of victims (for example, Indonesia, Australia, New Zealand) and then check the box to indicate that other nationalities were also included as victims.

Ransom demand: (checkbox & numeric) This section provides information on whether the terrorists made a ransom demand (and if so, the amount) in a kidnapping or hijacking incident. If there is reference to a ransom demand in the “rans dem” or “US rans dem” box on the incident card, you should place a checkmark in the small box for ransom demand. Then, if the incident card specifies the amount of the ransom demand, you should type the dollar amount in the relevant field.

If the ransom amount is unknown, this field should be left blank (but the ransom demand box should remain checked). Similarly, you should type the dollar amount demanded from the U.S. in the relevant field.

Ransom paid: (checkbox & numeric) This section provides information on whether a ransom was paid. As with ransom demand, if there is a reference to whether a ransom was paid in the “rans paid” or “US rans pd” box on the incident card, you should place a checkmark in the ransom paid box. Then, type in the amount of the ransom that was paid (if a ransom was paid but the amount is unknown, leave this field blank).

Vehicle: (text) This is an indicator for whether a vehicle was used during the terrorist attack. This is most likely to occur in the case of an assassination. You should type in this field word for word what is contained in the "vehicle" box on the incident card. The usual response will be yes/no, although there is more detail in some incidents. If the incident card says "unknown" or "unk," you should enter this.

Result: (text) This explains what happened to the victims in a kidnapping or hijacking (or a facility attack where people were taken hostage). For example, an incident card may have written "6 passengers released" or "released 10 Nov" or "freed by police after 5 hours" in this box. You should type word for word what is contained here. When this information is available, you will also enter it on the next page (see "kidnapping and hijacking details" below).

Persons killed: (numeric) This indicates the number of people that were killed during the incident (both targets and terrorists). The information is contained in the "killed" (total persons killed) and "US kill" (U.S. nationals killed) boxes on the incident card. You should enter the number of casualties using the drop-down menu provided. The options range from 0 to 25 (with an option to select unknown). If the number of casualties exceeds 25, you should select "over 25" from the drop-down menu, and then type the actual number of casualties in the box ">25." If the box is blank on the incident card, it implies that there were no casualties, so you should enter "0." **Note**: This first field is required; you must include the total number of persons killed for every incident. If you do not, the interface will not take you to the next page. If the box on the card is blank you must select "Unknown" from the drop-down menu before proceeding.

If there are U.S. fatalities, you should follow the same procedures using the drop-down menu (this field is not required). In some incidents, terrorists will also be killed. In these cases, you should also provide information on the number of terrorists that were killed.

Persons injured: (numeric) This indicates the number of people that were injured as a result of the incident (both targets and terrorists). The protocol is the same as for persons killed. Again, if this field is not completed, the interface will not take you to the next page.

Damages: (checkbox & text) This indicates the nature of the damages incurred during bombing incidents. Any time you code a bombing incident, the small box will be automatically checked. This box should remain checked even if the incident card has no information on damages. The field is a text field, and any information in the “damages” and “US damages” boxes on the incident card should be entered in their respective fields word for word (Details, US details). In some incidents, the incident card will provide a dollar amount, whereas in others the card will provide only a description of the damage (e.g., extensive, moderate). If the incident is not a bombing but damage is reported, you should check the small box first, and then provide detail about the nature of the damage. The field will be “grayed out” if there is no checkmark, which means that no information will be recorded in the database.

Robbery: (checkbox & text) This indicates whether a robbery took place during a facility attack (for example, bank robberies are considered facility attacks). You should type the data word for word from the “robbed” and “US robbed” boxes on the incident cards into the appropriate fields (Amt., Amt. US). If the incident is not a facility attack

but a robbery nonetheless took place, be sure that you place a checkmark in the robbery box first, and then record the relevant data.

Terrorist Group: (drop-down) This indicates the name of the group that was responsible for the terrorist incident. When you enter the group name, you should use the drop-down menu. This will contain an exhaustive list of terrorist groups, and in almost all cases you will find the group name here. Again, you can move quickly through this list by typing the first letter of the group—for example, "S" for Shining Path or "I" for Irish Republican Army. In cases where the group name is not listed in the drop-down menu, you should select "Not in list" from the drop-down menu and then type in the name (exactly as it appears on the card) in the box following "Not in list" (please do not use all caps, and do not enclose the group name in quotation marks). Once a new group name is entered in this field and the page submitted, the drop-down menu is automatically updated. Note that if you add a group that is already contained in the drop-down menu, the group's name will appear multiple times. So please double-check that the group is not already provided in the menu.

There is also a checkbox to the right labeled "Uncertain." If there is any indication on the card that the group responsible was not confirmed, then you should check this box. For example, the incident card may indicate "FARC suspected" or "FARC – not verified" (FARC is the Spanish acronym for the Revolutionary Armed Forces of Colombia). In this case, FARC should be entered as the name of the group, and the box checked for uncertainty.

Number of terrorists in group: (numeric) This indicates the total number of terrorists participating in the group during the incident. This should be entered exactly as

it appears on the incident card in the "# group" box. Similarly, you should record the number of males and females in the group if this information is provided on the incident card.

Location of incident: (text) This indicates the specific section of the city where the incident took place (e.g., a house, on a street corner, in an office building). You should type word for word what appears in the "location" box on the incident card. If you do not have sufficient space in the coding interface to enter the full location description, include "*" at the end of the line and type all of the information in the "Additional Offense Information" note box on the next page (beginning with: "Location: [text]").

Weapons: (drop-down) This indicates the different types of weapons that were used during the incident. In a bombing, the weapon is typically an "explosive" or "incendiary." In an assassination, the weapon is typically "auto" (referring to an automatic weapon, not a car). At times, the weapon will simply be coded on the incident card using a single letter as in "f" (firearm) or "k" (knife).

There are four fields that are available to record data on different weapon types. Multiple fields should only be used if there are multiple weapon types, but should not be used for multiple weapons of the same type. You will select the weapon type using a drop-down menu. However, if your weapon is not included, you should select "Not in list" from the drop-down menu and then type in the type of weapon in the "If not in list" field. Be specific when coding the weapon. For example, if AK-47 is the weapon, it should not be entered as "automatic rifle," but instead as "Automatic (AK-47)."

PAGE 3: ADDITIONAL NOTES

The fourth page contains extra information, anything that was not coded in the previous page (such as details handwritten in the margins).

Multiple incidents: (yes/no & numeric) At the top of this page you are asked two questions: “Do you believe that this card represents more than one incident?” and “How many total incidents are represented?” If there is any reference on the card as to whether there was more than one of the same type of incident, you should answer “yes” and enter the number. For example, in the margin of a bombing there may be written “2 more same” (i.e., two more in addition to the incident described on the card), which indicates that there were two additional bombings that occurred that have the same incident characteristics, but which were actually separate bombings. Instead of filling out three separate bombing cards with identical information, this note indicates that there are actually three bombings total. Consequently, you will respond with “yes” as to whether the card represents more than one incident, and then enter “3” for the total number of incidents. (Thus, “5 more same” = 6 incidents total.)

Update: (yes/no) If there is a note in the margin suggesting that the incident is an update of an earlier incident, you should check the appropriate box. This will usually be indicated simply as “update.” These incidents should also be set aside after entering the data, so that staff can match the update with the original incident.

Kidnapping details: (drop-down & numeric) If you code a kidnapping or hijacking incident, you are asked several questions about the outcome of the incident for victims (e.g., were they released, rescued, or killed, or did they escape, etc.), and specific information about how many were released/rescued/killed/escaped and the date of their release/rescue/death/escape. Some of this information may also be written in the “result”

box on the incident card (and subsequently entered into the "result" field on the web), in which case you will complete this information again. It may also be handwritten in the margins (if the information is available). **Note**: In some cases, there will be multiple outcomes, for example, in a single hijacking, one group of hostages may be released after a short time, a second group may be killed, and a third group may be released some time later. Since the web interface accommodates only one outcome, you should select "Other" from the drop-down menu for the type of outcome, enter "999" into the field for the number, and enter the details about the multiple outcomes under "Additional Outcome Information" in the handwritten notes box.

Hijacking details: (text) If the incident is a hijacking, you should determine what was the country, city, or airport of origin (when you coded the country for a plane hijacking on the previous page, you recorded which country the plane was flying over at the time it was hijacked). You should also try to determine to what country, city, or airport the plane was diverted (if at all).

Handwritten notes: (text) There are three large text boxes for additional notes that may be written in the margin, or for information on the previous page that you want to elaborate in greater detail. You should check the appropriate box that identifies the type of information you are including, and then type word for word what appears on the card. The categories that are included are:

Victim names: If there is only one victim, the name should appear on the previous page in the target section under "target/occupation." However, if there is more than one victim name on the incident card, you should put the first name (usually the

primary target) under “target/occupation,” and then list the additional victim names here, just as they appear on the incident card.

Additional victim/target information: Here you should include any other reference to characteristics of the victim(s) or target(s), for example, the age of the victim, relationship between the primary assassination target and the other fatalities (e.g., the mayor was the target, but his or her bodyguards were also killed), details about the corporation (e.g., it is a subsidiary of another corporation), etc.

Additional offender information: Here you should include additional reference to the offenders. This might also include an assessment of the motive for the incident from the perspective of the terrorist group (e.g., a political rivalry between two factions) or details on the actions or characteristics of the offenders (e.g., “they wore black hoods,”).

Additional offense information: Here you should include additional information relative to the commission of the specific offense, for example, an assassination that began as or turned into a robbery, whether there was evidence of torture to the victim, etc.

Additional outcome information: Here you should include details about the outcome of the incident, for example, whether there was a police raid on the terrorist group, the terrorists were taken into custody, the victim retaliated against the kidnappers, etc. You should also include in this section information about the victim subsequently dying (for example, “victim died of complications 2 days after the incident”).

Other: Here you should include details that do not seem to fit anywhere else, or that you are unsure of where it goes.

Source information: There is a drop-down menu for the name of the source. As above, if the source is not in the drop-down menu, “Not in List” should be entered in the drop-down and the source name typed into the “If not in list” field. In many cases, there are multiple sources listed for an incident, in which case you should list all of them. The web interface accommodates four sources total. The most common sources you will encounter are FBIS (“F”), State (“S,” representing the State Department), Reuters (“R”), and Diario (for incidents that occur in Latin-American countries).

The date of the source and other specific information (section and page #) should also be entered. For example, if the incident information was taken from an article in the Washington Post that began on page A4, the source name is “Washington Post,” the section is “A,” and the page is “4.” On many incident cards, the year of the source is not provided. However, in most cases the year of the source will be the same as the year of the incident. One of the few exceptions is when the incident takes place in December, and the source date is in January. Another exception is when the incident card is an update of an earlier incident, in which case the source date could be one year later or more.

Card legibility: At the very bottom of the final page you should rate (on a scale from 1 to 10) the legibility of the incident card. This is a completely subjective rating, so rate the legibility in a manner that you find useful. If you think that the incident card was completely legible and that you entered all of the data accurately, then you should rate the legibility as a “10.” If you have difficulty reading some of the handwriting and have to make a guess about some of the text, you should rate the legibility at a score below 10.

We will use your rating as a flag for quality-control checks, so that if there are legibility problems, we can have staff double-check the information that was entered with

the original incident card so that we can ensure agreement about its content. Staff will make any score 5 or below a high priority to be double-checked.

APPENDIX C: GENERAL DATA ENTRY TEST CASE RESULTS

50 Test Case Comments

1. Please be sure that you carefully **read the data entry guide** that was passed out on the training day. This guide contains helpful hints. You might want to add some of your own comments and hints in the margin and keep the guide handy when you are entering data.
2. Most of you did a great job of highlighting areas and incidents that gave you trouble when you were coding. Please keep this up. However, you need to make sure that you **SEPARATE** into two piles those cases that you enter successfully and those that have errors, are updates or multiple incidents, or contain unusual or illegible information. **You also need to write your name and project id number on all problematic cases.**
3. If a **specific box** on the incident card **is left blank** – for the most part you should **leave it blank** (the **exception** being the number of people killed or injured. If these boxes are blank then you should type in 0). For example, if the "Result" box is left blank, but the margin notes give information about the end result – **DO NOT** put this information in the result box. You should put it in the Additional Notes sections only**.**

4. **DO NOT** use all caps when entering the data. It is appropriate to capitalize City, Country and Victim names, but please to do not use all capital letters in the data entry.
5. Incident date = If there is uncertainty about the specific date for an incident, you should enter "0" for the month, day, or year (whichever one has the uncertainty). For example, one of the incidents had a date "13-14 Jan 96." This is the type of incident where you should enter "0" for day, but "1" for month and "1996" for year. Then, you should set the incident aside to give to staff and write a note on the card about the uncertainty.
6. Successful = It is easy to get in the habit of entering "Yes" for whether or not the incident was successful, since a majority of them are. However, be **conscientious** when filling this information out; **not all incidents are successful**.
7. Country = The country should be entered <u>exactly as it appears</u>. Several coders entered "Ireland" when the country was actually "Northern Ireland." This is not a trivial difference; Ireland and Northern Ireland are two different countries (Northern Ireland is part of the United Kingdom, whereas Ireland is its own country).
8. State = Remember that when the country is the United States, you should enter the state (if known) where the incident occurred.
9. Vicinity = Use this **<u>only if</u>** the card explicitly says that the location was "near X city." For example, "N. Costa Rica" does not imply that the location is in the vicinity, because this is a region rather than a specific city. In this case, you

should type it exactly as it appears. Also, **do not include "near"** when typing in the City name – that is already taken care of via checking the vicinity box.

10. Kidnapped = Do not forget to look at these boxes; they are easy to overlook. On one kidnapping incident, 1/2 of coders did not enter any information for the number of days held, even though this information was provided on the card. Also, if you know the number of days, but the number of hours is not provided, you should leave this field blank. In most cases, you will be provided either the number of days or number of hours (if less than one full day).
11. Target = Multiple targets should be entered only if there is some information that is different about the corporation, specific target, or nationality. For example, a husband and wife that are kidnapped should be treated as a single target. The first person's name listed on the card should be entered into the target field, and then the second person's name entered on the notes page under "victim names." Also note that in many cases, the information written in the target box is too long to fit into the box on the card (this is especially true for assassinations, where the target is a person's name). In these cases, the information will either be continued in the margin or in the box below (nationality).
12. Vehicle = Many people are leaving this field blank when the information is provided on the card (**usually "Yes" or "No," rarely is a vehicle described.** For example, in one of the test cases many people entered "4W" for four-wheel when the card actually read "Yes."). Be careful that you do not overlook this information.

13. Casualties = You should enter “unknown” **only if** the card actually says “unknown.” Otherwise, if the card is blank, you should enter “0” for both number of people killed and number of people injured.
14. # terrorists killed = Since there is not a box on the card where this information will be provided, you should carefully read any handwritten notes in the margin. If it is known whether any terrorists are included in the number killed, this information will usually be provided.
15. Damages = There was a bombing in Northern Ireland which there were a total of ten incidents. The damage amount written in the box on the card was “$2,000,000,” but in the margin was written “Total damages to 10 stores attacked on 1 January. I changed so that each incident shows $200,000 each.” In this case, you should enter $2,000,000” for the damage amount (**exactly what appears in the box on the card**), but add the handwritten note in the “additional outcome information” on the notes page (you could also have entered “2,000,000 *” to draw staff’s attention to the discrepancy).
16. Group = **Make sure** the group is not in the drop-down list before you add a new one. You should double-check that it is not entered differently. For example, if the group is “Former Nicaraguan Guerillas,” you should try to find this before you add “Nicaraguan Guerillas (Former).”
17. Group uncertain = This box should only be checked only if there is information on the card that explicitly states that the group was suspected or not confirmed. If the group is blank, you should not check the uncertain box.

18. Weapon = You should only enter weapons that are written in the weapon box on the card. In one incident, a woman was assassinated, and then the terrorists blew up the body with dynamite. On the card, only "pistol" was written in the weapon box, so only this should be entered on the web page. The note about dynamite should be included on the notes page, and since it was used after the target was already dead (and thus not included in the weapon box), it should not be entered as a weapon. Also, if the card says "unknown" in the weapon box, you should select "unknown" from the weapon drop-down menu.
19. Multiple incidents = **There is no need to enter "1" for the "total number of incidents represented."** Use this field only if the incident represents **more than one incident**, or if there are multiple ID's listed in the top right corner of the card. On one incident in which "2 incidents" was written in the top margin, 63% of the coders did not check "Yes" for multiple incidents. Be careful that you do not overlook this information. Also, if the card says "1 more same," this means that there are two total incidents.
20. Result = You should not enter information here if there is no link to the "result" box on the incident card. For example, if "Freed 09/17/96" is written in the margin, but there is no arrow pointing to the result box, you should include this as a note (and also enter it into "date of last outcome"). Or, if there is written in the margin, "target shot and killed by female terrorist," this is a note rather than a result (unless there is an arrow to the result box on the card). Also, please type this information in **exactly as it appears on the card**. For example, if the card

says in the result box, “Rescued by police on 22 Jan,” you should type exactly this.

21. Released = If two people are kidnapped, and there is a note indicating “Freed 09/17/96,” this implies that both people were released. Thus, the number of people released is “2,” not “1” or blank. If fewer people are released than were kidnapped, it will usually say so on the card. You should also remember that this information is valid **only for incidents where people are taken** (e.g., kidnapping, hijacking). This will not apply for assassinations, and should thus be left blank for these incidents. **Also, do not confuse the source date for the release date; several coders put in a release date for “R 1-25” when in fact R stands for Reuters (a source).**
22. Additional hijacking information = Hijackings will not always be of airplanes, and it is not uncommon to come across an incident in which a bus was hijacked. Information about the origin and to where it was diverted will be handwritten in the margins. So please read the extra information carefully to see if this extra hijacking information is provided. For example, there was an incident in which a school bus was hijacked in Peshawar, Pakistan. In the margin was written “driver forced to drive bus 105 miles to Islamabad.” For this incident, the origin of the bus is not provided (although presumably it is Peshawar), and the bus was diverted to Islamabad (a city in Afghanistan). Also, if there are multiple outcomes (i.e., persons released on different dates, or some victims were released by the terrorists while others were rescued), you should enter all outcome information in a notes box (“additional outcome information”) and enter “999” in response to

"How many were released/escaped…?" Finally, it is usually the city name that is of interest when looking to the "originated from" and "diverted to" categories, especially when the cities are within the same country.

23. "U/I" means "unidentified." You should type this exactly as it appears.
24. "ns" stands for "not stated."
25. Turn in all copies of update incidents and multiple incidents to Heather with your name and project id number given on them.
26. **Do not enter in the incident date as the release date, these are separate dates**. The only time they will be the same is if the card specifically states that people were released on the same day as the incident occurred.
27. Remember to **click the update box** on the computer interface if dealing with an **update card**.
28. **Type in the text that you explicitly see for the result box and for all other boxes (this problem kept popping up in re: to the result box)**
29. For hijacking incidents, if the target is a plane (or bus, car, whatever) and the nationality of the plane is "panama" then there are not multiple nationalities—the nationality of the plane not the passengers.
30. Do not write "see notes", follow the protocol listed in your guide book (*)
31. For the question asking about whether hostages or kidnappees were released or killed or unknown or etc, you hit "other" when there is more than one outcome. And then you must enter in "999" for the question asking how many were released or killed or etc. Enter the exact number of outcomes for each hostage in the notes.

32. When there is ** in a text box of the incident card, try to enter that information into the appropriate box on the interface and then end* if the entry is too long, and continue in notes. Do not just type ** in the interface box.
33. If the terrorist group is unknown, you do not have to check the uncertainty box—that is assumed.
34. The single numbers on the top right hand corner of the card (for example 654) **do not** indicate that there is another card, only **multiple numbers or a series of numbers** (i.e. 654, 655, 666, 667) indicate multiple events.
35. The damages box is sometimes checked because of the type of event, but if there is no information on the card leave the interface box blank. You should not attempt to "uncheck" the box if it is automatically checked. In all cases, if the damages box is empty. leave it empty.
36. The nationality chosen from the interface is the representative country, so for example if the card says Salvadorian you choose El Salvador.
37. If a card's box (for example vehicle) says 'not stated' write that in the interface exactly.
38. Do not assume information goes in the result box unless it begins in the result box or there is a * in the result box and one at the beginning of the text.
39. If the card does not represent a multiple incident you do not need to enter the number of multiple incidents as 1, leave it blank
40. Dollar Amounts whether it be for robbed or damages are always in US currency, enter what is in the box and if there is more information continue in notes section

41. Although the currency might be US, it doesn't mean that the US was for example robbed 10,000 dollars.
42. If the card says for example 'Rick: 5 more of the same', you must check yes as to this card being a multiple incident and you must add 1 to the number of the same so that you put a 6 in the number of multiple incidents box on the interface. (You can just ignore the name 'Rick' but not that there are '5 more of the same').
43. If there is just a question mark in the group box this means the name of the group is unknown and you should choose unknown from the drop down menu, but you do NOT need to check the box next to group name for uncertain in the interface.
44. If in the notes or result section or anywhere on the card there is any indication about who was killed or injured you must select the appropriate number from the appropriate boxes. For example if the Result's box says 'Gunmen attack police picket (NFI). Police return fire. One attacker, two passersby KIA…' this means that of the three total people killed one of them was a terrorist and thus you must choose 1 from the number of terrorists killed in the interface, not 0 which over 90% of coders did!
45. Make sure if notes on the bottom or side of the card that begin with a * are entered in the box on the card with the corresponding *. For example the if there is a * in the results box of the card and there is a * at the beginning of notes on the card then you enter all of this text into the interface in the results section and when you run out of room you end with a * and continue in the notes section beginning with 'results:' (remember you do not need to split up continued text from specific boxes into different additional notes sections. For example text

continued from the results box on the interface that runs over the space allotted in the results box is all entered in the same additional notes box).

46. KIA is killed in action, and WIA is wounded in action.
47. If the vehicle box on the card says ‘no’ you must enter ‘no’ into the interface, do not just leave it blank.

APPENDIX D: SOURCES USED TO CREATE THE DATABASE COUNTRY LIST

ITERATE	"Codes for nations and place names conform with the standard international relations archive country code developed by Bruce M. Russet, J. David Singer and Melvin Small in 'National Political Units in the Twenith Century: A Standardized List' 62, 3 American Political Science Review (September 1968), pp935-950. A few entries not relevant to the Russett, et al., study have been added. Incidents have occurred in locations other than nation-states, including colonies, dependencies, in the air and on the high seas" (Mickolus 2003:8).
RAND	"Either the State Departments or the United Nations" (Ellis, personal correspondence, 2003)
PGIS	"PGIS made up their own list of "countries, dependencies and other entities." When I finalized a list and cross-referenced names (e.g., Zimbabwe, formerly Rhodesia and Southern Rhodesia) for the web site we developed in 1995/1996, the total came to 228. Instead of confining the list to independent countries, we included colonies such as Hong Kong (until 1 July 1997), for example, and the individual island components of the Netherlands Antilles: Bonaire, Curacao, Saba, St. Eustatius, and St. Maartin as another." (Barber, personal correspondence, 2003)

APPENDIX E: COMPARING RAND, ITERATE, AND PGIS COUNTRIES

RAND Countries/Areas	ITERATE Countries/Areas	PGIS Countries
(Countries/Areas in Bold and Red are those which do not match up in all three databases)		
	Abu Dhabi	
Afghanistan	Afghanistan	Afghanistan
African nation, indeterminate	**African nation, indeterminate**	
Albania	Albania	Albania
Algeria	Algeria	Algeria
	American Samoa	
	Andorra	
Angola	Angola	Angola
	Anguilla	
	Antigua	
Argentina	Argentina	Argentina
	Armenia	
		Aruba
Australia	Australia	Australia
Austria	Austria	Austria
Azerbaijan	Azerbaijan	Azerbaijan
Azores	**Azores**	
Bahamas	Bahamas	Bahamas
Bahrain	Bahrain	Bahrain
Bangladesh	Bangladesh	Bangladesh
Barbados	Barbados	Barbados
		Belarus
Belgium	Belgium	Belgium
Benin, Dahomey	Benin	Benin

	Bermuda	
	Bhutan	
Bolivia	Bolivia	Bolivia
		Bonaire
Bosnia (see 345)	Bosnia -Herzegovina	Bosnia -Herzegovina
Botswana	Botswana	Botswana
Brazil	Brazil	Brazil
British Honduras	British Honduras, Belize	Belize
	Brunei	
Bulgaria	Bulgaria	Bulgaria
	Burkina Faso, Upper Volta	
Myanamar (formerly Burma)	Burma	Myanamar/ Burma
Burundi	Burundi	Burundi
Cabinda	**Cabinda**	
Cambodia	Cambodia	Cambodia
	Cameroon	
Canada	Canada	Canada
Canary Islands	**Canary Islands**	
	Cape Verde	
		Cayman Islands
	Cechnya	
Central African Republic	Central African Republic	Central African Republic
Chad	Chad	Chad
Chile	Chile	Chile
China, People's Republic of	China, People's Republic of	China, People's Republic of
China, Republic of Taiwan	China, Republic of Taiwan	China, Republic of Taiwan
Colombia	Colombia	Colombia
	Comoros	

Congo (Brazzaville)	Congo (Brazzaville)	Congo (Brazzaville)
	Cook Islands	
Corsica	**Corsica**	
Costa Rica	Costa Rica	Costa Rica
Croatians	Croatians	Croatians
Cuba	Cuba	Cuba
		Curacao
Cyprus	Cyprus	Cyprus
Czech Republic (as of 6/93)	Czech Republic (as of 6/93)	Czech Republic
Czechoslovakia	Czechoslovakia	Czechoslovakia
Denmark	Denmark	Denmark
Djibouti	Djibouti	Djibouti
	Dominica	
Dominican Republic	Dominican Republic	Dominican Republic
	Dubai	
Ecuador	Ecuador	Ecuador
Egypt	Egypt	Egypt
El Salvador	El Salvador	El Salvador
	Equatorial Guinea	
Eritrea	Eritrea	Eritrea
Estonia	Estonia	Estonia
Ethopia	Ethopia	Ethopia
European, indeterminate	**European, indeterminate**	
	Faeroe Islands	
	Falkland Islands, Malvinas	
Federal Republic of Germany (West)	Federal Republic of Germany (West)	Federal Republic of Germany (West)
	Fernando Po	
Fiji	Fiji	Fiji

Finland	Finland	Finland
France	France	France
	French Guiana	
French Polynesia	French Polynesia	French Polynesia
Gabon	Gabon	Gabon
	Gambia	
Georgia	Georgia	Georgia
German Democratic Republic (East)	**German Democratic Republic (East)**	
		Germany
Ghana	Ghana	Ghana
Girbraltar	Girbraltar	Girbraltar
Greece	Greece	Greece
	Greenland	
Grenada	Grenada	Grenada
Guadeloupe	Guadeloupe	Guadeloupe
	Guam	
Guatemala	Guatemala	Guatemala
	Guernsey and Dependencies	
	Guinea	
	Guinea Bissau	
	Guyana, British Guiana	
Hati	Hati	Hati
Honduras	Honduras	Honduras
Hong Kong	Hong Kong	Hong Kong
Hungary	Hungary	Hungary
Iceland	Iceland	Iceland
	Ifni	
	Indeterminate Arabs, Palestine	
	Indeterminate Latin American Nation	
India	India	India

Indonesia	Indonesia	Indonesia
International, multilateral	International Organizations	International
Iran	Iran	Iran
Iraq	Iraq	Iraq
Ireland	Ireland	Ireland
	Isle of Man	
Israel	Israel	Israel
Italy	Italy	Italy
Ivory Coast	Ivory Coast	Ivory Coast
Jamacia	Jamacia	Jamacia
Japan	Japan	Japan
Jewish, non-Israeli (just one incident in Paris)		
Jordan	Jordan	Jordan
Kashmir		
	Kazakistan	
Kenya	Kenya	Kenya
		Kiribati
		Korea
Korea, South	Korea, South	Korea, South
	Kurdistan	
Kuwait	Kuwait	Kuwait
	Kyrgyzstan	
Laos	Laos	Laos
Latvia	Latvia	Latvia
Lebanon	Lebanon	Lebanon
Lesotho	Lesotho	Lesotho
Liberia	Liberia	Liberia
Libya	Libya	Libya
	Liechtenstein	
Lithuania	Lithuania	Lithuania
Luxembourg	Luxembourg	Luxembourg

	Macao	
	Macedonia (FYRM)	
	Madagascar, Malagasy Republic	
	Madeira Isles	
	Malawi	
Malaysia	Malaysia	Malaysia
	Maldive Islands	
Mali	Mali	Mali
Malta	Malta	Malta
	Marianas Islands	
Martinique	Martinique	Martinique
Mauritania	Mauritania	Mauritania
	Mauritius	
Mexico	Mexico	Mexico
	Moldova	
	Monaco	
	Mongolia	
	Montserrat	
Morocco	Morocco	Morocco
Mozambique	Mozambique	Mozambique
	Muscat and Oman	
Namibia, SWAf	Namibia, SWAf	Namibia, SWAf
	NATO	
		Nauru
Nepal	Nepal	Nepal
Netherlands	Netherlands	Netherlands
Netherlands Antillies		
	New Caledonia	
	New Hebrides	
New Zealand	New Zealand	New Zealand
Nicaragua	Nicaragua	Nicaragua

Niger	Niger	Niger
Nigeria	Nigeria	Nigeria
		Niue
	North Korea	**North Korea**
	North Vietnam	
		North Yemen
Northern Ireland	**Northern Ireland**	
Norway	Norway	Norway
Pakistan	Pakistan	Pakistan
Panama	Panama	Panama
	Panama Canal Zone	
Papua-New Guinea	Papua-New Guinea	Papua-New Guinea
Paraguay	Paraguay	Paraguay
Persian Gulf		
Peru	Peru	Peru
Philippines	Philippines	Philippines
Poland	Poland	Poland
Portugal	Portugal	Portugal
	Portugese Timor	
Puerto Rico	Puerto Rico	Puerto Rico
	Qatar	
	Reunion	
	Rio Muni	
Romania	Romania	Romania
	Ruanda-Urundi	
Rwanada	Rwanada	Rwanada
	Ryukyu Islands	
		Saba
		Saint Barthelemy
	Saint Christopher (Saint Kitts), Nevis	
		Saint Eustatius

	Saint Lucia	
		Saint Maarten
		Saint Martin
		Saint Pierre and Miquelon
	Saint Vincent	
	San Marino	
	Sao Tome and Principe	
Saudi Arabia	Saudi Arabia	Saudi Arabia
Scotland	**Scotland**	
Senegal	Senegal	Senegal
Serbia (see 345)		**Serbia-Montenegro**
	Seychelles	
Sierra Leone	Sierra Leone	Sierra Leone
	Sikkim	
Singapore	Singapore	Singapore
	Slovak Republic	
	Slovenia	
	Solomon Islands	
Somalia	Somalia	Somalia
South Africa	South Africa	South Africa
	South Molucca	
	South Yemen, PDRY	
Spain	Spain	Spain
	Spanish Guinea	
	Spanish North Aftrican Presidios, Alhucemas, Ceuta, Charfarinas, Melilla, Penon de Velez	
Spanish Sahara	**Spanish Sahara**	
Sri Lanka (Ceylon)	Sri Lanka (Ceylon)	Sri Lanka (Ceylon)
Sudan	Sudan	Sudan
Surinam, Dutch Guyana	Surinam, Dutch Guyana	Surinam, Dutch Guyana
Swaziland	Swaziland	Swaziland
Sweden	Sweden	Sweden

Switzerland	Switzerland	Switzerland
Syria	Syria	Syria
Tajikistan	Tajikistan	Tajikistan
Tanzania	Tanzania	Tanzania
Thailand	Thailand	Thailand
Togo	Togo	Togo
	Tonga	
Transkei	**Transkei**	
Trinidad-Tobago	Trinidad-Tobago	Trinidad-Tobago
Trucial Oman states	**Trucial Oman states**	
Tunisia	Tunisia	Tunisia
Turkey	Turkey	Turkey
		Turkmenistan
		Turks and Caicos
		Tuvalu
Uganda	Uganda	Uganda
Ukraine	Ukraine	Ukraine
United Arab Emirates	United Arab Emirates	United Arab Emirates
United Kingdom	United Kingdom	United Kingdom
	United Kingdom Virgin Islands	
United States	United States	United States
	United States Pacific Trust Territories	
	United States Virgin Islands	
not specified	unknown	unknown
Unspecific foreign (international Waters)		
	Unspecified foreign nations	
Uruguay	Uruguay	Uruguay
USSR	USSR (Russia)	USSR
Russia	USSR (Russia)	Russia
	Uzbekistan	

	Vanuatu	
	Vatican City	
Venezuela	Venezuela	Venezuela
Vietnam	Vietnam	Vietnam
Vietnam, South	Vietnam, South	Vietnam, South
		Wallis and Futuna
West Bank		
West Berlin		
	West Indies Federation	
	West Indies Federation	
	West Irian, Netherlands New Guinea	
	Western Samoa	
Worldwide, inderterminate		
Yemen	Yemen	Yemen
Yugoslavia	Yugoslavia	Yugoslavia
Zaire (Belgian Congo)	Zaire	Zaire (Democratic Republic of the Congo)
Zambia	Zambia	Zambia
	Zanzibar	
Zimbabwe (Rhodesia)	Zimbabwe, Rhodesia	Zimbabwe/Rhodesia

APPENDIX F: DISTRIBUTION OF INCIDENTS BY COUNTRY

Country	Frequency	Percent
Afghanistan	120	0.18
Albania	60	0.09
Algeria	1181	1.76
Andorra	1	0.00
Angola	370	0.55
Antigua and Barbuda	2	0.00
Argentina	816	1.21
Armenia	12	0.02
Australia	62	0.09
Austria	93	0.14
Azerbaijan	30	0.04
Bahamas	4	0.01
Bahrain	45	0.07
Bangladesh	1156	1.72
Barbados	3	0.00
Belgium	120	0.18
Belize	8	0.01
Benin	7	0.01
Bermuda	1	0.00
Bolivia	309	0.46
Bosnia-Herzegovina	119	0.18
Botswana	7	0.01
Brazil	251	0.37
Brunei	2	0.00
Bulgaria	34	0.05
Burkina Faso	3	0.00
Burundi	234	0.35
Byelarus	4	0.01

Cambodia	235	0.35
Cameroon	18	0.03
Canada	35	0.05
Cayman Islands	1	0.00
Central African Republic	9	0.01
Chad	21	0.03
Chile	2309	3.44
China	129	0.19
Colombia	6167	9.18
Comoros	6	0.01
Congo	16	0.02
Corsica (France)	930	1.38
Costa Rica	67	0.10
Croatia	17	0.03
Cuba	35	0.05
Cyprus	106	0.16
Czech Republic	11	0.02
Czechoslovakia	7	0.01
Denmark	42	0.06
Djibouti	17	0.03
Dominica	3	0.00
Dominican Republic	100	0.15
East Germany (GDR)	1	0.00
Ecuador	202	0.30
Egypt	480	0.71
El Salvador	5554	8.27
Equatorial Guinea	1	0.00
Eritrea	4	0.01
Estonia	17	0.03
Ethiopia	92	0.14
Falkland Islands	1	0.00

Fiji	9	0.01
Finland	5	0.01
France	1263	1.88
French Guiana	6	0.01
French Polynesia	3	0.00
Gabon	4	0.01
Gambia	2	0.00
Georgia	88	0.13
Germany	639	0.95
Ghana	18	0.03
Greece	677	1.01
Grenada	5	0.01
Guadeloupe	55	0.08
Guam	1	0.00
Guatemala	2118	3.15
Guinea	7	0.01
Guyana	14	0.02
Haiti	195	0.29
Honduras	299	0.45
Hong Kong	24	0.04
Hungary	37	0.06
Iceland	7	0.01
India	2974	4.43
Indonesia	163	0.24
International	3	0.00
Iran	520	0.77
Iraq	148	0.22
Ireland	102	0.15
Israel	1767	2.63
Italy	1500	2.23
Ivory Coast	19	0.03

Jamaica	34	0.05
Japan	367	0.55
Jordan	63	0.09
Kazakhstan	7	0.01
Kenya	82	0.12
Kuwait	64	0.10
Kyrgyzstan	5	0.01
Laos	9	0.01
Latvia	15	0.02
Lebanon	1807	2.69
Lesotho	25	0.04
Liberia	19	0.03
Libya	21	0.03
Lithuania	16	0.02
Luxembourg	15	0.02
Macao	28	0.04
Macedonia	4	0.01
Madagascar	16	0.02
Malawi	4	0.01
Malaysia	40	0.06
Mali	39	0.06
Malta	16	0.02
Man, Isle of	2	0.00
Martinique	10	0.01
Mauritania	8	0.01
Mauritius	1	0.00
Mexico	438	0.65
Moldova	4	0.01
Morocco	24	0.04
Mozambique	228	0.34
Myanmar	193	0.29

Namibia	117	0.17
Nepal	36	0.05
Netherlands	108	0.16
New Caledonia	32	0.05
New Zealand	9	0.01
Nicaragua	2022	3.01
Niger	48	0.07
Nigeria	64	0.1
North Korea	1	0.00
North Yemen	5	0.01
Northern Ireland	1976	2.94
Norway	13	0.02
Pakistan	2211	3.29
Palau	1	0.00
Palestine	162	0.24
Panama	132	0.20
Papua New Guinea	83	0.12
Paraguay	36	0.05
Peru	6069	9.04
Philippines	2002	2.98
Poland	35	0.05
Portugal	139	0.21
Puerto Rico	69	0.10
Qatar	3	0.00
Republic of Cabinda	1	0.00
Rhodesia	85	0.13
Romania	27	0.04
Russia	261	0.39
Rwanda	125	0.19
Saudi Arabia	19	0.03
Senegal	70	0.10

Serbia-Montenegro	24	0.04
Seychelles	2	0.00
Sierra Leone	61	0.09
Singapore	10	0.01
Slovak Republic	16	0.02
Slovenia	5	0.01
Somalia	168	0.25
South Africa	1499	2.23
South Korea	57	0.08
South Vietnam	1	0.00
South Yemen	3	0.00
Soviet Union	74	0.11
Spain	2813	4.19
Sri Lanka	2298	3.42
St. Kitts and Nevis	2	0.00
Sudan	73	0.11
Suriname	69	0.10
Swaziland	8	0.01
Sweden	47	0.07
Switzerland	82	0.12
Syria	147	0.22
Taiwan	39	0.06
Tajikistan	140	0.21
Tanzania	6	0.01
Thailand	222	0.33
Togo	48	0.07
Tonga	1	0.00
Trinidad and Tobago	15	0.02
Tunisia	18	0.03
Turkey	2359	3.51
Uganda	175	0.26

Ukraine	22	0.03
United Arab Emirates	15	0.02
United Kingdom	513	0.76
United States	932	1.39
Uruguay	95	0.14
Uzbekistan	4	0.01
Vanuatu	3	0.00
Venezuela	276	0.41
Vietnam	6	0.01
Virgin Islands (U.S.)	1	0.00
Wallis and Futuna	1	0.00
West Germany (FRG)	513	0.76
Western Sahara	4	0.01
Western Samoa	1	0.00
Yemen	86	0.13
Yugoslavia	120	0.18
Zaire	54	0.08
Zambia	45	0.07
Zimbabwe	68	0.10

APPENDIX G: NATIONALITY OF THE TARGET

Target Nationality	Frequency
Colombia	5777
Peru	5684
El Salvador	5394
United States	3140
India	2909
Spain	2620
Turkey	2595
Northern Ireland	2490
France	2384
Chile	2154
Sri Lanka	2089
Nicaragua	1986
Israel	1969
Pakistan	1968
Guatemala	1941
Philippines	1786
United Kingdom	1750
South Africa	1502
Italy	1347
Algeria	1090
Lebanon	827
Germany	777
Argentina	636
Iran	579
Egypt	489
Palestine	481
Greece	424
Japan	392

Mexico	362
Russia	322
Syria	290
Angola	281
Bolivia	275
Venezuela	271
Honduras	238
Brazil	217
Burundi	201
Myanmar	200
Soviet Union	196
Mozambique	191
Thailand	185
Cambodia	175
Indonesia	175
Haiti	172
Ecuador	170
Iraq	156
Uganda	146
Yugoslavia	144
China	143
Portugal	133
Ireland	124
Panama	118
Afghanistan	116
Bangladesh	113
Switzerland	113
Rwanda	103
Namibia	101
Netherlands	101
Dominican Republic	92

Tajikistan	90
Belgium	89
Cuba	88
West Germany (FRG)	83
Rhodesia	80
Uruguay	75
Australia	74
Saudi Arabia	70
Kenya	69
Libya	69
Somalia	69
Canada	68
Georgia	68
Zimbabwe	66
Austria	64
Bosnia-Herzegovina	64
Papua New Guinea	64
Kuwait	63
Nigeria	62
Senegal	62
Jordan	61
Sudan	57
Cyprus	56
Suriname	56
Yemen	55
Albania	51
Serbia-Montenegro	51
South Korea	51
Sweden	49
Taiwan	48
Ethiopia	47

Togo	44
Poland	43
Sierra Leone	41
Costa Rica	40
Niger	38
Paraguay	38
Nepal	37
Bulgaria	36
Hungary	36
Malaysia	36
Zaire	36
Romania	35
Zambia	35
Mali	34
Bahrain	33
Denmark	31
Morocco	29
Azerbaijan	22
Jamaica	22
Guadeloupe	21
Lesotho	21
Ukraine	20
Hong Kong	19
Macao	19
Tunisia	19
Armenia	18
Croatia	18
Chad	17
Ghana	17
Vietnam	17
Ivory Coast	16

Liberia	16
New Caledonia	16
Slovak Republic	16
Cameroon	15
Guyana	15
Puerto Rico	15
Djibouti	14
Malta	14
Congo	13
New Zealand	12
Trinidad and Tobago	12
United Arab Emirates	12
Czech Republic	11
Latvia	11
Madagascar	11
Norway	11
Estonia	10
Lithuania	10
Botswana	9
Commonwealth of Independent States	8
Comoros	8
Czechoslovakia	8
Fiji	8
Finland	8
Guinea	8
Singapore	8
Swaziland	8
Benin	7
North Korea	7
Bahamas	6
Central African Republic	6

Iceland	6
Korea	6
Laos	6
Malawi	6
Kyrgyzstan	5
Grenada	4
Kazakhstan	4
Luxembourg	4
Macedonia	4
Mauritania	4
Moldova	4
Qatar	4
Slovenia	4
Tanzania	4
Antigua and Barbuda	3
Belize	3
Burkina Faso	3
Eritrea	3
Gabon	3
Martinique	3
Barbados	2
Byelarus	2
Dominica	2
French Guiana	2
Gambia	2
North Yemen	2
Palau	2
Uzbekistan	2
Brunei	1
Equatorial Guinea	1
Greenland	1

Man, Isle of	1
Mauritius	1
Mongolia	1
Seychelles	1
Tonga	1
Tuvalu	1
Vanuatu	1
Other	3042

APPENDIX H: A STUDY OF AERIAL HIJACKINGS

TESTING A RATIONAL CHOICE MODEL OF AIRLINE HIJACKINGS*

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TESTING A RATIONAL CHOICE MODEL OF AIRLINE HIJACKINGS

ABSTRACT

Using data that combines information from the Federal Aviation Administration, the RAND Corporation, and a newly developed database on global terrorist activity, we are able to examine trends in 1,101 attempted aerial hijackings that occurred around the world from 1931 to 2003. We have especially complete information for 828 hijackings that occurred before 1986. Using a rational choice theoretical framework, we employ continuous-time survival analysis to estimate the impact of several major counter hijacking interventions on the hazard of differently motivated hijacking attempts and logistic regression analysis to model the predictors of successful hijackings. Some of the interventions examined use certainty-based strategies of target hardening to reduce the perceived likelihood of success while others focus on raising the perceived costs of hijacking by increasing the severity of punishment. We also assess which specific intervention strategies were most effective for deterring hijackers whose major purpose was terrorism related. We found support for the conclusion that new hijacking attempts were less likely to be undertaken when the certainty of apprehension was increased through metal detectors and law enforcement at passenger checkpoints. We also found that fewer hijackers attempted to divert airliners to Cuba once that country made it a crime to hijack flights. Our results support the contagion view that hijacking rates significantly increase after a series of hijackings closely-clustered in time—but only when these attempts were successful. Finally, we found that the policy interventions

examined here significantly decreased the likelihood of non-terrorist but not terrorist hijackings.

TESTING A RATIONAL CHOICE MODEL OF AIRLINE HIJACKINGS

Over the past several decades, the rational choice perspective has been applied to a wide variety of criminal behavior, including drunk driving (Nagin and Paternoster, 1993), burglary (Wright and Decker, 1994), robbery (Wright and Decker, 1997), shoplifting (Piquero and Tibbetts, 1996), income tax evasion (Klepper and Nagin, 1989), drug selling (Jacobs, 1996), and white collar crime (Paternoster and Simpson, 1996; Simpson et al., 1998). In this paper we use a rational choice perspective to develop a series of hypotheses about the success, benefits and costs of aerial hijacking. Rational choice theory would seem to be an especially appropriate theoretical perspective for understanding hijackings, given that many are carefully planned and appear to include at least some consideration for risks and rewards. But at the same time, the aerial hijackings of September 11, 2001 vividly demonstrate that perpetrators of terrorist action sometimes appear to be largely indifferent to the kinds of individual costs and benefits most commonly measured in criminology research. In this research we apply the rational choice perspective to both terrorist and non-terrorist motivated hijackings.

We develop a series of hypotheses about hijackings and test them with a database obtained from the Federal Aviation Administration with additional data from the RAND Corporation, and a newly developed database on global terrorism (identifying reference). Based on hazard modeling, our results support the conclusion that some certainty of apprehension measures (metal detectors and law enforcement at passenger check points) did significantly reduce the rate of new hijacking attempts. Also, a severity of punishment measure that made hijacking a crime in Cuba was significantly related to a

drop in the hazard that a hijacked flight would be diverted to Cuba. We additionally found support for a contagion view that the rate of hijackings significantly increases following a series of successful hijackings closely-clustered in time. Finally, we found evidence that policy interventions significantly impact the likelihood of non-terrorist but not terrorist hijackings.

Before we present the results, we first provide an overview of rational choice theory and the prior research on rational choice theory and aerial hijacking.

RATIONAL CHOICE THEORY

The belief that credible threats of apprehension and punishment deter crime is as old as criminal law itself and has broad appeal to both policymakers and the public. As elaborated by social reformers like Bentham and Beccaria, or jurists like Blackstone, Romilly, or Feuerbach, rational actor perspectives assume that crime can be deterred by increasing the costs of crime or increasing the rewards of non-crime (Gibbs, 1975; Ross and LaFree, 1986; Paternoster, 1987). In particular, the principle of utility advanced by Bentham proposed that individuals act in view of their own self-interest and that the effective use of punishment serves to deter individuals from specific actions (including crime) that serve their self-interest.

Many contemporary rational choice models of crime (Becker, 1968; Carroll, 1978) express utilitarian philosophy in mathematical terms, with individuals maximizing satisfaction by choosing one of a finite set of alternatives, each with its particular costs and benefits (Cornish and Clarke, 1986; Clarke and Felson, 1993:5). At their core, these

rational choice models suggest that crime can be deterred through appropriate public policy. In general, the choice of crime is more appealing when legal options are less rewarding, when crime is less punishing, and/or when crime is more rewarding. Research on the rational choice perspective has increased our understanding of the costs and benefits associated with both crime and non-crime alternatives (Piliavin et al., 1986; Clarke and Cornish, 1985), and recent evidence suggests that the criminal justice system can exert a deterrent effect on crime (for a review, see Nagin, 1998).

Mathematically, a rational choice explanation of crime suggests that if p(success)*benefits > [1-p(success)]*costs, then crime is more likely to occur, and conversely, if p(success)*benefits < [1-p(success)]*costs, then crime is less likely to occur. The probability of *success*, p(success), is a function of the offender's perception. The rational choice perspective assumes that offenders calculate their probability of success when evaluating criminal opportunities. In general, a major goal of policy makers who design formal systems of punishment is to control or alter this calculation through policies aimed at reducing the certainty of success. In the case of policies on aerial hijacking for the past half century, this goal has been pursued primarily through target hardening including metal detectors, posting security personnel at airport gates, and baggage-screening.

According to the rational choice perspective, *benefits* can be both internal (e.g., monetary gain) and external (e.g., achieving political recognition) to offenders. Further, as prospective perpetrators witness others' hijacking successes, they may be more likely to use hijacking as a means to achieve their own goals. Piquero and Pogarsky (2002) and

others (Stafford and Warr, 1993; Paternoster and Piquero, 1995; Piquero and Paternoster, 1998) have found that this vicarious experience with punishment avoidance is an important determinant of both the perception of sanctions and criminal behavior. Examples of such benefits in the case of aerial hijacking include the rapid growth of hijackings to Cuba in the late 1960s and early 1970s (before Cuba defined hijacking as a crime) and the rash of hijackings for the extortion of money after the widely publicized success of D.B. Cooper in November 1971.[i] The role of benefits in rational choice theory is closely related to the concept of contagion, which we discuss below.

The rational choice perspective also posits that offenders interpret and weigh the *costs* associated with their offending decisions. Such costs include the probability of apprehension, as well as the severity of punishment experiences. Accordingly, policymakers try to raise the perceived costs of aerial hijacking by increasing the certainty of detection and by strengthening the severity of punishment. For example, several laws passed in the United States during the 1960s and 1970s were aimed at increasing punishment severity for airplane hijacking. At the same time, policies such as posting security personnel at airport gates and placing sky marshals on aircraft were efforts aimed at increasing the certainty of apprehension.

To summarize, the rational choice perspective predicts that the frequency of aerial hijackings will decrease if the probability of success is decreased, the perceived benefits are reduced, and the perceived costs are increased. In addition to testing specific hypotheses developed from rational choice theory, our analysis permits us to explore whether these general expectations hold equally well depending on the location of the

incident and the likely motivation of hijackers. In particular, we distinguish in the analysis between hijacking incidents that originated in the U.S., those that originated elsewhere, offenders whose major purpose appears to be transportation to Cuba, and offenders who we classify as having a terrorist purpose.

PRIOR RESEARCH

We were able to identify three early studies that explicitly examined the rational choice perspective within the context of aerial hijacking (Chauncey, 1975; Landes, 1978; Minor, 1975). All three of these studies focus only on the cost component of the rational choice framework. Chauncey (1975) examined five deterrence-based policy efforts (two representing changes in the probability of success or certainty, two representing changes in severity, and one combining the two) related to hijacking incidents and found that only the two certainty events produced reductions in the rate of attempts, with the largest reduction being a function of the metal detector screening/carry-on baggage inspection policy implemented in the first quarter of 1973 in U.S. airports. Minor (1975) applied deterrence/prevention concepts to understand skyjacking in the U.S. and worldwide, and concluded that there was no major deterrent effect of skyjacking control programs before 1973, but that there was a prevention effect in 1973 and 1974 due to the implementation of baggage screening and metal detectors. Unfortunately, neither Chauncey nor Minor offer systematic statistical tests of their hypotheses about deterrence and prevention.

Following Becker (1968) and Ehrlich (1973), Landes (1978) developed and tested an economic model of hijacking, conducting a quarterly analysis of mainly U.S. aircraft hijacking between 1961 and 1976. His results show that an increase in the probability of apprehension, the conditional probability of incarceration, and the length of sentence for those convicted of hijacking were all associated with significant reductions in hijacking during the 1961 to 1976 period. Additionally, using regression estimates from the sample period ending in 1972, Landes developed forecasts of the number of hijackings that would have taken place between 1973 and 1976 if (1) mandatory screening had not been instituted and (2) the probability of apprehension (once the hijacking was attempted) had remained constant and equal to its 1972 value. He concluded that without these interventions there would have been between 41 and 67 additional hijackings during the 1973 to 1976 period compared to the 11 that actually occurred.

While they do not specifically adopt a rational choice perspective, Hamblin, Jacobsen and Miller (1973) and others (Rich 1972; Phillips 1973) rely on contagion or diffusion explanations of hijacking attempts to make predictions that are closely related to the reward component of the rational choice perspective. Thus, researchers supporting a contagion model assume that when potential aerial hijackers perceive that previous hijacking attempts have been rewarded (e.g., successful outcomes, avoidance of punishment) and that they can avoid punishment in the commission of a hijacking, they will be more likely to offend. For example, Holden (1986) argues that successful airline hijackings will foster more airline hijackings while unsuccessful episodes will lead to fewer new skyjacking attempts. Related arguments include Rich's (1972) claim that a "skyjack virus" may be transmitted through the media; Phillips' (1973) argument that

imitation explains the frequency of hijackings; and Hamblin, Jacobsen, and Miller's (1973) argument that hijackings spread by diffusion and modification of a basic invention, as new hijackers attempt to outdo previous ones by inventing more effective hijacking strategies.

In the most detailed empirical study of the contagion hypothesis to date, Holden (1986) develops a mathematical model of contagion and applies it to aircraft hijackings in the U.S. between 1968 and 1972. Defining contagion as an increase in the rate of new hijacking attempts, Holden (1986:886) tests five hypotheses. First, the rate of aircraft hijacking attempts in the U.S. will increase following other hijacking attempts. Second, the rate of aircraft hijacking attempts in the U.S. will increase following publicized hijacking attempts, but not following unpublicized attempts. Third, compared to unsuccessful attempts, successful (i.e., rewarded) hijacking attempts will have a greater stimulating effect on additional hijackings. Fourth, because the motivation for transportation and extortion hijacking attempts may be very different and because history shows that the peak periods for transportation (1969-1970) and extortion (1972) hijackings were separated by three years, transportation hijackings should be stimulated only by prior transportation hijackings, and extortion hijackings only by prior extortion hijackings. And finally, the stimulating effect on the U.S. hijacking rate will be far greater for hijackings on U.S. carriers than non-U.S. carriers.

Holden's research shows that successful hijackings generate additional hijacking attempts of the same type (transportation or extortion), but finds no contagion effects of unsuccessful hijacking attempts in the U.S. or successful or unsuccessful hijacking attempts outside the U.S. In particular, each successful transportation hijacking in the

U.S. generated an average of .75 additional attempts, with a median delay of 60 days. This effect accounted for 53% of the total rate of U.S. transportation hijacking attempts in Holden's analysis. Each successful extortion hijacking in the U.S. generated an average of two additional hijacking attempts, with a median delay of 44 days, accounting for 85% of the total rate of U.S. extortion hijacking attempts. Holden's results also show (pp. 898-899) that while U.S. hijackers were not influenced by incidents outside the U.S., the likelihood of foreign extortion-based hijackings (including parachute hijackers) were increased by hijackings in the U.S.[ii]

Although instructive, prior research on aerial hijacking from the rational choice perspective is limited in several ways. First, while there is some descriptive information available on overall trends in hijacking events (Merari, 1999; Karber, 2002), much less is known about the effect of hijackers' motives on the frequency and success of the crime in the U.S. and elsewhere. Second, much of the prior research does not use formal statistical tests to determine if deterrent/preventive policies significantly reduce hijacking. Third, most studies (Chauncey, 1975; Minor, 1975) have focused on the costs component of the rational choice framework and the only major study to examine the benefits component (Holden, 1986), did so through a contagion approach using data from a limited time span (1968 to 1972). And finally, past efforts have not examined the specific variables that are associated with hijacking success. For example, Holden's research distinguished successful from unsuccessful hijackings, but he includes no analysis of the variables that estimate successful hijackings. Our study specifically addresses these limitations.

CURRENT FOCUS AND HYPOTHESES

We employ hazard modeling (Cox, 1972) to identify how a set of theoretically relevant variables (e.g., success and purpose of attack) affect the time between hijacking incidents. This approach allows us to determine the variables that reduce the temporal frequency of hijacking incidents. We then use logistic regression analysis to identify the qualities of hijacking attempts that are most likely to contribute to their success.

We develop five hypotheses derived from success, benefits and cost-related assumptions of the rational choice perspective.[iii] For the purposes of this paper, and because much of our data come from a longitudinal databased coded and published by the FAA, we rely on the FAA's (1983) definition of a successful hijacking as one *in which hijackers gain control of the plane and reach their destination, whether by landing or by a parachute escape, and are not immediately arrested or killed on landing; unsuccessful hijackings are those in which hijackers attempt but fail to take control of an aircraft or take control but are immediately killed or arrested on landing.*[iv] Our success-related hypothesis:

H1: The hazard of a new hijacking attempt will decrease when the certainty of apprehension is increased.

Hypothesis 1 is based on the fundamental rational choice prediction that the chances of additional prohibited behavior will decline when perpetrators can be expected to believe that the likelihood of success has lessened. We discuss below how we will use the timing of two certainty-based security policies to test this hypothesis. We also

conduct an exploratory analysis to determine which flight characteristics and policies actually do increase the chances that hijackers will be apprehended. [v]

The three benefits-related hypotheses are based on the premise that offenders will be more likely to attempt aerial hijackings when the expected benefits of hijacking increase:

H2a: The hazard of new hijacking attempts will increase shortly after earlier attempts.

Consistent with Holden's (1986) arguments about contagion, in Hypothesis 2a we predict that the incentives to hijack may manifest externally when prospective hijackers witness the hijacking attempts of others. Such attempts likely generate much media attention.

H2b. The hazard of new hijacking attempts will be greater following a series of successful hijackings.

Also consistent with Holden's arguments, in Hypothesis 2b, we examine whether successful hijacking attempts affect the hazards of additional attacks. By comparing the results for H2a and H2b, we will also be able to determine the extent to which any contagion effects are driven by all events or only by successful events.

H2c: Compared to those who hijack for other reasons, the hazard of hijacking attempts by terrorists will be less affected by counter hijacking measures that raise the severity or certainty of punishment.

This last hypothesis is based on the observation that terrorist-motivated hijackings may not follow the same risk/reward calculus that is typical of more common criminal offenders. It is not that we expect terrorists to avoid deliberation about their activities because of their strongly held beliefs or religious fanaticism. In fact, the evidence

suggests that terrorists often deliberate deeply and with profound patience about their attacks (Rapoport 2001; U.S. Commission 2004). But while advancing group goals may be a paramount concern on the part of terrorists, individual-level perceptions of benefits often appear to be different for terrorists than ordinary criminals. The obvious example here is the suicide bomber who is largely oblivious to any formal threat of punishment. In short, compared to common criminals, perpetrators motivated by terrorist causes are likely to represent a somewhat different set of perceptions regarding the costs and benefits of their attacks. Although we cannot directly measure the differential motivation for terrorists to hijack an aircraft, in H2c we hypothesize that compared to those who hijack for monetary gain or for transportation to another country (most often Cuba), terrorist hijackers will be less affected by traditional measures that increase the certainty or severity of individual punishment.

Our final hypothesis is derived from the cost-related portion of rational choice theory:

H3: The hazard of a new hijacking attempt will drop after harsher punishments are announced.

This hypothesis is based on the deterrence/rational choice expectation that sanction severity will reduce criminal activity.

DEVELOPING AN AERIAL HIJACKING DATABASE

As used here the term “aerial hijacking” is limited to situations in which perpetrators either seized control of an aircraft or clearly announced their intention to seize control of an aircraft but were thwarted in their efforts to do so.[vi] To examine long-term trends in hijacking we obtained data on 1,101 aerial hijackings (285 originated from U.S. airports

and 816 originated from non-U.S. airports) from 1931 to 2003. Much of the data from 1931 to 1985 are from the FAA and include 268 hijackings that originated from U.S. airports and 560 hijackings that originated elsewhere. We updated the original FAA database with published FAA reports through 1999 [vii] and collected hijacking event data from 2000 to 2003 from the aviation safety network (http://aviation-safety.net/index.shtml). We then supplemented the resulting FAA database with 39 additional hijacking cases identified from publicly available data from RAND (http://www.db.mipt.org/index.cfm) and from our own newly created database on terrorist events (identifying reference). Data for 828 cases from 1931 to 1985 are especially complete, including whether the event was successful, as well as information on city/country of origin/destination, number of passengers, and weapons used.

In order to distinguish terrorist hijackings from other hijackings, we relied on the RAND data and our own terrorism database. For the purposes of this study, we defined terrorist hijackings as those that involve *the threatened or actual use of illegal force and violence to attain a political, economic, religious or social goal through fear, coercion or intimidation* (identifying reference). For example, an incident identified in our database as a terrorist hijacking happened on January 31, 1980 when three Shi'ite Moslems hijacked an Air France airliner with pistols and a grenade over Beirut, Lebanon to draw attention to the disappearance of spiritual leader Iman Musa Sadr in Libya (identifying reference).[viii] The resulting composite database includes information on all known aerial hijackings from 1931 to 2003 and more detailed information on hijackers, their affiliations, and their main purpose for hijacking an aircraft from 1931 to 1985 (828 cases). Because our analysis includes an independent variable that incorporates

information on two previous incidents (described below) we drop the first two airline hijackings (1931 and 1947) leaving us with 826 cases for the quantitative analysis.

AERIAL HIJACKING and counter hijacking measures, 1947 TO 2003

Figure 1 shows trends in total hijackings of flights originating in the U.S. and outside of the U.S. Because our data include no hijackings between 1931 and 1946, we limit Figure 1 to hijackings between 1947 and 2003. According to Figure 1, the total number of U.S. and non-U.S. skyjackings never rose above ten per year until the mid-1960s. In fact, our data show no non-U.S. hijackings for the years 1954, 1955 and 1957 and following the first U.S. hijacking in 1961. There were no reported U.S. hijackings in the years 1963 and 1966. But the total number of U.S. and non-U.S. hijackings rose dramatically after the mid-1960s. Both U.S. and non-U.S. annual hijackings first exceeded ten in 1968 (20 U.S.; 15 non-U.S.). Figure 1 shows an especially sharp rise in both U.S. and non-U.S. hijackings from 1968 to 1973. The highest number of hijackings of flights originating in the U.S. was in 1969 (39) and for flights originating in other countries it was 1970 (64).

Figure 1 about here

Following 1973, there was a sizeable decline in hijackings, especially for flights originating in the United States. In fact, from a high point of 39 hijackings in 1969, U.S. hijacking counts declined to only two cases in 1973. Declines in non-U.S. hijackings were less dramatic, but still substantial. From a record high of 64 hijackings in 1970, non-U.S. hijackings dropped to a total of 14 in 1975. Following the early 1970s, non-U.S. hijackings experienced several smaller increases, with high points in 1990 (39), 1985 and 1993 (34 and 31 respectively), 1977 (28), and 2000 (21). Compared to the non-

U.S. hijacking trends, the U.S. experienced lower post-1973 total hijackings, with high points in 1983 (21) and 1980 (20). However, there were no recorded hijackings of U.S.-origin flights from 1992 until an unsuccessful hijacking attempt by a lone offender in 2000.[ix] After this event, the next incident was the deadly attack of September 11, 2001 involving four hijacked aircraft.

Not surprisingly, as aerial hijackings increased in the 1960s and 1970s, policy makers in the U.S. and elsewhere responded with a growing number of counter-hijacking strategies. After an extensive review of national counter hijacking policies (FAA 1983; Karber 2002), we identified six major policy changes aimed at reducing aerial hijackings from 1947 to 1986:[x] (1) in October 1970, the Cuban government made skyjacking a crime; (2) in January 1972, the FAA issued rules ordering tighter screening of all air passengers and baggage using one or more suggested methods: "behavioral profile, magnetometer, identification check, physical search" (National Materials Advisory Board, 1996: 6); (3) in August 1972, the FAA mandated that airlines refuse to board any passengers who fit a hijacking behavioral profile before they were physically or electronically searched; (4) on January 5, 1973, metal detectors were installed in U.S. airports and although the dates and times differ substantially, similar devices were gradually introduced to major airports around the world; (5) on February 3, 1973, the U.S. and Cuba signed a Swedish-brokered agreement that defined hijacking as a criminal act in both nations and promised to either return hijackers or put them on trial; and (6) on February 5, 1973 the FAA required that local law enforcement officers be stationed at all passenger check points during boarding periods.[xi]

ESTIMATING THE HAZARDS OF AERIAL HIJACKING

To test our hypotheses, we use Cox proportional hazard models to estimate the impact of the current flight context, hijacking motives, and policy intervention on the hazard of an additional hijacking attempt.[xii] We use continuous-time survival analysis with the dependent variable measured as the number of days until the next hijacking attempt and the independent variables measured at the time of the current hijacking attempt. Most applications of the Cox model estimate the hazard of a single event using many observations. Here, we instead apply the Cox model to estimate the hazard of many events (hijacking attempts) using only one observation (the world). By conditioning all events on one observation, we reduce the chances of dependence across observations. Yet, the rational choice theory underlying this research predicts dependence across some observations. We assume that the observations are conditionally independent once we control for characteristics of current and previous hijacking attempts.[xiii] With conditional independence, the multiple events in the current research should be synonymous with the more typical hazard model's multiple observations. If this assumption is unmet, then the parameter estimates will be biased and inconsistent, and the standard errors will be biased downward making our results vulnerable to Type II error. Thus, findings with marginal levels of significance should be interpreted with caution.[xiv]

To test the hypotheses outlined above, we estimate models separately for six subsets of hijacking attempts: (1) total, (2) those originating in the U.S., (3) those originating outside of the U.S., (4) those diverted to Cuba, (5) terrorist-related, and (6)

non-terrorist-related. We use the following specification for the proportional hazard models in the analysis:

$$h(Y) = \lambda_0(Y)\, exp(\beta_1 Policies + \beta_2 MajorPurpose + \beta_3 Context)$$

We estimate the coefficients associated with the hazard of a new hijacking attempt (estimated by the number of days until the next attempt, *Y*) as a function of an unspecified baseline hazard function and other risk or protective variables measured at the time of the current hijacking attempt represented by the vectors *Policies, Major Purpose*, and *Context*, which reflect our hypotheses and a set of control variables.

We use the temporal ordering of hijacking attempts to create both our dependent variable and two important independent variables. The temporal relationships underlying the measurement of these variables are shown in Figure 2. Our dependent variable, *Y*, is measured by the number of days until the next attempt. *Last attempt* measures the number of days since the previous hijacking attempt. And we calculate a *success density* measure by taking the current and two previous flights, and calculating the proportion of those flights that were successful over the number of months spanning the three events. Thus, a large success density indicates that most events were successful over a relatively short time period.[xv]

Figure 2 about here

In Figure 3 we show the specific dates of the anti-hijacking policies outlined above. The most striking feature of Figure 3 is that all six major policy interventions happened over only a two and one-half year period: October 1970 through February 1973. This, of course, makes it more challenging to evaluate the individual impact of specific policies.

Figure 3 about here

In Table 1 we summarize the variables included in the analysis and their possible values. Based on the temporal ordering of the anti-hijacking policies, we identified three strategic policy dates.[xvi] If the policy was intact at the time of the current hijacking attempt, that policy variable is coded as one, and zero otherwise. The first selected policy was enacted on October 31, 1970, the date that Cuba made hijacking a crime (*Cuba Crime*). Because the policy goal was specific to Cuban hijacking, it provides a direct way to examine its effects: if there is truly a policy impact as a result of this law it should have a significant effect in the model that uses data from hijackings diverted to Cuba—and because 57.5 percent of these flights originated in the United States, we would expect a U.S. effect as well.[xvii] The second is the FAA policy (enacted on January 31, 1972) of ordering *Tighter Screening* of all U.S. aircraft passengers and baggage. This policy intervention is strategic for two reasons. First, because it was imposed by the FAA only for flights from U.S. airports, any policy effect should be limited to the United States. And second, although several policy interventions are clustered closely during this period, tighter screening was implemented more than a year after the prior policy intervention, thus reducing the chance of simultaneous effects of the interventions.[xviii]

Table 1 about here

Finally, we selected three major policies that were implemented in January and February of 1973 (labeled *Metal Detectors*). While these policies were implemented about the same time, we might expect them to have somewhat different effects on the sub-samples being analyzed. Metal detectors should have an especially strong impact on flights departing from U.S. airports—because these policies were first implemented in the

United States (Enders and Sandlers, 1993). But at the same time, these policies spread fairly quickly to other highly industrialized nations and were gradually adopted by most other nations of the world. By contrast, the agreement between Cuba and the U.S. should only affect Cuba-U.S. flights.

As shown in Table 1, we distinguish between three major hijacking purposes for the current hijacking attempt: *Terrorism*, *Extortion*, and *Transportation to Cuba*. By comparing the FAA flights to hijackings found in terrorism databases, we were able to classify hijackings as terrorist when the hijackers made political, economic, religious or social demands. The FAA classified as extortion all cases in which the hijackers demanded money. Finally, the FAA coded all Cuban-related flights. We examined the FAA reports and determined whether the hijackers attempted to use the flight to get to Cuba. If so, we classified the case as transportation to Cuba. Altogether, we classified 51.8 percent of the cases as having at least one of these three purposes. The remaining cases were classified as "other" because they included no indication that perpetrators made terrorist demands, tried to extract a monetary ransom, or demanded transportation to Cuba.[xix] In 35 cases (4.2%) we classified a single event in two of three substantive categories and in two cases (0.2%) we classified a single event in three of the substantive categories. One of the cases included in all three categories happened on November 10, 1972 when three members of the Black Panther Party hijacked (made political demands, therefore terrorist) a Southern Airways jet to Havana, Cuba (transportation to Cuba) and demanded $2 million in ransom (extortion; RAND, 2001).

We include five variables to measure the context of the current hijacking attempt: *Last Attempt*, *Success Density*, *Private Flight*, *U.S. Origin*, and *Year*. We described the

last attempt and success density measures above (see Figure 2). We also include indicators of whether planes were privately owned, whether flights originated from U.S. airports, and the year of each incident. By including the year of the current event, we control for any increase or decrease in the overall hazard of hijacking over time. This variable is especially important because an increased hazard could lead to the adoption of the above policy interventions, thus biasing our findings and making the policy appear ineffective or even counter-effective. Fortunately the time-ordering of the data also reduces our vulnerability to this type of bias. For example, if surge of hijackings led to the adoption of counter-hijacking policies, were the data cross-sectional it could erroneously appear as if the new policies "caused" the hijackings. Related to this, year can also serve as a proxy for increased air traffic over time, which is likely a component of the "opportunity" to hijack. However, we expect that hijacking opportunity is less related to air traffic since the 1950s because since then flights take off at a nearly constant rate.

ESTIMATING THE HAZARDS OF HIJACKING ATTEMPTS

Table 2 shows the hazard model results for total incidents, U.S. originated incidents, non-U.S. incidents, Cuba diverted incidents, terrorist-related incidents, and non-terrorist-related incidents. In each model, the dependent variable is the number of days until the next event. A positive coefficient suggests that the variable increases the hazard of another hijacking attempt in a shorter time while a negative value decreases the hazard of another hijacking attempt.

Table 2 about here

Hypothesis 1 predicts that the hazard of hijacking attempts will decrease following the adoption of measures that increase the certainty of apprehension. We examined the effect of two certainty-based measures: tighter U.S. security screening adopted in January 1972 and the adoption of metal detectors and enhanced U.S. airport security adopted in February 1973. The results show partial support for the certainty of apprehension hypothesis. Consistent with H1, the hazard of hijacking in the U.S.-origin model significantly dropped following the adoption of metal detectors and other target hardening policies in 1973. In fact, the 1973 policies were the only interventions that significantly reduced hijacking hazards in all models, except those limited to terrorism.[xx] In contrast, increasing certainty of apprehension through tighter U.S. screening protocols introduced in January 1972 reduced the hazard of non-U.S. origin flights but failed to do so for U.S. flights. In fact, there was a short-term *increase* in the hazard of U.S. origin hijacking attempts following the implementation of the 1972 screening policy.

Our next set of hypotheses examines the impact of perceived benefits of hijacking on the hazard of new hijacking attempts. Hypothesis 2a is a test of the hypothesis that new hijacking attempts will be more likely shortly after earlier attempts (*Last Attempt*). This hypothesis is unsupported. Instead Table 2 shows that the hazard of another hijacking *decreases* significantly if the current and previous hijackings were attempted temporally close to one another.

In Hypothesis 2b we examine whether a series of successful hijackings increases the likelihood of additional hijackings. In support, Table 2 shows that if the three most recent events were primarily successful and close together, the hazard of a new hijacking attempt increased for the full sample as well as for non-U.S. and non-terrorist hijackings.

As noted above, these two hypotheses are both related to the contagion concept—that the widespread publicity attached to hijacking incidents will encourage other incidents. Interestingly, these results suggest that contagion seems to operate only through the rapid occurrence of *successful* hijackings.

Our other benefits-related hypothesis (H2c) predicts that compared to those who hijack for other reasons, those with terrorist-related motives will be affected less by the counter hijacking measures being examined here. The results are shown in the last two columns of Table 2. The null associations of the coefficients for tighter screening and the Cuban crime policy neither support nor reject the hypothesis because neither policy significantly impacted terrorist or non-terrorist related hijackings. By contrast, the 1973 policies (*Metal Detectors*) are significantly related to non-terrorist hijackings while null for terrorist events thus supporting the hypothesis. However, we should note that the differences in magnitude between the coefficient in the terrorism model (-0.644) and the non-terrorism model (-0.996) suggest only weak support for the hypothesis ($z=0.78$).

Hypothesis 3 predicts that as the severity of punishment increases, the hazard of a new hijacking will decline. We test this hypothesis by including a variable that indicates when it became a crime in Cuba to hijack a plane. Indeed, the hazard of hijacking decreased substantially after this policy was enacted for both Cuban and for U.S. origin flights. As indicated above, the latter finding makes sense because nearly three-fifths of flights diverted to Cuba originated in the United States. Note also the null impact of this policy on other types of hijackings not closely related to Cuban flights.

VARIABLES ASSOCIATED WITH HIJACKING SUCCESS

The significant effect of our success density measure strongly suggests that a successful hijacking attempt (as defined by the FAA) will likely lead to more attempts. Yet, little is known about the characteristics of successful hijackings. How closely do prospective hijackers' perceptions of the likelihood of success correspond to their actual likelihood of success? In the next part of the analysis, we use logistic regression to examine the determinants of successful hijackings. Our detailed hijacking data allows us to track trends in successful and non-successful U.S. and non-U.S. hijackings from 1947 to 1985.[xxi] Figure 4 shows that while the total number of successful hijackings originating in U.S. and non-U.S. airports are highly correlated until the 1970s, they diverge somewhat thereafter, with successful hijackings of U.S. origin flights declining more rapidly than successful hijackings of non-U.S. flights for most years after 1973 (the exceptions are 1975, 1980 and 1983). And as we have seen above, there are no hijackings originating in the U.S. from 1991 through 1999. In short, both the total number of hijackings and the total number of successful hijackings falls off more sharply for the U.S. than for other countries following 1972.

Figure 4 about here

In Table 3 we summarize the effects on hijack success of variables measuring *Policies, Major Purpose,* and *Context* generated from a logistic regression analysis. All variables are constructed in the same way as described in Table 1, except that instead of using the success density measure, we include an indicator of whether the previous flight was successful (*Last Success*). Because Table 3 reports odds ratios, all coefficients less

than one indicate a negative effect and all coefficients greater than one indicate a positive effect.

Table 3 about here

Turning first to the policy results, perhaps the most striking finding is that all hijackings except terrorist-motivated attacks were less likely to succeed following the passage of a Cuban law making hijacking a crime. The magnitudes of these results are quite large. For example, the ratio for Cuban flights suggests that the odds that an attempted hijacking to Cuba was successful dropped by 84.3 percent (100-15.7) after the policy was implemented. Thus, the probability of a successful Cuban flight after this law is implemented drops from 0.863 to 0.495.[xxii] Table 3 also shows that following the implementation of metal detectors and the other interventions in 1973 there was a significant decline in the likelihood of success for both hijackings originating in the U.S. and those diverted to Cuba. Again, the magnitude of these reductions is quite large. For flights originating in the U.S., the probability of success dropped from 0.30 to 0.05. The probability of success for hijackings intended to divert the flight to Cuba dropped by more than half (from 0.90 to 0.43). Finally, the results show that the tighter screening policy had no effect on hijacking success.

The next series of findings relate to the major purpose of the hijackers. Because there were only five cases of terrorism-related hijacking that originated in the U.S. and four of these were successful, we dropped the U.S. origin model from this part of the analysis. Table 3 shows that compared to other flights, flights hijacked by terrorists are much more likely to be successful for total, non-U.S., and Cuban diverted incidents. Conversely, flights motivated by extortion were much less likely to be successful for total flights,

non-U.S. origin flights and non-terrorism related flights. Flights diverted to Cuba were more likely than other flights to be successful in the analysis of total incidents, U.S. origin incidents, non-U.S. origin incidents, and non-terrorist incidents. In fact, the odds of a successful hijacking originating in the U.S. are more than 14 times higher if the purpose of the hijacking was transportation to Cuba (or more than twice as probable, 0.285 versus 0.134). This last finding likely reflects the long-standing U.S. policy of not offering physical resistance to hijackers who had forced aircraft to fly to Cuba on the assumption that this response was least likely to result in casualties (Holden 1986:881; Phillips 1973).

Finally, turning to the findings related to the context of the flight we see that a previous success only produces significant reductions in the success of Cuban flights. The odds of another successful Cuban hijacking after a successful Cuban hijacking are less than half of those that follow unsuccessful attempts. This finding might be due to the fact that a successful hijacking produces greater vigilance on the part of authorities, making subsequent successful attempts less likely—especially immediately after the successful hijacking. However, if this is the case, it is unclear why this effect is limited to the Cuban flights.

Table 3 also shows that the likelihood of success is unrelated to the time that has passed since the last attempted hijacking. While our analysis of the probability of new hijackings (Table 2) showed that private planes were no more likely to be hijacked than commercial aircraft, the results in Table 3 show that when private planes are hijacked, the hijacking is more likely to be successful—for all flights except Cuban.[xxiii] Finally, flights

originating from U.S. airports faced a lower probability of success both for the full sample and for the non-terrorist cases.

DISCUSSION AND CONCLUSIONS

Based on a rational choice perspective we developed a set of five hypotheses about the likelihood of hijacking attempts and used data from the FAA, RAND and a newly developed terrorist events database to determine whether aerial hijacking attempts respond to situations and policies expected to affect the probability of hijacking success and its perceived benefits and costs. Our results support three main conclusions. First, and most policy relevant, we found considerable support for the conclusion that new hijacking attempts are less likely to be undertaken when the certainty of apprehension or severity of punishment increases. But in this regard one of the certainty measures we examined (metal detectors and increased enforcement) had significant effects while another certainty measure (tighter baggage and customer screening) did not. Perhaps the implementation of metal detectors and increased law enforcement at passenger check points was simply a more tangible, public, and identifiable intervention than the tighter screening policies introduced 18 months earlier.[xxiv] The drop in the hazard of hijacking attempts after the Cuban crime policy was implemented strongly suggests that the threat of sanctions was useful here. Taken together, these results suggest that of the major policies we investigated, the public (and would-be hijackers) may be more likely to gain immediate knowledge of the metal detectors (which are highly visible) and the Cuban law (a public act), than the tighter screening which may not have been as visible or as

public. However, the fact that these policies were implemented closely in time also raises the possibility that it was the accumulation of policies as opposed to one specific policy that made the difference.

Second, we found partial support for a contagion view of hijacking: the rate of hijackings significantly increased following a series of successful hijackings but actually declined following a series of hijacking attempts that did not take success into account.

Finally, we found that the counter-hijacking policies examined had no impact on the hazard of hijacking attempts whose main purpose was terrorism. By contrast, we found that the adoption of metal detectors and increased police surveillance significantly reduced the hazard of non-terrorist related hijackings. Moreover, tighter screening significantly reduced the hijacking hazard of non-U.S. flights and a policy making hijacking a crime significantly reduced hijackings to Cuba. Similarly, the policies examined had no significant impact on the success of terrorist-related hijackings. But in contrast, metal detectors and increased police surveillance significantly reduced the likelihood that U.S. origin and Cuba diverted flights would be successful and a policy criminalizing hijacking in Cuba significantly reduced the likelihood of success of all non-terrorist related flights.

While we have assembled the most comprehensive longitudinal database on international hijackings of which we are aware, our study has several limitations. Like many earlier macro-level tests of the deterrence/rational choice perspective, we had no perceptual data that would have allowed us to examine the individual motivations of hijackers. Although data on individual motivations from hijackers or would-be hijackers appear especially difficult to collect, such information would allow researchers to better

understand how hijackers actually interpret policies and sanctions. Second, because most of the major anti-hijacking interventions happened very close in time, it was difficult to separate out independent effects. Thus, our analysis of the three policies passed in January and February of 1973 had to be combined. Third, although our database includes many of the variables shown by prior research to be associated with aerial hijackings, it is certainly plausible that other variables not available to us (and likely unavailable elsewhere) would be useful to have. This is especially the case regarding our measure of benefits specific to terrorist-related hijackings. For example, a hijacking could draw attention to a terrorist group's political agenda, could increase its standing with its followers, or could increase its membership.

And finally, because we relied on FAA data for this analysis, we were limited to the definition of hijacking success adopted by the FAA. This limitation may be especially important for terrorist-related hijackings, where simply drawing attention to a cause can be considered a measure of success, even if the incident results in the death or capture of the perpetrators. Additionally, it is possible that from the perspective of a would-be terrorist hijacker, getting past security at the airport gate before being apprehended or killed would be considered a success. These and other alternative conceptions of hijacking success should be considered in subsequent research. Having said that, we also find the FAA definition of hijacking success—where hijackers gain control of the plane and reach their destination, whether by landing or by a parachute escape, and are not immediately arrested or killed on landing—to be a defensible one. It includes the behavior that until recently was traditionally perceived as a successful hijacking. This view has changed dramatically following the suicide hijackings of 9/11.

However, our quantitative analysis ends before the 9/11 hijacking cases. The main type of hijackings that are not considered successful under the FAA definition are those involving hijackers who manage to get into a plane, but the plane never departs from the airport.

While this study is an initial attempt at applying the deterrence/rational choice framework to aerial hijacking using data that have heretofore been unexamined, much remains to be documented and understood. We envision at least four additional projects. First, because aerial hijacking occurs over space and time, it is important to examine the specific sources of this variation. Perhaps certain countries or airlines are more hijack-prone than others at various times.

Second, we need to better understand the motivation of terrorists. In particular, to what extent are their perceptions of costs and benefits different from those typically applied to common criminal offenders? Along these lines, it would be useful in future research to more thoroughly document individual and group-based motivations across different types of hijackings and hijackers.

Third, because much of our analysis was confined to the pre-1986 period, we cannot comment on the efficacy of the many recent efforts (e.g., sky marshals, reinforced cockpit doors) currently employed by the U.S. and other governments to thwart aerial hijacking. And in fact, the very infrequency of aerial hijackings in the United States since 1986 limits the utility of statistical tests of specific countermeasures. Nevertheless, research on these policies will be important in order to determine their effectiveness weighed against their costs. Additionally, it is likely that such policies will be effective only to the extent that potential offenders recognize these efforts and consider them in

their decision-making. As with other types of prohibited behavior (Nagin, 1998:1, 36-37), designing effective deterrence policy in the case of aerial hijacking ultimately depends on knowledge about the relationship of sanction risk perceptions to specific policies.

Finally, and as noted above, it will be useful to develop different conceptions and operationalizations of success and to examine how these alternative definitions relate to terrorist and non-terrorist incidents. From a policy perspective, our analysis indicates that some certainty- and severity-based interventions were effective at reducing some types of hijacking attempts and lowering the probability of some types of successful hijackings. That some policies are more effective at certain times and places and for certain kinds of acts than others is consistent with the policy implications emanating from situational crime prevention (Clarke and Cornish, 1985; Smith and Cornish, 2004), an approach based largely on the assumptions about individual motivation underlying the deterrence/rational choice framework. Policy makers need to study carefully the effectiveness of their policies, continue implementing the ones that work, modify the ones that may work, and abandon the ones that do not work.

Taken together, our results provide mixed evidence regarding the effectiveness of deterrence/rational choice-based policies. The certainty-based 1973 metal detector and police surveillance policies appear more effective than the 1972 tighter screening policy. There was evidence that the Cuba crime policy was effective in reducing Cuba-related hijackings. These findings support Nagin's (1998) conclusion that some deterrence efforts do work. At the same time, they also suggest that there is considerable variation in the effectiveness of the hijacking counter measures that were implemented.

Our results also suggest that policy interventions had less impact on the success of terrorist-related hijackings than on the success of other hijacking types. In fact, none of the three policies examined were significantly related to the attempts or success of terrorist-related hijackings. Perhaps the rational choice perspective is not the most appropriate theoretical framework for understanding terrorist-motivated hijackings, and other theoretical models may be more useful (LaFree and Dugan, 2004; Rosenfeld, 2004).[xxv] However, much more research is needed before this conclusion can be supported. This is so because traditional deterrence/rational choice models in criminology have been primarily aimed at understanding the behavior of individual offenders. A rational calculus at a group level may look very different. For example, a group-level calculus may privilege outcomes like publicizing group grievances, countering feelings of hopelessness and humiliation, and obtaining international status ahead of the perceived individual costs of increased certainty and severity of punishment. And even among individual measures, there is much difference between concern about legal punishment versus the attractions of martyrdom or eternal bliss. Hence, it may be that we need different measures of costs and benefits in the study of terrorist-motivated hijackings.

REFERENCES

Agnew, Robert

1992 Foundation for a general strain theory of crime and delinquency. Criminology 30:47-87.

Akers, Ronald L. and Adam Silverman

2004 Toward a social learning model of violence and terrorism. In Margaret A. Zahn, Henry H. Brownstein, and Shelley L. Jackson (Eds.), Violence: From Theory to Research. Cincinnati, OH: LexisNexis - Anderson Publishing.

Allison, Paul D.

1995 Survival Analysis Using the SAS System: A Practical Guide. Cary, NC: SAS Institute Inc.

Andenaes, J.

1974 Punishment and Deterrence. Ann Arbor, MI: University of Michigan Press.

Becker, G.S.

1968 Crime and punishment: An economic approach. Journal of Political Economy 76:169-217.

Blumstein, Alfred, Jacqueline Cohen, and Daniel S. Nagin

1978 Deterrence and Incapacitation: Estimating the Effects of Criminal Sanctions on Crime Rates. Washington, DC: National Academy of Sciences.

Carroll, John S.

1978 A Psychological Approach to Deterrence: A Psychodynamic Study of Deviations in Various Expressions of Sexual Behavior. New York: Citadel Press.

Chauncey, R.

1975 Deterrence: Certainty, severity, and skyjacking. Criminology 12:447-473.

Clarke, R.V. and D.B. Cornish

1985 Modeling offenders' decisions: A framework for research and policy. In M. Tonry and N. Morris (Eds.), Crime and Justice: An Annual Review of Research, Volume 6. Chicago: University of Chicago Press.

Clarke, R.V. and M. Felson

1993 Introduction: Criminology, routine activity, and rational choice. In R.V. Clarke and M. Felson (Eds.), Routine Activity and Rational Choice, Advances in Criminological Theory, Volume 5. New Brunswick, NJ: Transaction.

Cornish, Derek B. and Ronald V. Clarke, eds.

1986. The Reasoning Criminal. New York: Springer-Verlag.

Cox, D.

1972 Regression Models and Life-Tables. Journal of the Royal Statistical Society, Series B (Methodological) 34:187-220.

Dornin, R.

1996 D.B. Cooper is gone but his legend lives on. CNN Interactive, Cable News Network, Inc. November 23, 1996.

Ehrlich, Isaac.

1973 Participation in illegitimate activities: A theoretical and empirical investigation. Journal of Political Economy 81: 521-565.

Enders, W. and T. Sandler

1993 The Effectiveness of Anti Terrorism policies: A Vector–Autoregression Intervention Analysis. American Political Science Review 87: 829-44.

Federal Aviation Administration (FAA)

1983 Aircraft Hijackings and Other Criminal Acts Against Civil Aviation Statistical and Narrative Reports. Washington, DC: FAA, Office of Civil Aviation Security.

Gibbs, J.

1975 Crime, Punishment, and Deterrence. Amsterdam, The Netherlands: Elsevier Scientific Publishing Co.

Hamblin, R.J., R.B. Jacobsen, and J.L.L. Miller

1973 A Mathematical Theory of Social Change. New York: Wiley-Interscience.

Holden, R.T.

1986 The contagiousness of aircraft hijacking. American Journal of Sociology 91:874-904.

Jacobs, Bruce

1996 Crack Dealers and Restrictive Deterrence: Identifying Narcs. Criminology 34:409-431.

Jeffery, C. R.

1971 Crime prevention through environmental design. Beverly Hills, CA: Sage.

Karber, Phillip A.

2002 Re-constructing global aviation in an era of the civil aircraft as a weapon of destruction. Harvard Journal of Law and Public Policy 25:781-814.

Klepper, Steve and Daniel S. Nagin

1989 Tax Compliance and Perceptions of the Risks of Detection and Criminal Prosecution. Law & Society Review 23:209-240.

LaFree, Gary and Laura Dugan

2004 How Does Studying Terrorism Compare to Studying Crime? Pp. 53-74 in M. DeFlem, ed., Terrorism and Counter-Terrorism: Criminological Perspectives. New York: Elsevier

Landes, W.M.

1978 An Economic Study of U.S. Aircraft Hijackings, 1961-1976. Journal of Law and Economics 21:1-31.

Levitt, Steven D.

2002 Testing the Economic Model of Crime: The National Hockey League's Two Referee Experiment. Contributions to Economic Analysis and Policy 1:1-19.

Merari, Ariel

1999 Attacks on civil aviation: Trends and lessons. In P. Wilkinson and B.M. Jenkins (eds.), Aviation Terrorism and Security. London: Frank Cass.

Minor, W.W.

1975 Skyjacking crime control models. Journal of Criminal Law and Criminology 66:94-105.

Nagin, Daniel S.

1998 Criminal deterrence research at the outset of the twenty-first Century. In M. Tonry (ed.), Crime and Justice: A Review of Research, vol. 23. Chicago: University of Chicago Press.

1978 General Deterrence: A Review of Empirical Evidence. In A. Blumstein, J. Cohen, and D. Nagin (eds.), Deterrence and Incapacitation: Estimates and Effects of Criminal Sanctions on Crime Rates. Washington, D.C.: National Academy of Sciences.

Nagin, D.S., and R. Paternoster

1993 Enduring individual differences and rational choice theories of crime. Law and Society Review 27:467-496.

National Materials Advisory Board

1996 Airline Passenger Security Screening: New Technologies and Implementation Issues. Washington, D.C.: National Academies Press.

Paternoster, R.

1987 The deterrent effect of the perceived certainty and severity of punishment: A review of the evidence and issues. Justice Quarterly 4:173-217.

Paternoster, R. and A. Piquero

1995 Reconceptualizing deterrence: An empirical test of personal and vicarious experiences. Journal of Research in Crime and Delinquency 32:251-286.

Paternoster, Raymond and Sally S. Simpson

1996 Sanction threats and appeals to morality: testing a rational choice model of corporate crime. Law and Society Review 30(3):549-583.

Phillips, D.

1973 Skyjack: The Story of Air Piracy. London: Harrap.

Piliavin, I., R. Gartner, C. Thorton, and R. Matsueda

1986 Crime, deterrence, and rational choice. American Sociological Review 51:101-119.

Piquero, A. and R. Paternoster.

1998 An application of Stafford and Warr's reconceptualization of deterrence to drinking and driving. Journal of Research in Crime and Delinquency 35:3-39.

Piquero, A.R. and G. Pogarsky

2002 Beyond Stafford and Warr's reconceptualization of deterrence: Personal and vicarious experiences, impulsivity, and offending behavior. Journal of Research in Crime and Delinquency 39:153-186.

Piquero, Alex R. and Stephen G. Tibbetts

1996 Specifying the direct and indirect effects of low self-control and situational factors in offenders' decision making: toward a more complete model of rational offending. *Justice Quarterly* 13(3):481-510.

RAND

2001 Black Panthers attack airlines and airports target. MIPT Terrorism Knowledge Base, MIPT (National Memorial Institute for the Prevention of Terrorism) Chronology Data 1968-1997.

Rapoport, David C., editor

2001 Inside Terrorist Organizations. London: Frank Cass.

Rich, E.

1972 Flying Scared. New York: Stein & Day.

Richard Rosenfeld

2004 Terrorism and Criminology. Pp. 19-32 in M. DeFlem, ed., Terrorism and Counter-Terrorism: Criminological Perspectives. New York: Elsevier.

Ross, Laurence and Gary LaFree

1986 Deterrence in Criminology and Social Policy. In Behavioral and Social Science: Fifty Years of Discovery, edited by N.J. Smelser and D.R. Gerstein. Washington DC: National Academy Press.

Simpson, Sally S., Nicole L. Piquero, and Raymond Paternoster

1998 Exploring the Micro-Macro Link in Corporate Crime Research. In Peter Bamberger William J. Sonnenstuhl (Eds.), Research in the Sociology of Organizations. JAI Press: Greenwich, CT.

Smith, Martha J. and Derek B. Cornish

2004 Theory for Practice in Situational Crime Prevention. Crime Prevention Studies, Volume 16. New York: Criminal Justice Press.

Stafford, M. and M. Warr

1993 A reconceptualization of general and specific deterrence. Journal of Research in Crime and Delinquency 30:123-135.

United States Commission on Terrorist Attacks upon the United States: The 9/11 Commission.

2004 Final Report. New York: W. W. Norton.

Whittaker, J.

1990 Graphical Models in Applied Multivariate Statistics. New York: Wiley.

Wright, Richard T. and Scott H. Decker

1994 Burglars on the Job: Streetlife and Residential Breakins. Boston, MA:Northeastern University Press.

1997 Armed Robbers in Action: Stickups and Street Culture. Boston, MA:Northeastern University Press.

Zimring, F. and G. Hawkins

1973 Deterrence. Chicago: University of Chicago Press.

Figure 1. US and Non-US Hijacking Attempts, 1947-2003.

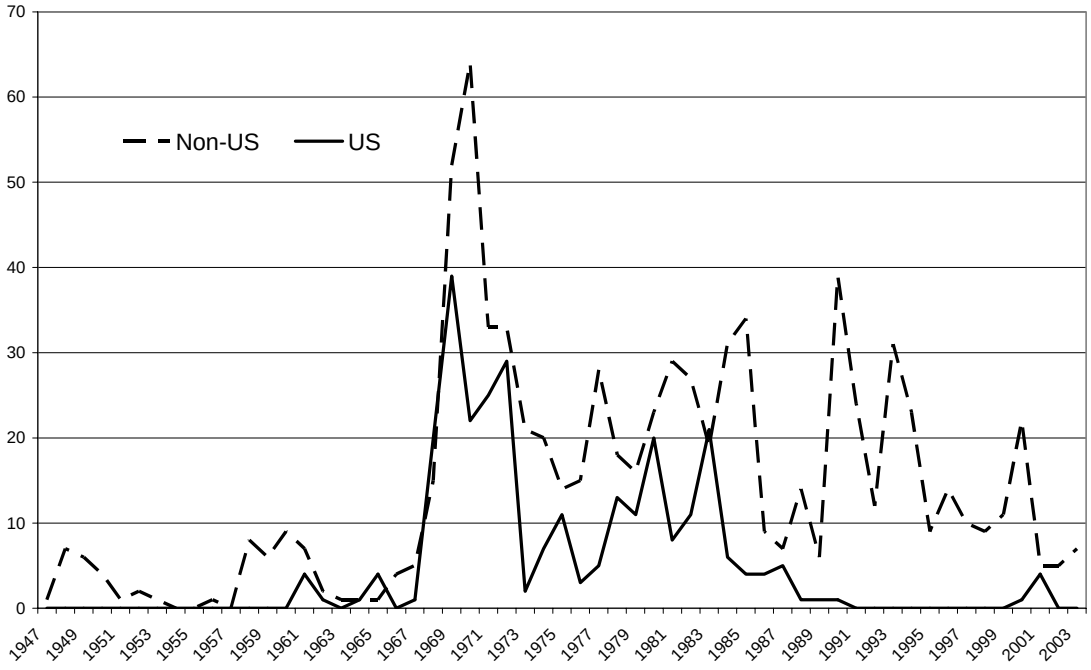


Figure 2. Diagram of Hijacking Attempts.

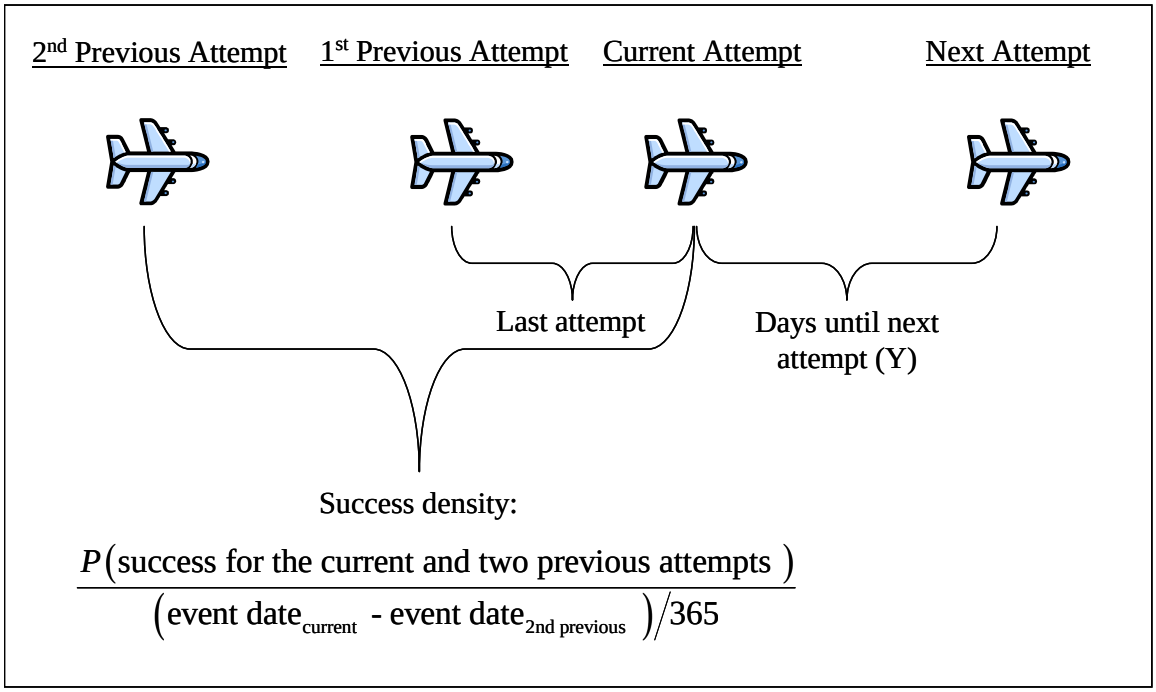


Figure 3. Hijacking Policies.

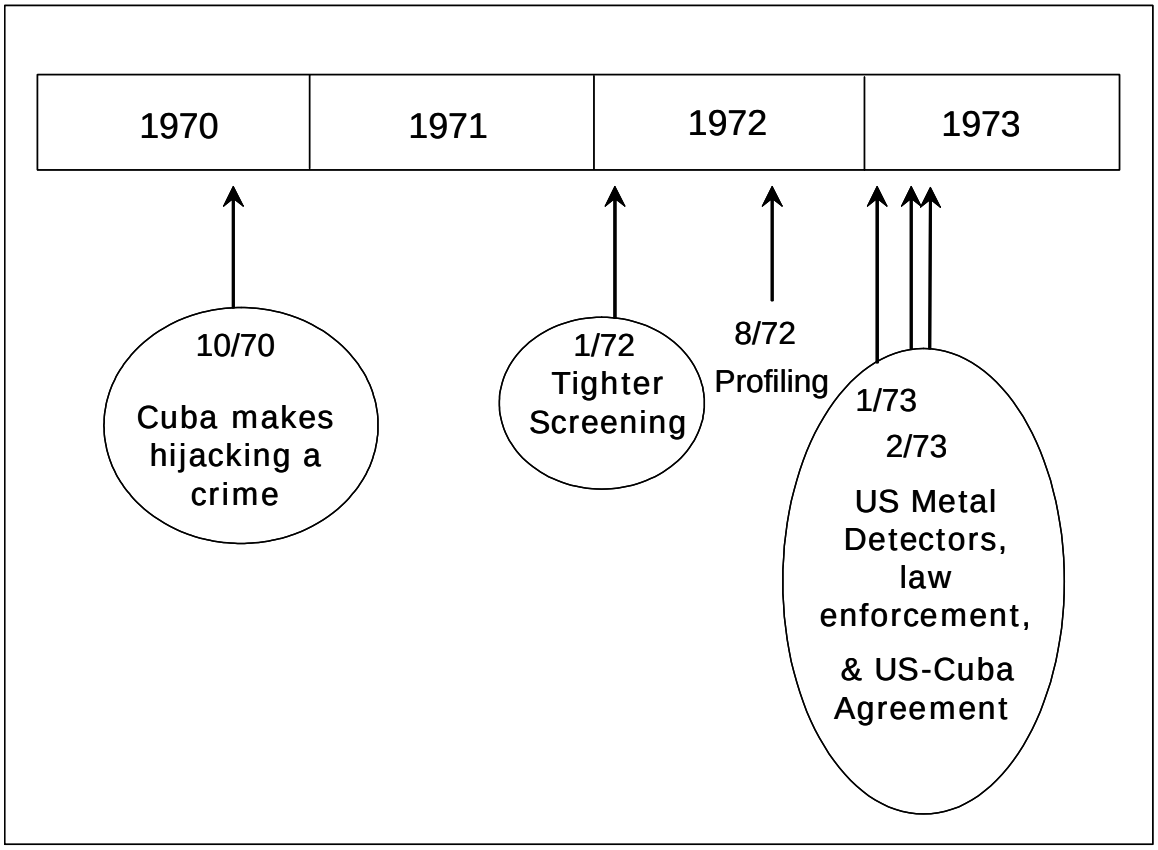
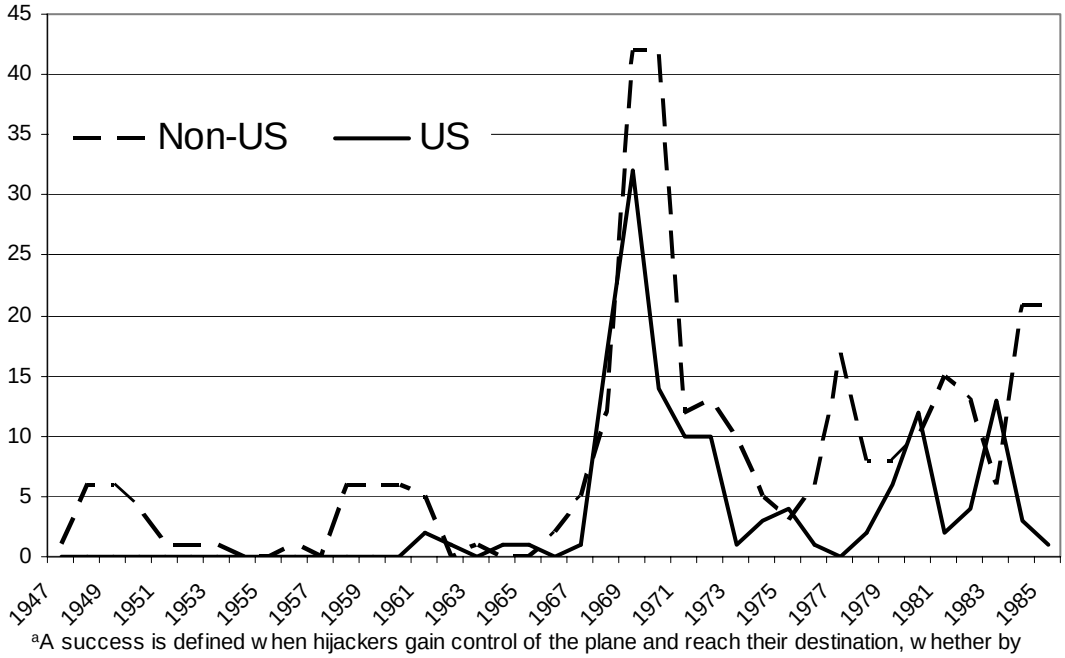


Figure 4. US and Non-US Successful Hijackings, 1946-1985[a]



[a]A success is defined when hijackers gain control of the plane and reach their destination, whether by landing or by a parachute escape, and are not immediately arrested or killed on landing; unsuccessful hijackings are those in which hijackers attempt but fail to take control of an aircraft (FAA, 1983).

Table 1. Variable Descriptions.

Variable	Possible Values	Description
Policies:		
Cuba Crime	0, 1	The October 1970 Cuban law made hijacking a crime (date set at October 31, 1970)
Tighter Screening	0, 1	The January 1972 order required tighter screening of all U.S. air passengers and baggage (date set at January 31, 1972)
Metal Detectors	0, 1	Three separate policies were enacted within a month: 1) January 1973 metal detector installation in U.S. airports, 2) February 1973 U.S./Cuba agreement to return or prosecute hijackers, and 3) February 1973 U.S. requirement that local law enforcement officers be stationed at all passenger checkpoints (date set at February 5, 1973)
Major Purpose:		
Terrorism	0, 1	The motive was to terrorize for political or social reasons.
Extortion	0, 1	The motive was to extort money.
Transportation to Cuba	0, 1	The hijacker was attempting to diverted the flight to Cuba.
Context:		
Success Density	[0, ∞)	$\frac{P(\text{success for the current and two previous atten}}{\left(\text{event date}_{\text{current}} - \text{event date}_{\text{2nd previous}}\right)/365}$
Last Success	0, 1	The previous hijacking attempt was successful.

Last Attempt	0, ∞	The number of days from the previous to the current hijacking attempt.
Private Flight	0, 1	The current flight was privately owned.
US Origin	0, 1	The current flight originated in the United States.
Year	[1947, 1985]	The year of the current hijacking attempt.

Table 2. Coefficients and Standard Errors for Cox Proportional Hazard Models.

	All Incidents	**US Origin**	**Non-US Origin**	**Cuba Diverted**	**Terrorist**	**Nonterrorist**
	n=826	n=265	n=556	n=272	n=123	n=700
Policies:						
Cuban Crime	-0.095	-0.500*	0.233	-0.421*	0.782	-0.145
	0.147	0.232	0.199	0.219	0.569	0.155
Tighter Screening	-0.084	0.686	-0.505*	0.070	-1.020	-0.016
	0.184	0.311	0.246	0.381	0.637	0.198
Metal Detectors	-0.949**	-1.598**	-0.653**	-0.967*	-0.644	-0.996**
	0.166	0.371	0.204	0.434	0.410	0.184
Major Purpose:						
Terrorism	0.146	0.359	0.163	0.311		
	0.104	0.470	0.109	0.246		
Extortion	0.147	0.142	0.052	0.178	-0.239	0.218
	0.139	0.260	0.176	0.412	0.331	0.154
Transportation to Cuba	0.171*	0.086	0.287**		0.439	0.141
	0.092	0.148	0.119		0.275	0.099
Context:						
Last Attempt	-0.004	-0.003	-0.003	-0.002	0.001	-0.004
	0.001	0.001	0.001	0.001	0.001	0.001
Success Density	0.002**	0.002	0.002*	0.001	0.000	0.002*
	0.001	0.001	0.001	0.001	0.001	0.001
Private Flight	-0.098*	-0.037	0.009	-0.130	0.517	-0.107

	0.119	0.193	0.161	0.238	1.152	0.120
US Origin	0.050			0.029	0.533	0.052
	0.087			0.137	0.532	0.089
Year	0.078**	0.074**	0.075**	0.091**	0.041	0.081**
	0.010	0.028	0.011	0.031	0.031	0.010

* = $p \leq 0.05$ and ** = $p \leq 0.01$, all one tailed tests.

Table 3. Odds Ratios and Standard Errors for Logistic Models Estimating Success.

	All Incidents	**US Origin**	**Non-US Origin**	**Cuba Diverted**	**Terrorist**	**Nonterrorist**
	n=827	n=267	n=559	n=273	n=119	n=702
Policies:						
Cuba Crime	0.286**	0.239**	0.254**	0.157**	1.112	0.251**
	0.091	0.131	0.105	0.077	1.406	0.085
Tighter Screening	1.528	3.813	1.143	3.598	0.554	1.563
	0.643	2.945	0.607	3.638	0.763	0.753
Metal Detectors	1.021	0.156*	1.506	0.081*	0.691	1.021
	0.379	0.138	0.659	0.088	0.619	0.447
Major Purpose:						
Terrorism	3.604**		3.369**	6.157*		
	0.852		0.820	4.830		
Extortion	0.418**	0.717	0.378*	0.171	2.871	0.223**
	0.140	0.469	0.152	0.192	2.444	0.101
Transportation to Cuba	3.623**	12.948**	1.843*		2.661	3.648**
	0.755	5.252	0.482		1.862	0.810
Context:						
Last Attempt	1.004	1.004	1.001	0.999	1.000	1.004
	0.003	0.003	0.001	0.001	0.001	0.003
Last Success	1.226	1.004	1.064	0.463*	0.961	1.061
	0.198	0.325	0.205	0.168	0.443	0.191

Private Flight	2.813**	7.096**	2.520**	2.522		2.961**
	0.758	3.855	0.902	1.684		0.814
US Origin	0.660*			1.642		0.650*
	0.129			0.538		0.132
Year	0.992	1.089	0.981	1.149*	1.048	0.994
	0.020	0.074	0.021	0.076	0.069	0.021

* = $p \leq 0.05$ and ** = $p \leq 0.01$, all one tailed tests.

ENDNOTES

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[i] A hijacker using the name D.B. Cooper seized control of a Northwest Orient airliner and threatened to blow it up during a flight from Portland to Seattle. After he extorted $200,000 he parachuted from the flight and has never been found. This event gained national attention and the fact that Cooper successfully avoided detection gave him folk legend status with admirers (Dornin, 1996).

[ii] Holden's (1986:879) extortion category "includes incidents involving both extortion (i.e., demands other than for transportation) and diversion to a particular destination because the primary motive in these cases is presumed to be other than transportation."

[iii] Because we have no direct data on actors' perceptions, our research is similar to other macro-level tests of deterrence/rational choice theory (e.g., Blumstein et al., 1978; Nagin, 1978; Levitt, 2002) in assuming that potential hijackers' decisions were based at least in part on their knowledge of the probability of success and the costs of failure.

[iv] The definition of success employed in this study was the one adopted by the FAA for their construction of the longitudinal database we employ. While the FAA definition of success is the one that has been most commonly used in prior research (e.g., Holden 1986), it is clear that it is more in keeping with a criminal rather than a terrorist interpretation of hijacking incidents. For example, the FAA definition would classify the hijackings of September 11, 2001 as unsuccessful—even though many might argue that the immediate goals of the hijackers in this case were fully realized. Definitions of aerial hijacking also disagree about the precise physical location at which an aerial hijacking

begins. The FAA data count as aerial hijackings only those cases in which hijackers get past airline security gates. Hence, a hijacker apprehended in the bridge connecting the airplane to the airport would be included in the database (as an unsuccessful hijacking attempt), but someone who was apprehended outside the airport or at an airport ticket counter would not be included (cf., Merari 1999). We return to these definitional issues in the discussion section.

[v] Although we do not empirically distinguish between deterrent and preventive effects, it is useful to briefly explain the two. Prevention, according to Andenaes (1974) and Jeffery (1971) refers to the elimination of the opportunity for crime through modification of the environment in which crime occurs. Zimring and Hawkins (1973:351) suggest that: "..if the probability that a particular type of offender will be apprehended is greatly increased, then the increased apprehension rate may achieve a substantial *preventive* effect which is quite independent of the *deterrent* effect of the escalation in enforcement…Nevertheless…it is crime prevention rather than deterrence which is the ultimate object of crime control measures."

[vi] Other definitions of hijacking are of course possible. For example, Merari's (1999:11) detailed analysis of "attacks on civil aviation" includes attacks not only against airliners, but also against airports and airline offices. In general, the FAA data exclude these latter cases unless the perpetrators were in the airline loading area or beyond and made it clear that their intentions were to hijack an airplane (these cases were treated as unsuccessful hijackings). Because most of the deterrence-based policies that are the main subject of

this research focus on airliners rather than airports or airline offices, the operationalization of aerial hijacking used here seems defensible.

[vii] Until the mid-1980s FAA hijacking data were publicly and freely available in hard copy format. However, after the publication of a 1986 report that contained an impressive amount of detailed information (much of which is used in this study), the FAA reports contained far less detailed information and are currently available for a fee from the National Technical Information Service (NTIS). Since the last published report (2003), which listed the cutoff date for aerial hijackings as December 31, 2000, we were unable to identify any publicly available reports from the NTIS or FAA regarding aerial hijackings.

[viii] We had separate research assistants identify the terrorism cases independently. The correlation in selection of terrorism cases across assistants was 0.91. We reexamined disagreements and resolved discrepancies.

[ix] The lone U.S. hijacking in 2000 occurred on July 27th and involved an individual who boarded a plane at Kennedy Airport in New York City with the intent of hijacking it, but was captured before the plane left the ground.

[x] We identified but eliminated three other possible policy interventions. On November 1, 1969, Cuba extradited six American hijackers to the United States. We judged this to be a one-time event rather than a formal policy change. In February 1969, the FAA authorized physical searches of passengers and in October, 1969, three major U.S. airlines implemented an FAA system that used weapons detection devices for passengers that fit a behavioral profile of past hijackers. However, neither of these two interventions

were mandatory and in any event, neither received widespread press coverage—a critical element in rational choice models.

[xi] We have no data on non-U.S. global airline policies designed to stop aerial hijacking. It is worth noting that of the 516 non-U.S. originating flights with a known flight plan through 1985, the largest percentage originated in Colombia (8.5%) followed by Poland (4.8%) and then Lebanon (4.3%). However, by far the largest number of hijacking attempts during this period originated in the United States (267 versus 44 in Colombia).

[xii] We use the exact method to resolve ties in survival time (Allison, 1995). This method assumes that the underlying distribution of events is continuous rather than discrete and incorporates the likelihood of all possible ordering of events. This is the most appropriate strategy because airline hijacking can occur at any time.

[xiii] If dependence exists even after conditioning on previous hijacking attempts, it will likely be strongest for the most recent attempt. The models include the length of the previous "spell" (time between the 1st previous and current hijacking attempt, as shown in Figure 2) as a test for contagion (H2a). As suggested by Allison (1995), we tested for further dependence by including the next previous spell (between the 2nd previous and 1st previous hijacking attempts as defined in Figure 2). Its null association ($p>0.10$) supports the assumption of conditional independence. However, as with all dynamic research models, the findings are vulnerable to bias due to the omission of an unmeasured time-dependent variable that increases or decreases the probability of hijacking leading to temporal clustering of events.

[xiv] An earlier version of this paper included a quarterly time-series analysis that produced similar results. Because the hazard model allows us to test all of the hypotheses and because of space limits, we have excluded the time-series results.

[xv] We initially calculated this measure using 3, 5, 7, 10, 15, 20, 30 and 40 incidents. The substantive findings remained the same, although they weakened as we increased the number of incidents. We decided to report only the results for three incidents here because this strategy retained the most observations.

[xvi] Five cases in the database were missing information on specific dates. For three of these cases, month of the hijacking was available and we estimated the dates by using the last day of the month (February 1931, August 1966, and November 1978). This assures that any policy intervention occurred prior to the event. For the remaining two cases we knew only that the case occurred in the "Fall" and we therefore set the dates equal to October 31 of the appropriate year—the middle of the Fall season.

[xvii] Although this measure could also be interpreted as increasing the certainty of punishment (Chauncey, 1975), we chose to conceptualize it here in terms of severity because of its reliance on the administration and degree of punishment.

[xviii] After a preliminary analysis of the effect of the August 1972 profiling policy, we could find no effect and chose to omit it from the analysis. However, its close proximity to the early 1973 policies raises the possibility that its effects are being picked up by these later interventions.

[xix] An examination of these cases shows that "other" hijackings include attempts for purposes of transportation to somewhere other than Cuba, political asylum, escape from Cuba, juvenile behavior, robbery of passengers, mental instability, and other reasons.

[xx] To be sure that this result is specific to the date, we reestimated the model replacing February 5, 1973 with later dates. None of these reestimates were significant.

[xxi] The first incident in 1931 was excluded because two of the independent variables measure the previous incident.

[xxii] These probabilities were calculated by setting all other values to the median.

[xxiii] Because there was only one terrorist hijacking of a private flight (it failed), we omitted the private flight variable from the terrorism model.

[xxiv] We tested for a lagged impact of tighter screening and found none.

[xxv] For example, two theories in particular, general strain (Agnew, 1992) and social learning (Akers and Silverman, 2004) could serve as viable alternative perspectives for understanding terrorism generally, and hijacking in particular. Regarding general strain, it may be that terrorists perceive noxious stimuli, either personally or vicariously, become angry and full of rage and resentment, and then lash out violently. Regarding social learning theory, individuals could be exposed to definitions favorable to hijacking and through the learning process, develop rationales and neutralizations that lead to criminal activity.