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Spatial Analysis of U.S. Terrorism Incidents

OVERVIEW

This research brief represents an overview of basic spatial patterns across a sample of terrorism incidents in the United States. While research concerning characteristics of incidents has received some study, the geospatial patterns of these incidents remains largely unexamined. Logically, different ideological categories of terrorism may lend themselves to different spatial patterns and preferences for target distance. In addition, the distance required to perpetrate an incident may affect the success rate of an attack. Terrorists who must travel further to engage in preparatory activity such as surveillance or transporting weapons may stand an increased chance of failure due to human intervention.

Previous research from the American Terrorism Study (ATS) has examined these ideas and generally suggests terrorists favor targets closer to their place of residence; this research brief builds upon that previous work. The findings suggest that in recent years, terrorists have lived closer to the intended target. This is primarily related to the increase in ISIS-affiliated incidents.

PROJECT BACKGROUND

The American Terrorism Study (ATS) is led by researchers at the Terrorism Research Center at the University of Arkansas. The ATS is an empirical relational database consisting of data on federal terrorism-related court cases, persons indicted in these court cases, and related officially designated terrorism incidents. Incidents included in the database are identified through court documents, some of which were planned but not successfully executed. While the database in its entirety contains 602 incidents, the current analysis extracted data from the ATS on the key variables listed below.

MAJOR CONCLUSIONS

- More than half of terrorism incidents occur within 30 miles of the perpetrator's city of residence, indicating an increasing prevalence for terrorists in the United States to live closer to the target than in years past.
- Far-left incidents, dominated by the United Freedom Front's campaign in the late 1970s and 1980s, tended to involve a greater degree of travel than other ideological categories.
- ISIS-related incidents in the United States tended to occur in the city in which the perpetrator(s) lived more than AQAM-related incidents, but most perpetrators from both groups lived within 100 miles of their target.
- Overall, proximity to the target alone does not appear to significantly affect the likelihood of incident success.

KEY VARIABLES

Category designates the incident as being related to an ideological group based on the perpetrators involved in the case study. The ideologies of concern in this research brief are Environmental, Far-left, Far-right, Al-Qa'ida and Associated Movements (AQAM), and Islamic State of Iraq and Syria (ISIS).

Incident Success is a measure of whether the plot was successfully carried out, partially successful, or unsuccessful. For this analysis, "successful" and "partial success" plots were collapsed into a single "successful" category and compared against "unsuccessful" plots. Incidents are considered to be "unsuccessful" when the attack on the intended target was prevented or failed to occur due to plot cancellation, complete device failure, or human intervention.

Distance in Miles measures how far the perpetrator or perpetrators lived from the target. These distances are calculated as straight-line distances between the perpetrator(s) city of residence and the city containing the intended target. In cases with more than one perpetrator involved in one incident, we utilized the average distance. A portion of the analysis recodes this variable into Log10 based categories - 0 to 30 miles, 31 to 90 miles, 91 to 270 miles, 271 to 810 miles, and over 811 miles.

Incident Range codes whether the perpetrators lived in the same city as the target, outside the city within 100 miles, or more than 100 miles outside the city. This was useful in cases where we knew generally where or how far the perpetrators were from, but could not obtain an exact city-to-city distance.

FINDINGS

CHARACTERISTICS OF THE DATA

Of the 602 incidents documented from 1976 to 2017 ATS, 515 incidents fit into these ideological categories, leaving 87 incidents to be excluded from the analysis. The sample is further pared down based on availability of data for the variable used in the analysis. Distance in miles could be determined for 218 incidents, while each of the analyses utilizing incident range contained 247 incidents.

DISTANCE IN MILES

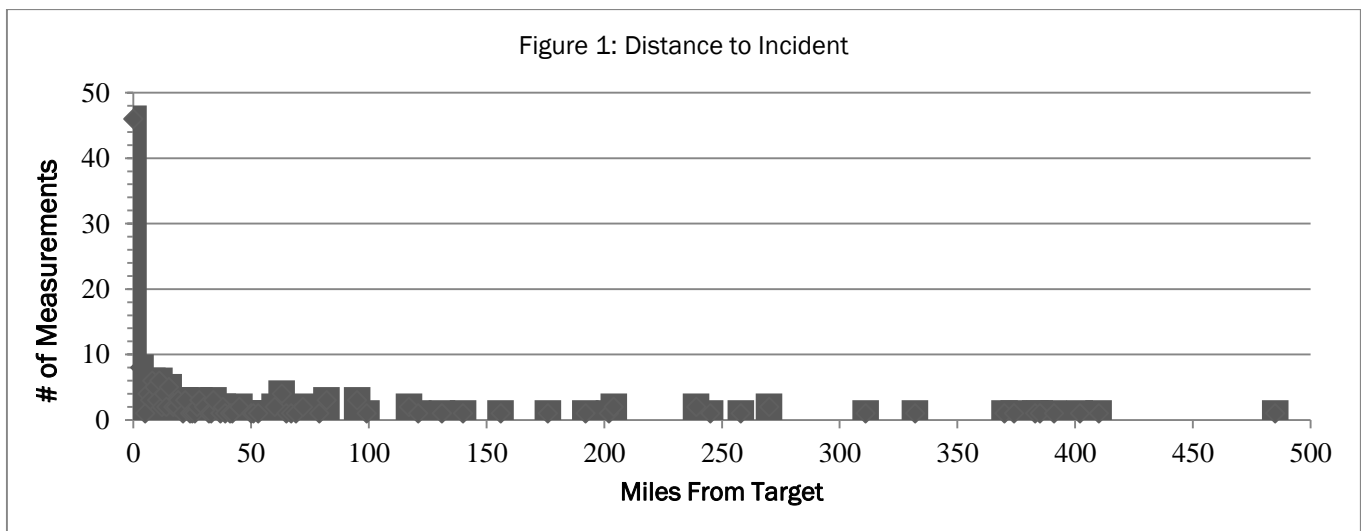
In addition to including data from the five ideological categories, a portion of the analysis involved calculating an exact distance in miles. This calculation requires that a city be determined for both the incident and the perpetrator(s) carrying out or planning the incident. Occasionally, particularly with Far-left and Environmental incidents, not all perpetrators could be identified and an average could not be calculated. Because both bits of data are not always available together, the distance in miles could only be determined for 218 incidents in the database.

This number was further reduced by omitting six outliers in the dataset, which were largely composed of an individual planning a series of attacks in the United States but living in Pakistan. These outliers all included distances of over 6,000 miles, which skewed the statistics of the data set. The remaining 212 incidents are including in the analysis. Over half of these incidents took place between 0 and 30 miles away from the perpetrators' residences, indicating an overall preference not to travel a great distance.

Table 1: Descriptive Statistics

Number of Incidents	212	Log ₁₀ Ranges	
Min. Distance	0	0 – 30 miles	55%
Max. Distance	3986	31 – 90 miles	15%
Mean	233	91 – 270 miles	10%
Median	23	270 – 810 miles	8%
Std. Dev	478	811+ miles	12%

Figure 1 below shows the frequencies of distances between 0 and 500 miles. As indicated from Table 1, the bulk of incidents occurred within 30 miles from the perpetrator's residence. For ease of viewing, only incidents occurring within 500 miles are displayed on the graph. The number of incidents sharply decreases as the distance increases. The percentage of individuals living within 30 miles of the intended target (55%) represents a significant increase from previous analyses. Previous findings ranged between 33-40 percent. The increase in recent years is apparently due to changes in the nature and types of terrorism plots in the United States since the advent of al-Qa'ida and ISIS. These changes are discussed in the next section.



SPATIAL DISTRIBUTION ACROSS IDEOLOGICAL CATEGORY

The analysis of spatial patterns across ideological category indicates some significant differences in the distances each group tends to travel. Perpetrators of Far-left incidents are unique in their apparent degree of travel to perpetrate an incident. A large majority (95.2%) of these incidents involved perpetrators living, on average, more than 100 miles from the location of the incident. The group responsible for the bulk of these recorded incidents, the United Freedom Front, perpetrated a long-running campaign of incidents across a number of different locations in the United States. Environmental groups also traveled further than other groups (39.3% more than 100 miles), though not to the same degree as the Far-left groups. ISIS-affiliated individuals appear to stay close to home more often than any other ideological category, with 38.9 percent of these individuals living in the city of their plot. Nearly 80 percent of both ISIS and AQAM individuals lived within 100 miles of their target, with 19.4 percent and 21.3 percent living more than 100 miles away, respectively.

Table 2: Spatial Distribution by Ideological Category

N = 247	Same city	Within 100 miles	More than 100 miles
Environmental (61)	8.2%	52.5%	39.3%
Far-left (21)	4.8%	0.0%	95.2%
Far-right (82)	25.6%	45.1%	29.3%
AQAM (47)	10.6%	68.1%	21.3%
ISIS (36)	38.9%	41.7%	19.4%
Total	18.6%	47.0%	34.4%

Sig = .000

DISTANCE AND SUCCESS

Finally, Table 3 shows the analysis concerning the relationship between incident success and distance traveled. While two thirds of the incidents involving perpetrators who did not have to travel far resulted in success, plots involving individuals who lived over 100 miles from the target have a slightly higher rate of success (58.8%) compared to those who lived outside of the target city but within 100 miles (54.3% successful). While these patterns are interesting and suggest an advantage to living within the same city, these differences are not statistically significant. Previous ATS research has indicated that success rates vary significantly across ideological category, and the spatial impact on success may be dependent upon the distance-preferences of that particular group.

Table 3: Spatial Distribution and Success

N = 247	Unsuccessful	Successful
Lived in same city (46)	32.6%	67.4%
Lived within 100 miles (116)	45.7%	54.3%
Lived over 100 miles (85)	41.2%	58.8%
Total	41.7%	58.3%

p = NS

RESEARCHERS AND CONTACT INFORMATION

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To provide feedback, or for any correspondence relating to this research, email infostart@start.umd.edu.



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