Adaptive Adversaries and Their Consequences
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ABOUT CREATE

Now in its tenth year of operation, the National Center for Risk and Economic Analysis of Terrorism Events (CREATE) was the first university-based Center of Excellence (COE) funded by University Programs of the Science and Technology (S&T) Directorate of the Department of Homeland Security (DHS). CREATE started operations in March of 2004 and has since been joined by additional DHS centers. Like other COEs, CREATE contributes university-based research to make the Nation safer by taking a longer-term view of scientific innovations and breakthroughs and by developing the future intellectual leaders in homeland security.

CREATE’s mission is to improve our Nation’s security through research and development of advanced models and tools to evaluate risks, costs and consequences of terrorism and natural and man-made hazards and to guide economically viable investments in homeland security. We are accomplishing our mission through an integrated program of research, education and outreach that is designed to inform and support decisions faced by elected officials and governmental employees at the national, state, and local levels. We are also working with private industry, both to leverage the investments being made by the Department of Homeland Security in these organizations, and to facilitate the transition of research toward meeting the security needs of our nation.

CREATE employs an interdisciplinary approach merging engineers, economists, decision scientists, and system modelers in a program that integrates research, education and outreach. This approach encourages creative discovery by employing the intellectual power of the American university system to solve some of the country’s most pressing problems. The Center is the lead institution where researchers from around the country come to assist in the national effort to improve homeland security through analysis and modeling of threats. The Center treats the subject of homeland security with the urgency that it deserves, with one of its key goals being producing rapid results, leveraging existing resources so that benefits accrue to our nation as quickly as possible.

By the nature of the research in risk, economics, and operations, CREATE serves the need of many agencies at the DHS, including the Transportation Security Administration, Customs and Border Protection, Immigration and Customs Enforcement, FEMA and the US Coast Guard.. In addition, CREATE has developed relationships with clients in the Offices of National Protection and Programs, Intelligence and Analysis, the Domestic Nuclear Detection Office and many State and Local government agencies. CREATE faculty and students take both the long-term view of how to reduce terrorism risk through fundamental research, and the near-term view of improving the cost-effectiveness of counter-terrorism policies and investments through applied research.

In 2011, the University of Southern California (USC) and a team of 23 partner institutions were awarded a new 5-year Cooperative Agreement resulting from a recompetition of the Center’s charter. This annual report covers the third year under Cooperative Agreement 2010-ST-061-RE0001, the ninth year overall of CREATE’s DHS funding, from October 2012 to September 2013.
1 Research Accomplishments

1.1 Terrorist Attack and Target Diversity: Changepoints and Their Drivers

Terrorists choose from a wide variety of targets and attack methods. This project investigates how diversity in target choice and attack modes among transnational and domestic terrorists has evolved and changed over the past 40 years. Our analysis relies on count data drawn from the Global Terrorism Database (GTD) for 1970–2010 that distinguish between transnational and domestic terrorist incidents. Using Bayesian Reversible Jump Markov chain Monte Carlo changepoint methods and a Herfindahl index of diversity, we show that diversity in both attack modes and target choices has fallen over the last four decades. Nevertheless, this diversity still remains high. Bombings of private parties have become the preferred target-attack combination for both transnational and domestic terrorists. This combination is the hardest-to-defend target-attack combination. In addition, we identify changepoints for attack modes and target choices, and identify the drivers for these changepoints. Policymakers can use these and other results to focus their counterterrorism measures on the right targets.

We discover both good and bad news. In recent years the extent of diversification in target choice and attack mode for both types of terrorists has fallen. This suggests that counterterrorism measures are working and terrorists are losing substitution ability among choices. However, the level of diversification is still high, which means that counterterrorism measures must focus on deterring many types of attack modes and protecting most kinds of targets. This is still a costly prospect. However, costs can be curtailed if counterterrorism measures are directed toward the preferred attack and target combinations, used by transnational and domestic terrorists. This counterterrorism strategy will be particularly effective if the more damaging target-attack combinations are deterred, so that terrorists resort to less harmful incidents. Past actions have not necessarily achieved this goal. We also find that domestic terrorists are more diverse than transnational terrorists in their use of attack modes when hostage events are excluded. Both types of terrorists use almost equally high levels of diversification among target types. The project also identifies myriad changepoints in terrorist’s use of attack modes and target selection. The drivers of these changepoints are identified as well.

The project was completed during the fall and submitted to the Journal of Peace Research. It was quickly accepted and appeared in January 2013.
1.2 Terrorist Success in Hostage-Taking Missions

This project investigates the determinants of logistical and negotiation successes in hostage-taking incidents using a dataset that runs from 1978 to 2010. Unlike earlier studies, the current study has a rich set of negotiation variables in addition to political, geographical, and organizational variables associated with the perpetrators or targets of the attacks. The 33 years of data permit a split into two subperiods: 1978–1987 and 1988–2010, before and after the rise of religious fundamentalist terrorist groups. Logistical success depends on resource and target vulnerability proxies, while negotiation success hinges on bargaining variables. Among many novel findings, democracy significantly hampers logistical success throughout the entire period. Kidnappings, tropical climates, and high elevations foster logistical success. Religious fundamentalists’ logistical advantage during 1978–1987 was lost during 1988–2010. Abducting protected persons, making demands on the host country, and staging incidents in a democracy limit negotiation success for the terrorists. If terrorists moderate or replace one or more demands, the likelihood of negotiation success for the terrorists goes up.

This project has been completed and written up. It was accepted at Public Choice and appeared in the July 2013 issue.

1.3 An Empirical Study of Suicide Terrorism: A Global Analysis

The primary purpose of this third subcomponent is to present the first global empirical analysis of the quality (i.e., number of casualties) and quantity (i.e., number of attacks) of suicide terrorist missions based on country-specific and attack-specific variables. A second novel purpose is to identify why some countries experience no suicide attacks in a given year. A tertiary purpose is to distinguish how our independent variables differentially impact the different forms of suicide terrorism – i.e., transnational and domestic. Our sample period is 1998–2010. We merge event data from ITERATE, RAND, and GTD to provide observations on 2448 unique suicide terrorist attacks. Previous Palestinian studies had just over 150 suicide attacks. Unfortunately, unlike these earlier studies, we do not have micro-level data on the characteristics of the suicide bombers. By necessity, we have substituted attack-specific observations on the bombers’ terrorist group, their targets (i.e., business, military, official, and private parties), and venue city to investigate the quantity and quality of the suicide attack. In addition, we have macro-level, country-specific variables on the venue country of the attacks. Thus, we can investigate how the gross national income (GNI) per worker, the unemployment rate, tertiary school enrollment, democracy, foreign occupation/transition regimes, and some counterterrorism proxies affect the number of suicide attacks. The use of zero-inflated negative binomial panel analysis permits us to study how country-specific variables influence the absence of suicide terrorist attacks in a given year-country.

The paper from this third project was submitted to the Southern Economic Journal and was accepted after we responded to two favorable reviews. It is now scheduled to appear in April 2014, Volume 80(4).
2 Applied Relevance

Subproject 1 on terrorist attack and target diversity has much applied relevance, because it informs law enforcement agencies on how terrorists have altered their tactics (i.e., attack modes) and preferred targets over time. Moreover, the drivers of these changes for 1970–2010 are identified. This information allows law enforcement agencies and DHS to know where to allocate their defensive measures. Thus, limited protective resources can be allocated more efficiently. For example, bombings directed at private parties are now most-favored by terrorists, thereby making public gatherings particularly vulnerable. Terrorists are less inclined to go after official, business, and military targets. The decreased diversity in attacks can better enable authorities to direct their limited defensive resources to their most-valued use. The findings in this project can also be used to fine tune DHS grants to states. Finally, the drivers of past changepoints in operations and target diversity can allow governments to anticipate future changepoints and act accordingly. Our project uses GTD data from START in a policy-informative manner. Why collect these data if they cannot inform policy? We show that the data can enlighten policymaking.

Subproject 2 on terrorist success in hostage-taking can inform the CIA, the FBI, and police forces on effective negotiation strategies based on past hostage-taking incidents during 1978–2010. I presented my preliminary findings at a conference on hostage taking for ransoms at CIA headquarters in March 2012. In the last few years, hostage taking for ransoms has become a primary way for terrorist groups to finance their operations. The CIA, DHS, the US State Department, INTERPOL, and other institutions are interested in effective measures to stop hostage taking and to have governments abide by their no-concession pledges. By examining the determinants of logistical and negotiation success on the part of the terrorists, this project addresses these concerns. The huge success that TSA has had in thwarting US hijackings have two negative consequences: (i) an increase in other types of hostage-taking incidents abroad (Enders and Sandler, 2012), and (ii) a transference of skyjackings from the United States to abroad. Our project, however, shows that governments have better abided by their no-concession pledge in recent years. The project is rich in policy conclusions with respect to stopping hostage taking and ending the payment of concessions in the case of successful abductions. The project should be of great interest to various parts of DHS.

Subproject 3 analyzes suicide terrorism from a global viewpoint using event data from ITERATE, GTD, and RAND. In my co-authored book, The Political Economy of Terrorism (written in 2004 and early 2005), we predicted that suicide bombings would come to Europe and they have – e.g., the 7/7 London transport bombing and the Moscow airport bombing. Suicide terrorist attacks will increasingly come to the United States – 9/11 was the start. This is inevitable because suicide attacks are the terrorists’ response to hardened targets! This project uncovers the country-specific and attack-specific factors that determine the number and the destructiveness of suicide attacks. Part of our empirical procedure identifies what determinants are behind a set of countries experiencing no suicide terrorist attacks. Our study is the first global study on suicide terrorist attacks, which should be of great interest to DHS, law enforcement agencies, and others.
3 Collaborative Projects

Last year, I collaborated with S. Brock Blomberg, who is another CREATE researcher. Over the last few years, my annual conference on “Terrorism and Policy” has published one or more CREATE articles. I am on START’s advisory board that oversees GTD. I have collaborated with INTERPOL on a couple of CREATE projects. I continue to collaborate with INTERPOL on the implementation of MIND/FIND, which is used to protect borders in the USA and elsewhere. I am currently working on a new project on this topic. I am on the Advisory Board of SURVEILLE, an EU funded project, to study the effectiveness of surveillance. I am not compensated on this project.

4 Research Publications


Patrick T. Brandt and Todd Sandler, “A Bayesian Poisson Vector Autoregression Model,” *Political Analysis*, 20(3), Summer 2012, 292–315. (Note the application in this paper is to terrorist targeting decisions over time.)


Khusrav Gaibulloev, Todd Sandler, and Donggyu Sul, “Dynamic Panel Analysis under Cross-Sectional Dependence” conditional acceptance (subject to our replication material being checked by Dataverse) by *Political Analysis* (the main part of the paper applies our new techniques to the study of terrorism’s impact on economic growth).


5 Education and Outreach

I gave a public lecture on my research at Georgia Tech on February 15, 2013; I gave a public lecture at American University of Sharjah, UAE on March 6, 2013; I gave a lecture at the International Studies Association conference in San Francisco, CA on April 5, 2013; and on June 24, 2013 I gave a lecture on my suicide paper at the Jan Tinbergen European Peace Science Conference in Milan Italy. See 3 above for other contact.