HARDCENED TARGET ENVIRONMENTS AND THE USE OF SUICIDE TERRORISM

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ABSTRACT

Even after 15 years of intensive research, political scientists and terrorism experts are still having difficulties pinning down the true factors leading to suicide terrorism. It is not, as many media outlets would lead you to believe, simply an Islamist strategy. Suicide terrorism has been used worldwide by terrorist groups spanning all parts of the ideological spectrum, in pursuit of various goals, in conflicts originating before and after the 9/11 attacks. In this paper, I strive to gain a more comprehensive understanding of the causes of suicide terrorism by creating a more complete model of factors that drive an organization to the use of suicide terrorism. To do this, I take a sample of 12 terrorist organizations of varying sizes, ages, ideologies, and geographic locations and analyze their types of attacks, targets and factors present in their strategic environments from the year 1980 to 2014 in an attempt to determine which factors are common between the groups that use suicide terrorism. Ultimately, I find that there is, indeed, a strong positive relationship between the amount of attacks against hardened targets a group perpetrates and the likelihood that they will use suicide terrorism.
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Chapter 1 Introduction

“It is my lot to die young, I shall not see our victory, I shall not live one day, one hour in the bright season of our triumphs, but I believe that with my death I shall do all that it is my duty to do, and no one in the world can demand more of me.” These are the words of Ignaty Grinevitsky, the first man to become infamous as a suicide bomber, written the night before the suicide bombing that killed Tsar Alexander II of Russia. The date was March 13, 1881 and suicide terrorism would not become a commonplace form of terrorism for another century, but on that day Grinevitsky, a member of the left-wing terrorist group Narodnaya Volya (The People’s Will), successfully carried out one of the world’s first modern suicide bombings. After an accomplice unsuccessfully threw a grenade at the Tsar’s bulletproof carriage, Grinevitsky saw his chance when the Tsar stepped out of the carriage. He rushed towards the Tsar and detonated a grenade at his feet, killing himself and fatally wounding the Tsar. In an age where this was not yet common, the reaction must have been stunning. Why would anyone support this type of action? What group would ever condone or even encourage forfeiting their own lives just to take the life of another? Surely, they must have been insane.

One-hundred thirty-five years later, in 2016, suicide terrorism is not a new phenomenon; it has been used in various conflicts, with varying degrees of effectiveness for the past few decades. Yet the same reaction overcomes many people after hearing news of a suicide attack. Scholars now accept that suicide terrorism is not the work of the deranged; however, we are not much closer to answering the question of why suicide terrorism? Up until the September 11, 2001 attacks on the World Trade Center in New York City, suicide terrorism received little attention and little research had been done on its uses. Of course, since the 9/11 attacks, suicide
terrorism is a buzzword used by every politician, reporter and news anchor on an almost daily basis as a catch-all phrase to describe the radical Islamist terrorist organizations that the US is currently fighting. Dozens of theories exist, yet none is universally accepted. They all have their detractors or singular case studies that prove to be an exception. Many terrorist organizations fit profiles of groups that should use suicide terrorism, but do not; some groups who have used suicide terrorism do not fit the profile for groups that typically do. So what is it that pushes a group to use the most extreme and violent form of terrorism seen today? Why do some groups resort to the use of suicide terrorism while others do not? This is the question this study seeks to answer. This study does not claim to claim to create a universal theory on the causes of suicide terrorism, as there may be no such thing. But rather, it seeks to add to the literature of suicide terrorism research in an area where there is so disagreement.
Chapter 2 Literature Review

Bruce Hoffman is one of the first and foremost terrorism researchers in the world and needs no introduction; however, his 2003 article *The Logic of Suicide Terrorism* provides an exceptional introduction to this study and suicide terrorism as a whole. In this article, Hoffman recounts events from his trip to Israel, the country most widely impacted by the effects of suicide terrorism. His abstract, quoted below, provides a chilling first glimpse into the goals of suicide terrorism and the profound effect that it can have on the psyche of those who have experienced it.

“First you feel nervous about riding the bus. Then you wonder about going to a mall. Then you think twice about sitting for long at your favorite café. Then nowhere seems safe. Terrorist groups have a strategy—to shrink to nothing the areas in which people move freely—and suicide bombers, inexpensive and reliably lethal, are their latest weapons. Israel has learned to recognize and disrupt the steps on the path to suicide attacks. We must learn too.”

Hoffman goes on to describe how terrorists’ weapons are no longer simply guns and sticks of dynamite; they now make use of anything they can find that can be used a projectile (nails, bolts, ball bearing, shards of glass) to stuff inside of crudely made suicide vests and bags. These attacks are cheap, costing less than a few hundred dollars, and do not require escape plans or extensive knowledge of military tactics. And, although the individual nature of these attacks makes it seem like suicide terrorism is being perpetrated by lone wolves, the reality is far different. Terrorist organizations have become adept at organizing and orchestrating suicide attacks, what we are seeing is only the final product. One member will procure the supplies, one will assemble the explosive device, and another will carry out the attack. Many times, this is carried out in a cell-type fashion in order to reduce the chance of the entire attack being stopped. The story is not all doom and gloom, however. Although the rise of suicide terrorism has been abrupt and effective,
Israel, in particular, has seen success in its counter-terrorism policies. The Israeli Defense Force (IDF) has found that they can significantly decrease the quantity of successful suicide attacks by taking the fight to the Palestinians, not waiting for it to come to them. Increases in IDF deployments to the West Bank and Gaza Strip have resulted in noticeable decreases in the number of successful attacks. Now, this is a fairly easy tactic for the IDF to employ, seeing as the West Bank and Gaza Strip are so geographically close to Israel. A strategy such as constant deployments is not one that will work in the long term for a country such as the United States; as such, we must do all we can to learn more about the causes and motivations behind suicide terrorism in order to formulate policies to counteract it.

Martha Crenshaw’s work, *Explaining Suicide Terrorism: A Review Essay*, is very useful to us because it outlines many different theories about suicide terrorism and highlights disagreements between terrorism scholars regarding their theories. Crenshaw’s article reviews 13 different books about suicide terrorism regarding three questions: why do terrorist organizations see suicide terrorism as effective, why do communities support groups that use suicide terrorism, and why do individuals engage in suicide terrorism. She ends by giving some policy proposals for combatting suicide terrorism. For the purposes of this study, I will only review Crenshaw’s analysis of the first question, why do groups see suicide terrorism as effective, because it relates to group level motivations for using suicide terrorism.

Crenshaw splits her review of why groups see suicide terrorism as effective into three main theories. The first centers on Pape’s theory that suicide terrorism is used to coerce foreign occupying powers to withdraw. The second is based off Mia Bloom’s Outbidding Theory, which seeks to explain the reason for terrorist groups’ escalation in violence. Finally, she reviews the idea of suicide terrorism as a last resort. Pape’s argument is based off his work in his book *Dying*
to Win: The Strategic Logic of Suicide Terrorism. In this book, Pape argues that all groups in the past two decades to mount a suicide campaign have done so to coerce a foreign occupying democracy to withdraw from their territory. Many other researchers disagree with this claim. In this study, Pape excludes isolated attacks, which skews the view of how much suicide terrorism has been used against democracies. For instance, Pape excludes the Egyptian Islamic Jihad’s bombing of the Egyptian embassy in Islamabad and the Armed Islamic Group’s (GIA) reported suicide bombings against the neither foreign, nor democratic Algerian government. Both of these cases would be data points against Pape’s theory, but are excluded from his dataset.

Additionally, Elster, Brym and Araj question the validity of his methods for determining the success or failure of a suicide campaign, calling them arbitrary. On top of that, Pedahzur and Perliger argue that one third of all suicide terrorism is directed at undemocratic regimes, contrary to Pape’s claim of all. Finally, Crenshaw discuss how there are so many discrepancies in the datasets of Pedahzur and Pape that it is almost impossible to compare their results without first going through their data on a case by case basis.

The next theory that Crenshaw addresses is Mia Bloom’s Outbidding Theory. The concept behind this theory is that terrorist organizations will resort to increasingly violent and heinous acts of terror in order to gain notoriety or exposure in an environment where there are rival groups vying for attention. Atran, Gupta and Mundra tend to support this theory, but Elster disagrees. He argues that a game theory-like interpretation breaks down when trying to draw conclusions about more than two parties. Crenshaw notes that Bloom’s theory is most relevant to the Palestinian-Israeli Conflict, and Victor agrees. Ricolfi, however states that the political motivations described in Bloom’s theory were only present in one of three Palestinian campaigns and that the Palestinian factions frequently collaborate as well as competing. Additionally,
Crenshaw states that the Sri Lanka case, one of Bloom’s case studies, actually makes a point counter to Bloom’s central thesis. Bloom states that the Liberation Tigers of Tamil Eelam (LTTE) began using suicide terrorism after rival Tamil militants had been all but destroyed. This, Crenshaw says, would refute, not support, Bloom’s theory that suicide terrorism is used to gain an advantage over rival groups. Finally, Crenshaw addresses the al-Qaeda case in terms of competition with rivals. According to Yoram Schweitzer, al-Qaeda actually strives to promote the use of suicide terrorism by other Islamist terrorist organizations, and cannot really be explained by Outbidding Theory.

During my preliminary research of the current literature available involving why some groups decide to use suicide terrorism whereas some do not, I found an interesting argument between Robert Pape, Assaf Moghadam and Scott Atran again regarding Pape’s controversial book, *Dying to Win*. This disagreement helped me solidify my final research question by helping to show me where in the field there are disagreements and where there are gaps in research. In Pape’s book, he challenges the commonly held notion that individuals engage in suicide terrorism due to religious fanaticism. Pape instead suggests that suicide terrorism has a specific strategic logic behind it and is used by terrorists due to a rational choice. Using data from the Chicago Project on Suicide Terrorism, one of the largest dossiers cataloguing suicide attacks and personal information on the bombers themselves, Pape conducted a comparative case study examining many of the suicide bombers in order to prove his theory that, by and large, suicide bombings are not the result of religious fanaticism. He also claims that the reason why suicide terrorism has been used by terrorists is because it has been seen to be effective. In order to prove this fact, Pape analyzes 17 previous and current suicide terrorism campaigns using CPOST’s data. Through his analysis, Pape concludes that a majority of the 17 campaigns could be
considered successful, once he excluded four cases that he claimed were ongoing and could not be given a rating of success or failure. This analysis is what leads Pape to claim that suicide terrorism has been an effective strategy for terrorists to use. Finally, Pape makes the claim that suicide terrorism typically is used against foreign occupying powers, citing multiple examples such as the US in Afghanistan and Iraq and Israel in Palestine.

A second article, by Assaf Moghadam, took issue with Pape’s conclusions and wrote a critique to *Dying to Win*. In this critique, Moghadam contest three of Pape’s main broad conclusions claimed by his book. First, Moghadam took issue with the way Pape defined his main concepts. In his book, Pape had argued that the commonly held notion in political science research was that suicide terrorism was an irrational act partaken in because of radical religious ideologies. Moghadam argues that Pape tries to claim this in his book so that he can make it seem as though him calling suicide terrorism rational is a “new” idea. Moghadam points out that terrorism researchers have actually gone to great lengths to make it clear that they believe suicide terrorism *is* a rational strategy. Secondly, Moghadam argues that Pape’s definition of suicide terrorism allows him to include cases in his study that otherwise should not have been included. He states that “suicide terrorism” is a label typically given to suicide bombings on civilian populations, whereas the broader term “suicide attacks” include suicide bombings against military or police entities. Moghadam says that Pape defining suicide terrorism as any type of suicide bombing allows him to include cases that otherwise would be excluded with the traditional definition of suicide terrorism. Moghadam claims that this definition of suicide terrorism skews Pape’s sample. Thirdly, Moghadam contests Pape’s claim that suicide campaigns have been largely successful. Using Pape’s same dataset, Moghadam analyzes it and draws his own conclusions about whether or not suicide terrorism played a role in the success or
failure of the terrorist campaign. Moghadam included the four ongoing cases that Pape had excluded, stating that they could be given a definitive result. Through his own analysis, Moghadam concluded that suicide campaigns are only successful roughly 24% of the time, not the 54% that Pape had claimed, a radical difference. (715) Finally, Moghadam disagrees with Pape’s statement that suicide terrorism is used for primarily political goals and against foreign occupiers. He cites multiple instances where high ranking al-Qaeda official have stated the religious goals motivating their suicide attacks. He also notes that Pape overlooks the use of online indoctrination, which allows terrorist groups to perpetrate attacks in countries that are not occupying their nation and sometimes attacks are recorded in countries that have no foreign occupation at all.

The second article arguing Pape’s conclusions was by Scott Atran. Atran has four major issues with Pape’s conclusions. First, Atran takes issue with Pape’s sampling. He argues that the Kurdistan Worker’s Party (PKK) and Liberation Tigers of Tamil Eelam (LTTE) should not be used in the sample as hallmark examples of secular suicide terrorism, because both groups have been essentially inactive in recent years. He also contends that the attacks in Iraq have not been perpetrated by a highly organized group as Pape suggests, but instead by small, loosely affiliated cells who are all claiming to be fighting towards the same goal. Atran’s second argument against Pape is that Pape’s conclusions concerning suicide terrorism are simultaneously too broad and too narrow. On the narrow side, he claims that Pape’s data does not support his conclusion that conventional military tactics have been unsuccessful in suicide campaigns which have been successful in expelling occupying powers. On the broad side, Atran claims that the category of suicide terrorism Pape includes in his dataset is much too large and varied. His main argument is that, while the LTTE are clearly an important group to study in terms of suicide terrorism, he
doesn’t believe them to have had a major effect on the spread of suicide terrorism throughout the world. Thirdly, Atran argues that suicide terrorism is typically used to combat foreign occupying powers because there are many cases, such as the 9/11 attack and the Second Intifada in Palestine, that actually lead to extreme increases in military intervention in occupation in the Middle East. Finally, Atran refutes Pape’s claim that the Salafi ideology is unrelated to suicide terrorism. Atran claims that Pape uses outdated and inaccurate data to justify this claim.

Ashworth et al. also take issue with many of Pape’s conclusions in his controversial book, *Dying to Win: The Strategic Logic of Suicide Terrorism*. They do not, as Moghadam and Atran do above, claim that Pape’s theory is inherently wrong, but instead simply explain why they do not believe he had the ability to draw such conclusions from the data he had and study he used. Ashworth et al.’s main argument in this is that Pape cannot seek to make conclusions about the causes for suicide terrorism because his study sampled on the dependent variable. That is, Pape cannot draw conclusions about suicide terrorism in relation to other types of terrorism because his study solely includes cases of suicide terrorism. In order to explain why Pape’s cannot draw the conclusions he did from the data he had, Ashworth et al. conduct conditional probability and attributed risk assessments of Pape’s data. Results of Ashworth et al.’s analysis show that controlling for foreign occupation (one of Pape’s central theses) or religious extremism do not do enough to effect the attributed risks of suicide terrorism to be noteworthy. Attributed risk in this study can take a value anywhere between -1 and 1. After controlling for foreign occupation, the attributed risk only decreases the range to -.957 to .944, a minimal change. Controlling for religious extremism fared even worse, altering the bounds of attributed risk to -.973 to .981. Consequently, Ashworth et al. conclude that Pape’s theses of foreign occupation and religious extremism cannot be seen to seriously increase the use of suicide
terrorism. Ashworth et al.’s article has informed the dangers of selecting on the dependent variable, and I will be sure not to do the same in my study.

While Pape’s book, and the articles refuting it, did a lot to inform my initial research question, Berman and Laitin’s work, *Hard Targets: Theory and Evidence on Suicide Attacks*, did a lot to inform my main hypothesis. In this article, Berman and Laitin seek to explain three phenomena observed in terrorism. First, that normal insurgents target poor, mountainous countries whereas suicide terrorists do not, second, that, while insurgents frequently kill those of the same religion, they typically do not use suicide terrorism to do it, and finally that although many types of groups begin insurgencies, suicide terrorism is most often used by religious groups. Berman and Laitin use the notion of “hardened targets” to help explain points one and two, which is where I draw inspiration for my main independent variable and hypothesis. Berman Laitin do not official define “hardened targets”, instead simply explaining them as being “defended.” They conclude, however, that terrorists are more likely to expend the resources for a suicide attack against a hardened target than a soft target, a theory that I will test empirically in my study. In my framework, I will expand upon this concept of hardened targets to create a more concrete definition that can be used as a quantitative variable. While Berman and Laitin’s study focuses on attributes of the target that can lead to suicide terrorism, my study will focus more on the attributes of the strategic environment surrounding that target which could breed the use of suicide terrorism.

Finally, I feel as though I should include James A. Piazza’s 2009 article, *Is Islamic Terrorism More Dangerous*, due to the implications it could have on my choice to either include or exclude al-Qaeda and its affiliate groups from my dataset. In this article, James A. Piazza examines the widely held idea in political science that Islamist terrorist groups are, as a whole,
more lethal in their attacks than other classifications of terrorist organizations. Piazza attempts to theorize that it is not Islamist groups as a whole who are more violent, it is Al-Qaeda and Al-Qaeda affiliates who are more lethal, and thus skew results. In order to test this, Piazza runs a regression test and does a case-study, taking a dual sided approach to the hypothesis. In his regression test, Piazza uses a dependent variable called “number of victims” to represent the number of persons killed or wounded in a specific terrorist attack. Additionally, he uses numerous other dichotomous control variables in order to control for organizational or structural characteristics of terrorist organizations that might make them more violent. First, he uses dummy variables coded one or zero to classify groups under his previously explained framework for classifying terrorist organizations. Groups can either be Islamist, Leftist, Rightist or Nationalist/Separatist. Piazza also controls for whether or not the group is an Al-Qaeda affiliate. Additionally, Piazza uses the dichotomous variables abstract/universal group, strategic group, religious difference, national difference and state sponsored to further classify characteristics of the group. Religious difference and national difference refer to whether the victims of an attack were of the same religion or nationality as the attackers. Piazza also uses the interval level variables “number of competing groups,” and “press censorship of target nation” in order to describe the number of groups as specific terrorist group is competing with in a given area and the level of press freedom in the countries who are being targeted. All of the data above comes from the RAND Corporation’s Terrorism Knowledge Base except for the “press censorship of target nation” variable, which comes from Reporters Without Borders Press Freedom Index. As it turns out, the results of Piazza’s regression back up his hypothesis. In his first model, the variable Islamist Group is a significant positive indicator of the number of victims in a given attack. However, in his second model, when controlling for Al-Qaeda affiliates, the Islamist
Group variable is no longer significant, while the Al-Qaeda Affiliate variable is. This allowed Piazza to conclude that it is not Islamist groups as a whole who are more lethal, just those affiliated with Al-Qaeda. Piazza does an additional case study of Iraq between 1998-2005 in which he analyzes data from all of the 455 incidents in this time period and determines how many of these incidents were perpetrated by Al-Qaeda or its affiliates and what proportion of the victims of these attacks were due to these groups. Piazza’s findings again support his original hypothesis. He finds that, while there were few Al-Qaeda affiliates operating in Iraq during this period, they were responsible for almost 85% of the recorded attacks and almost 96% of the casualties.
Chapter 3 Theory

This study aims at using a group-level quantitative analysis in order to try to determine what factors in a strategic environment lead some terrorist organizations to use suicide terrorism as a tactic.

During the initial years where suicide terrorism became a prevalent tactic for terrorist organizations, many researchers and political scientists claimed that suicide terrorism was an irrational act committed by mentally ill or unstable individuals. They simply could not bring themselves to believe that a normal, sane person would be willing to blow themselves up in pursuit of such nebulous and far-fetched goals. Since then, however, it has been accepted that the use of suicide terrorism is, in fact, rational and strategically planned attacks that terrorists use as a force multiplier. That is to say, suicide terrorism allows a relatively small, unconventional, underequipped force to project their force against a much larger force by killing large quantities of people at little cost and effort to the groups. In terms of cost, the costs of executing a suicide attack are far lower than a conventional one. Consider what the US Army would consider a conventional attack; they would send an entire brigade of soldiers, including all of their supplies and logistical train, to another country in order to eliminate an enemy force numbering potentially as few as a couple hundred. This incredibly cumbersome, expensive and time-consuming method requires massive preparation and logistical planning in order to execute. Now consider the planning, preparation and logistical footprint required by a suicide attack. All that is required is one willing individual, a small quantity of explosives and equipment for a detonator. This tactic is highly cost effective and allows normal looking civilians to walk into crowded civilian areas where they can detonate and harm the highest number of people. It is much easier
to penetrate a target with one individual in plainclothes than it is for a group wearing uniforms. Since September 11, 2001, terrorism, and in particular suicide terrorism, has been studied heavily, however political scientists still struggle to agree on definitive reasons why some groups choose to use suicide terrorism, while others do not. There must be some similarity between the groups that use suicide terrorism or the strategic environments they fight in. If suicide terrorism is truly a rational tactic, groups do not randomly choose to use it. I hope to use this study to shed more light on these similarities that lead groups to use suicide terrorism. In the future, this may help to predict groups that could use suicide terrorism.

The main independent variable that I believe will have an effect on the amount of suicide terrorism a group uses is whether they are operating in an environment with hardened targets. As I will discuss in more depth in the Analysis section, I define hardened targets as buildings or installations that have had some deliberate increase in their security by some police, military or security force. This can range from posting armed guards all the way to physically strengthening the facility by way of blockades, security checkpoints or bullet proof and blast resistant outer defenses. For the purposes of this study, hardened targets encompass military and police installations, government buildings, and the bases/outposts of rival terrorist/non-state militias or violent political parties. The purpose of hardening targets is to reduce the potential for and effectiveness of armed attacks against that facility. My initial hypothesis assumes that the hardening of targets is indeed effective and significantly decreases the effectiveness of conventional attacks against that target. If true, it is logical that terrorist groups would then try to adapt to new strategies that can be more effective in this strategic environment. This is where suicide terrorism comes into the mix. Suicide terrorism is very difficult to detect prior to an attack and is very difficult to protect against. Whereas a group of armed assailants would never
even be able to get close to a hardened target without detection, a single individual wearing a concealed bomb or suicide vest could penetrate a hardened target without raising suspicions. In this way, small, underequipped terrorist groups can still commit attacks against an enemy’s hardened targets, making suicide terrorism the perfect strategy for them. Little has been done in terms of empirical analysis of the relationship between levels of hardened targets and suicide terrorism and for this reason it is my main independent variable for my first hypothesis. Hypotheses 1 relates my main independent variable (Hardened Target Environment) to my main dependent variable (% suicide).

H1: Groups that commit higher percentages of attacks against hardened targets will also commit higher percentages of suicide attacks.

In addition to my hypothesis about the main independent variable, I also have a hypothesis relating a few of the other independent, control variables in my model to my main dependent variable, namely: Group Size, Opponent Strength and Age. In terms of Group Size, expect to see smaller groups committing higher percentages of suicide terrorism than larger groups. The logic behind this is that smaller groups are more likely to be underfunded and have fewer resources than larger groups. For these smaller groups, suicide terrorism is an easy, cheap way to carry out attacks under limited resources. Age goes hand in hand with this same logic. Younger groups are likely to be smaller as well, and therefore have access to fewer resources. Additionally, younger groups will likely be trying to expand their ranks, and claiming responsibility for successful terrorist attacks could be a good way to gain notoriety and support. Finally, I also believe that we will see groups use higher percentages of suicide terrorism against stronger opponents. Militarily and economically stronger opponents are likely to have the
resources to harden their facilities and therefore will be more difficult to attack successfully using conventional means. As such, my second hypothesis is as follows:

\[ H2: \text{Smaller, younger groups fighting against militarily and economically stronger opponents will use a higher percentage of suicide terrorism.} \]

Secondary to my main dependent variable, \% Suicide, I also have another dependent variable that I wish to test against my independent variables. This variable is called Years to Suicide and it codes for the year that each group began using suicide terrorism, if applicable. With this variable, I hypothesize that a higher percentage of attacks against hardened targets will result in a greater likelihood that a group will begin using suicide terrorism in a given year. This is because these groups will have to adapt to new strategies when faced with a hardened target environment, and I believe the logical choice is suicide terrorism. According to this hypothesis, a rise in the percent of attacks against hardened targets should correspond with greater chance of that group switching to using suicide terrorism in that year.

\[ H3: \text{Increases in percentages in attacks against hardened targets will correspond with an increased likelihood of that group beginning to use suicide terrorism in that year.} \]

In this study, I will use a sample of terrorist attacks from 12 different terrorist organizations across the years of 1980-2014. The groups are split equally between three different ideologies: religious, nationalist/separatist and leftist. The sample includes groups ranging in size, age, conflict region and strategic environment. Data for all of these groups will be regressed twice, first against the main dependent variable, \% Suicide, and then against the secondary dependent variable, Years to Suicide. A table of summary statistics for all independent and dependent variables used in the study and a matrix detailing some summary information for each of the 12 terrorist groups in my sample is displayed below.
### Table 1. Summary Statistics

<table>
<thead>
<tr>
<th>Variable</th>
<th>Obs.</th>
<th>Mean</th>
<th>Std. Dev.</th>
<th>Min</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>ideology</td>
<td>378</td>
<td>1.920</td>
<td>0.797</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>totalincidents</td>
<td>365</td>
<td>48.148</td>
<td>105.101</td>
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<td>1038</td>
</tr>
<tr>
<td>totalsuicide</td>
<td>366</td>
<td>2.680</td>
<td>11.247</td>
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<td>130</td>
</tr>
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<td>suicidedependent</td>
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<td><strong>0.042</strong></td>
<td><strong>0.139</strong></td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Hardenedtarget-t</td>
<td>365</td>
<td>0.437</td>
<td>0.334</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>yrstosuicide</td>
<td>371</td>
<td><strong>0.372</strong></td>
<td><strong>0.484</strong></td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>age</td>
<td>372</td>
<td>4.142</td>
<td>1.096</td>
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<tr>
<td>groupsize</td>
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<td>foreignoccupier</td>
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<td>0.212</td>
<td>0.409</td>
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<td>regionalcompet-n</td>
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<td>0.986</td>
<td>0.927</td>
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<td>2</td>
</tr>
</tbody>
</table>

Notes:
Main independent variable in italics.
Dependent variables in bold.

### Table 2. Summary of Groups

<table>
<thead>
<tr>
<th>Group Name</th>
<th>Year Founded</th>
<th>Ideology</th>
<th>Group Size</th>
<th>Main Opponent</th>
<th>Suicide Terrorism?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Al-Qaeda</td>
<td>Late 1980s</td>
<td>Islamist</td>
<td>~50,000</td>
<td>United States</td>
<td>Yes</td>
</tr>
<tr>
<td>Hamas</td>
<td>1987</td>
<td>Islamist</td>
<td>&gt;1,000</td>
<td>Israel</td>
<td>Yes</td>
</tr>
<tr>
<td>Hezbollah</td>
<td>1982</td>
<td>Islamist</td>
<td>~1,000</td>
<td>Israel</td>
<td>Yes</td>
</tr>
<tr>
<td>The Taliban</td>
<td>1994</td>
<td>Islamist</td>
<td>&gt;35,000</td>
<td>United States</td>
<td>Yes</td>
</tr>
<tr>
<td>Al-Fatah</td>
<td>Late 1950s</td>
<td>Nationalist/Separatist</td>
<td>~10,000</td>
<td>Israel</td>
<td>No</td>
</tr>
<tr>
<td>IRA</td>
<td>1922</td>
<td>Nationalist/Separatist</td>
<td>~1,000</td>
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<td>~1,000</td>
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<td>1976</td>
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<td>~8,000</td>
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<td>Yes</td>
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<tr>
<td>Mujahedin-e Khalq</td>
<td>1965</td>
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<td>5,000-10,000</td>
<td>Iran</td>
<td>No</td>
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<tr>
<td>New People’s Army</td>
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<td>~4,000</td>
<td>Philippines</td>
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<td>Communist Party of</td>
<td>2004</td>
<td>Leftist</td>
<td>&gt;6,500</td>
<td>India</td>
<td>No</td>
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Notes:
All data taken from START’s Terrorist Organization Profiles database when available.
Chapter 4 Analysis

Methodology

In order to test these hypotheses, this study makes use of two different types of statistical analysis. For the first set of analyses, we will use a Tobit Regression. Tobit models are useful for regressing data that is bound between a certain upper and lower limit on the dependent variable. In this instance, we are regressing a percentage of suicide attacks in a given year on a percentage of attacks against hardened targets. Since both the independent and dependent variables are percentages, and therefore bound between 0 and 1, a Tobit model is useful. Tobit models can be interpreted similar to a normal linear regression in that the coefficients can be directly interpreted without additional analysis. The dependent variable (% suicide) is measured as a percentage of a terrorist group’s total attacks in a given year that are classified as suicide attacks. Data for this variable has been obtained from the Global Terrorism Database (GTD). The data includes all instances, regardless of doubt, including unsuccessful attempts. In this study, intent to commit a suicide attack is just as important as actually carrying it out. The independent variable (hardened target environment) is measured as a percentage of a group’s total attacks in a given year that are against hardened targets. Hardened targets are classified as military, police, or government facilities, along with attacks against other terrorists/non-state militias and violent political parties. In short, hardened targets are any targets that are likely to have enhanced security or military protection. Data was again gathered from the GTD and includes all instances, regardless of doubt, including failed attempts.
The second test that will be used in this analysis is a Logistic Regression Analysis. Logit Models are used in statistical analysis where the dependent variable is a categorical variable. Binary logistic models are used to estimate the probability of a binary response based on one or more independent variables. Here, the dependent variable is a dummy variable. The variable (years to suicide) is coded 0 for all group-years before that group’s first suicide attack. Beginning with the year in which that group committed its first suicide attack, they will receive a 1 thereafter to indicate their use of suicide terrorism. As with the variables for the Tobit model, data for the years to suicide variable was gathered from the GTD. In this logit model, the dependent variable will again be ran against the main independent variable, hardened target environment.

**Group Profiles**

Below are brief descriptions of each of the twelve terrorist organizations used in the sample. Groups were selected based off a variety of criteria. Most importantly, all groups had to be active enough and well known enough so as to provide sufficient data for the study. This was judged based off the completeness of GTD data for each group, because the GTD was the source of data for specific terrorist attacks. Secondly, groups were selected across three different ideologies: religious, leftist and nationalist/separatist. There are four groups from each ideology. Selecting across multiple ideologies will ideally allow this study to draw conclusions about all types of terrorist groups, not just ones a certain ideology. Some groups listed can be classified under multiple different ideologies, such as Hamas. In this case, groups are categorized based off their dominant ideology. Additionally, the case selection only includes groups that have been
around for a significant number of years. This goes along with the concept of wanting well known and active groups. Groups that have been around longer allow for more data collection and a larger overall dataset. The youngest group in the dataset is the Taliban, who was founded in 1994. This still allows for 20 years of observations, and conveniently, the Taliban has the highest number of total attacks in the entire dataset. Finally, there is a mix of groups that have and have not used suicide terrorism. As stated before in the context of diverse ideologies, this study hopes to draw conclusions about all types of terrorist organizations. Selecting solely groups who have used suicide terrorism would limit the study to only being able to draw conclusions about that type of group.

**Al-Qaeda**

Al-Qaeda is likely the most infamous terrorist organization in my sample because the 9/11 attacks in New York City, Washington, D.C. and Schenksville, PA are credited to them. Al-Qaeda was formed in the late 1980s by Osama bin Laden and some of his associates. They are a radical Islamist group whose goal is to lead a global jihad against western powers in order to establish an “umma,” or worldwide Islamic nation. While this is their ultimate goal, their immediate goals center more heavily around the removal of US ground forces from the Middle East. They are rumored to have as many as 50,000 members worldwide, although this number is an approximation. Al-Qaeda is well known for making use of suicide bombers in their attacks.

**Hamas**

Another radical Islamist group, Hamas was founded in 1987 as an outgrowth of the Muslim Brotherhood. The Muslim Brotherhood is a radical Sunni group that operates primarily in Egypt and Hamas grew as their political arm promoting the first Palestinian intifada in December 1987. In 1988, Hamas released an official charter and dedicated itself to the
destruction of the Israeli state and replacing it with an Islamic Palestinian government. Although Hamas’s ideology is both nationalist/separatist and religious, we use Hamas as an example of a religious group due to its goal of establishing an Islamic government in Israel and Palestine. In January 2006, Hamas won 76 of 132 seats in the Palestinian parliamentary election, and can be classified as a violent political party as well. Hamas is rumored to have somewhere over 1,000 members and has been known to use suicide bombings and rocket attacks to disrupt Palestinian-Israeli peace efforts.

Hezbollah

Hezbollah is a radical Shi’ite terrorist organization based in Lebanon. Hezbollah was formed in 1982 as a direct response to the Israeli invasion of Lebanon that was designed to destroy bases of operation for the Palestinian Liberation Organization (PLO). Hezbollah received significant funding, training and weaponry from the Iranian Revolutionary Guard and quickly became a formidable fighting force. In the early 1980s, Hezbollah was one of the first groups to popularize suicide terrorism as a tactic and has continued to use it in conjunction with rocket attacks ever since. Hezbollah states its goals to be the establishment of a Shi’ite government in Lebanon, the destruction of Israel and the removal of Western military influence in the Middle East. Experts believe that Hezbollah has around 1,000 full time members; however their base of support is much larger. Hezbollah’s political arm provides numerous social programs in southern Lebanon that the Lebanese government does not, which results in high levels of support from local populations.

The Taliban

The Taliban emerged in 1994, mostly comprised of Pashtun tribesman who took refuge in Pakistan. After being educated in Pakistan’s madrassas and trained by the Pakistani Inter-
Services Intelligence (ISI), they returned to Afghanistan and overthrew the Afghan government. Once in power, the Taliban instituted highly restrictive Sharia law. The Taliban held power in Afghanistan from 1996-2001, mostly financing itself from poppy grown in Afghanistan and monetary aid from the ISI. The Taliban was infamous for harboring terrorists, most notably being Osama bin Laden. In December 2001, the Taliban were ousted by US security forces and replaced by the Afghan Interim Authority, however the group has continued to operate as a non-state terrorist organization since that time. The Taliban has been highly lethal, having committed the most attacks in my sample, and have been well known to use suicide terrorism.

**Al-Fatah**

Palestinian activists in Kuwait founded Al-Fatah, commonly known as simply Fatah, in the late 1950s. As a secular Palestinian nationalist/separatist group, Fatah rejected the legitimacy of the Israeli state and vowed to destroy it. In 1967, Fatah aligned itself with the Palestinian Liberation Organization (PLO) and has worked closely with them since. In 1993, the Oslo Accords forced Fatah and the PLO to recognize the Israeli state and renounce terrorism. The PLO has since become a non-violent quasi-government in Palestine. While Fatah has claimed to be committed to peace, factions of the group have still been tied to active terrorist activities. Fatah is a large group, with over 10,000 members and has not been known to use suicide terrorism.

**Irish Republican Army (IRA)**

The IRA is by far the oldest and most long-lived group in this sample. Founded in 1922, the IRA has ruthlessly committed itself to the goal of a free and independent Ireland, fully independent of Great Britain. Although there was an official ceasefire in 1972, a faction on the official IRA, the Provisional IRA (PIRA), has continued the right to expel British troops from
Northern Ireland and unite the whole of the island under Irish governance. The IRA is a nationalist/separatist groups whose ideology is split between the Marxist IRA and traditionally republican PIRA. The IRA is not a large group, having approximately 1,000 members, but has still managed to survive for almost a century. The IRA has never been known to use suicide terrorism, instead opting for bombings, shootings and kidnappings.

**Kurdistan Workers’ Party (PKK)**

The PKK was founded in 1974 by a group of Turkish students of Kurdish descent who wished to incite a revolution that could result in the creation of an independent Kurdish state. As such, they are clearly a nationalist/separatist group. Following years of violence, a ceasefire was declared in 1999 and the group declared that it had renounced violence and laid out a three-stage plan for peacefully resolving the question of Kurdish independence. However, the ceasefire only lasted until 2004 and violence resumed promptly. The PKK has lost some of its previous strength in recent years but still boasts a membership of around 1,000. The PKK is one of few nationalist/separatist groups who is renowned for their use of suicide terrorism.

**Liberation Tigers of Tamil Eelam (LTTE)**

The LTTE is a nationalist/separatist group that has been active in Sri Lanka since 1976 seeking an independent state for the Tamil people of Sri Lanka. The LTTE is somewhat unique amongst the groups in this sample in that they control significant amounts of territory in their strategic environment. Notably, the LTTE was one of the worldwide pioneers of suicide terrorism, and is only surpassed by Hamas for the earliest recorded suicide attack in my dataset. The LTTE claim a membership of about 8,000.
Mujahedin-e-Khalq (MEK)

The People’s Mujahedeen of Iran, MEK, is a leftist, Iranian group that was founded in 1965 with the goal of overthrowing the pro-Western Shah Mohammad Reza Pahlavi. The group has participated in numerous anti-Western attacks over the years, including alleged participation in the 1979 Iran Hostage Crisis. The US State Department delisted the MEK from the Foreign Terrorist Organization (FTO) list in 2012, but there has been questions about potential ongoing violence. The MEK’s membership has dwindled in recent years, but numbers are still estimated to be between 5,000 and 10,000. The MEK has never had a recorded suicide attack.

New People’s Army (NPA)

The New People’s Army (NPA) is a left wing, Maoist group from the Philippines. The NPA was formed in late 1969 with the goal of overthrowing the Philippine government. The NPA is the military arm of the Communist Party of the Philippines. They NPA is rurally based but still conducts significant amounts of urban terrorism in addition to the more rural guerilla warfare. The NPA gets most of its funding from taxes extorted from businesses and donations from supporters. American authorities estimate the NPA’s membership to be around 2,000 members; however, the Philippine government claims there to be closer to 4,000 members. The NPA has not been known to use suicide terrorism as a strategic tool.

Revolutionary Armed Forces of Colombia (FARC)

Fuerzas Armadas Revolucionarias de Colombia (FARC) was founded in 1969 as an outgrowth of the Colombian Communist Party. Their main goal was to overthrow the democratic government of Colombia and replace it with a communist one. However, their activities cross the line between pure terrorist group and transnational criminal organization (TCO). The majority of their funding comes from cocaine trafficking and production, like a TCO, but they also engage in
terrorist-like activities such as extortion, kidnapping and hijacking. Despite their original goal of overthrowing the Colombian government, their current main objective is to control territory in Colombia. FARC has approximately 12,000 members, making it one of the larger organizations in the sample. By and large, they have not been known to use suicide terrorism except for in two specific instances. FARC has two recorded suicide attacks, one in 2003 and one in 2004.

**Communist Party of India (CPI)**

The group currently referred to as the Communist Party of India (CPI) is, in reality, a combination of a few formerly independent groups that merged. Among these groups are the Maoist Communist Center (MCC), People’s War Group (PWG) and Communist Party of India-Marxist (aka Janashakti). These groups all have the same goal of uniting to lead a peasant revolution to overthrow the Indian government and implement a new, communist system with no class hierarchies. The CPI is by far the most violent left wing group in India and there has been little to no success in peace talks with the Indian government. The group in its current state was founded in 2004, however the MCC was founded in 1969 and the PWG in 1980. They are estimated to have over 6,500 members and have not used suicide terrorism.

**Control Variables**

**Ideology**

For the purposes of my study, I have only selected groups in three categories of ideology. These ideologies are religious, leftist and nationalist/separatist. For the sake of simplicity, groups that could be classified across multiple ideologies have been coded based of their prevailing ideology. All of the ideologies have a mix of groups that have and have not made use of suicide
terrorism at one point or another. In my models, ideology will be operationalized as a three-level, nominal variable, where 1 codes for leftist groups, 2 codes for nationalist/separatist groups and 3 codes for religious groups. I have decided to include ideology in my model due to the fact that there have been many claims that groups motivated by religious ideologies are more likely to use suicide terrorism than other groups. While there have been many rebuttals to this notion, it does seem like we hear about suicide terrorism being used more frequently by prominent religious groups than others. I would like to determine whether it is actually religion that is the deciding factor, or if it just so happens that these are the incidents we hear about because prominent religious that we are engaged with perpetrate them.

Group Age

Group Age will be included in my model as a five-level ordinal variable. 1 codes for groups aged 1-10 years, 2 for groups aged 11-20, 3 for groups aged 21-30, 4 for groups aged 31-40 and 5 for groups older than 50 years. Controlling for group age helps to determine whether older or younger groups tend to use suicide terrorism more frequently. My theory is that older groups may be more likely to use suicide terrorism because they have had a longer lifespan to alter and adapt their strategies. These older groups will have had a longer life span and will likely have encountered the most different types of strategic environments. This could make it more likely that they adapt their strategies to include suicide terrorism.

Group Size

As with Group Age, Group Size is coded as a 5 level ordinal variable. 1 codes for groups with approximately 1-100 members, 2 codes for groups with about 100-500 members, 3 codes for groups with between 500-1000 members, 4 for groups with 1000-5000 members and 5 codes for groups with greater than 5000 active members. Group Size helps to quantify the level of
support and influence groups have. Theoretically, larger groups will have larger bases of support, more logistic capabilities and greater military influence. Most importantly, however, I have included this variable as a control because I believe that it is possible that large groups will be more likely to use suicide terrorism than smaller groups because they have more expendable members in the eyes of their leadership. Deploying 100 suicide bombers would not have a significant impact on the capabilities of a large group such as Al-Qaeda, but it would have a much larger effect on a smaller group. This may lead smaller groups to be more judicious with their use of force.

**Strength of Opponent**

*Strength of Opponent* is one of my most important control variables. This variable is codes using the Composite Index of National Capacity (CINC) scores from the Correlates of War Project. CINC scores are numerical variables assigned in terms of country-year. This score is a measure of the overall National Material Capacity of every country in the world in a given year. CINC scores are an aggregate of data points from six different components, total population, urban population, military personnel, military expenditures, primary energy consumption and iron and steel production. For the purposes of my study, I am using these scores as a measure of the overall strength of a country. One potential issue that should be noted with using CINC scores in my dataset is the time series. My time series runs from 1980 to 2014, inclusive. However, the most recent CINC scores only extend to 2007. As such, for the final seven years of my dataset, I have averaged the previous seven years CINC scores for that country and used them as my values for the final seven years.
**Presence of Foreign Occupier**

*Presence of Foreign Occupier* is another variable that has been included in order to test one of Robert Pape’s theories from his book *Dying to Win: The Strategic Logic of Suicide Terrorism*. In his book, he claims that suicide terrorism is used most often in situations where there is a foreign occupier. Many others have disputed this claim and this variable is being used in an attempt to shed more light on the matter. *Presence of Foreign Occupier* is coded as a dichotomous variable where 1 denotes that there is a foreign occupier in the conflict region and 0 indicates that there is not.

**Regional Competition**

Another popular theory that attempts to explain why some terrorist groups resort to gradually more extreme tactics is Mia Bloom’s “Outbidding Theory.” This theory claims that, when there are multiple competing groups in a conflict region, groups will compete with each other for attention and recognition by the use of increasingly more heinous and extreme acts of terror. I have included *Regional Competition* in my model as a way of testing this theory. *Regional Competition* is coded as a 3 level ordinal variable with 0 indicating that there are no rival terrorist organizations in the conflict region, 1 meaning that there is one other rival group in the region and 2 denoting that there are two or more rival groups in the conflict region.
Chapter 5 Results

The results for the main Tobit regression analysis are presented in Table 1 below. The analysis created five separate models that include various control variables and show varying results. However, despite variations in the significance of control variables present in each, the main independent variable, Hardened Target Environment, is significant across all five models. In Model 1, Hardened Target Environment is a strong, positive predictor of suicide attack use. This model indicated that groups that are operating in environments with hardened targets launch around 33% more suicide attacks. Additionally in this model, Age is a strong negative predictor of suicide attack use. We observe that for each year a group has been around, they are about 21% less likely to use suicide terrorism.

According to Model 2, Hardened Target Environment is still a strong predictor of suicide attack use, increasing the quantity of suicide attack use by 28% for groups operating in an environment with hardened targets. Age is still a significant negative predictor of suicide attack use, decreases its use by 15% for every additional year of a group’s existence. Our new control, Opponent Strength, is a highly significant positive predictor for suicide terrorism use, increasing the amounts of suicide terrorism used by groups by over 300%.

Model 3 conforms very closely with Model 2. The presence of hardened targets increases the percentage of suicide terrorism used by 25%, group age decreases the amount of suicide terrorism used by 15% and Opponent Strength increases amounts of suicide terrorism by over 200%. The additional control variable in this model is Foreign Occupier, which is shown to be a significant positive predictor of the amount of suicide terrorism used as well. The presence of a
foreign occupier in a terrorist organization’s strategic environment increases the quantity of suicide terrorism used by that group by 23%.

Model 4 shows a slight departure from the results of the first three in terms of the control variables. *Hardened Target Environment* is still a significant, positive predictor of the amount of suicide terrorism used by groups, showing a much larger 43% increase in the quantity of suicide terrorism used by groups in environments with hardened targets. *Opponent Strength* is also still a significant predictor, showing a 360% increase in the amount of suicide terrorism used by groups facing stronger opponents. In this model, however, *Age* is no longer significant at all. Interestingly, *Foreign Occupier* is still significant; however, it has changed sign to be a significant, negative predictor of suicide terrorism use. It now indicates that the presence of a foreign occupier leads to a 55% decrease in the percentage of suicide terrorism a group uses.

Finally, we add the ideological controls, *Islamist* and *Leftist*. As many would probably assume, the *Islamist* variable is a strongly significant, positive indicator of suicide terrorism use. According to this model, groups categorized as Islamist commit about 84% more suicide attacks than their nationalist/separatist counterparts do. On the other hand, groups labeled as *Leftist* seem to commit 33% less suicide attacks than nationalist/separatist groups.

The final, and most complete, Tobit model created is Model 5. This model shows the highest increase in the use of suicide terrorism for groups in hardened target environments, with a 44% increase. Strangely, despite being the strongest, most complete model, none of the control variables tested in the model came back as significant.
Table 3. Percent of Suicide Attacks based on Percent of Attacks of Hardened Targets

<table>
<thead>
<tr>
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<th></th>
<th></th>
<th></th>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>Hardened Target Environment</td>
<td>0.331**</td>
<td>0.286*</td>
<td>0.257*</td>
<td>0.433***</td>
<td>0.442***</td>
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<tr>
<td></td>
<td>(0.121)</td>
<td>(0.114)</td>
<td>(0.113)</td>
<td>(0.108)</td>
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</tr>
<tr>
<td>Age</td>
<td>-0.207***</td>
<td>-0.145**</td>
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<tr>
<td></td>
<td>(0.041)</td>
<td>(0.042)</td>
<td>(0.042)</td>
<td>(0.081)</td>
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<td>Group Size</td>
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<td>-0.109</td>
<td>-0.525</td>
<td>0.152</td>
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<tr>
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<td>(0.067)</td>
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<td>(0.078)</td>
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<td>Opponent Strength</td>
<td>3.685**</td>
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<td>3.60**</td>
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<tr>
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<td>(1.06)</td>
<td>(1.129)</td>
<td>(1.207)</td>
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<td>Foreign Occupier</td>
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<td>(0.090)</td>
<td>(.151)</td>
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<td>0.837***</td>
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<td></td>
<td>(0.198)</td>
<td>(1.234)</td>
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<td>Leftist</td>
<td>-0.334**</td>
<td>0.256</td>
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<td>(0.120)</td>
<td>(0.284)</td>
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<td>Pseudo R$^2$</td>
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</tr>
<tr>
<td>n</td>
<td>344</td>
<td>344</td>
<td>344</td>
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</tr>
</tbody>
</table>

Notes: 
Dependent variable: % Suicide 
Ordered Tobit regression estimations 
Standard errors in parentheses 
*** p < .001   ** p < .01   * p < .05

The five models that the logistic regression analysis of the secondary dependent variable are displayed in Table 2, shown below. The dependent variable in this analysis is the Years to Suicide variable, which codes for the year that each group made the switch to using suicide terrorism, if applicable. Unlike in Table 1, all models in Table 2 have a statistically significant main independent variable. Hardened Target Environment is not a significant predictor of whether or not groups will begin using suicide terrorism in Models 1, 2, and 3, but it is in Models 4 and 5. Unlike with a Tobit model, logit regressions cannot be interpreted strictly based off the
coefficients in the models. As such, we have to calculate the marginal effects for each model first. Marginal effects are presented in Table 3.

In terms of the trends observed in each specific model, Model 1 is the least explanatory. *Hardened Target Environment* and *Group Size* are not statistically significant at all. *Age*, however, is. In this model, group age is a statistically significant negative predictor of whether or not a group will begin using suicide terrorism in a given year. Here, each additional year in a group’s age results in a 12.5% decrease in the probability that a group will begin using suicide terrorism in a given year.

Again, in Model 2, *Hardened Target Environment* is still not a statistically significant independent variable. There has also been no change in the level of significance for *Group Size*. The additional new control variable, *Opponent Strength* is also not significant. *Age*, however, is still significant. As in Model 1, it is a negative predictor of suicide terrorism, indicating that each additional year in a group’s age should result in an 11% decrease in the probability of that group switching to the use of suicide terrorism in a given year.

In Model 3, there is still no change in the level of significance for our main independent variable, *Hardened Target Environment*. Incidentally, there has also been no change in the significance of the *Group Size* control variable. There has been a change to the significance of *Opponent Strength* since the addition of the *Foreign Occupier* variable. Since adding *Foreign Occupier* to the model, *Opponent Strength* has now become a statistically significant, negative predictor of suicide terrorism initiation. Meaning, there is a decrease of 265% in the probability of a group beginning to use suicide terrorism in any given year when fighting an increasingly stronger opponent. The new independent control, *Foreign Occupier*, is also significant. This model indicates that the appearance of a foreign occupying force in a group’s strategic
environment will result in a 66% increase in the chance of that group starting to use suicide terrorism in a given year.

Model 4 is first where we see a change in the significance level of the main independent variable. In this model, *Hardened Target Environment* is a statistically significant, positive predictor of suicide terrorism use. This model suggests that groups operating in an environment with hardened targets will be about 28% more likely to start using suicide terrorism in that year. *Group Size* is still not significant and *Opponent Strength* and *Foreign Occupier* have become not significant, but *Age* is still statistically significant. Additionally, the two ideological controls, *Islamist* and *Leftist*, are both statistically significant. In terms of *Age*, it is still a negative predictor of suicide terrorism, showing a 9% decrease in the chances of a group starting to use suicide terrorism for every year increase in their age. In this model, *Islamist* and *Leftist* are positive and negative predictors of suicide terrorism, respectively. In comparison to Nationalist/separatist groups, groups labeled as Islamist are about 74% more likely to begin using suicide terrorism in any given year. Conversely, Leftist groups are 27% less likely than Nationalist/separatist groups to start using suicide terrorism in a given year.

Model 5 seems to be the most explanatory model of the logit analyses and the pseudo R² value supports that statement. Interestingly, while *Hardened Target Environment* is statistically significant in the logit analysis, it is not significant after the marginal effects analysis. After the marginal effects analysis, all of the control variables except for *Age* are statistically significant. *Group Size* and both ideological controls are all significant, positive indicators of suicide terrorism use. For *Group Size*, larger groups are about 80% more likely to begin using suicide terrorism in a given year than small groups are. *Leftist* and *Islamist* ideologies also seem to increase the likelihood of groups switching to the use of suicide terrorism, with an increase of
41% for Leftist groups and a massive 99% increase for Islamist groups. Opponent Strength, Foreign Occupier and Regional Competition all seem to be negative predictors. This model suggests that groups fighting against stronger opponents are 110% less likely to begin using suicide terrorism in a given year. Groups fighting against a foreign occupier are about 24% less likely, as well. Finally, groups that have a competitor in the region are shown to be 62% less prone to switching to suicide terrorism, according to this model.

Table 4. Years to First Suicide Attack on Percent of Attacks on Hardened Targets

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<td>Hardened Target Environment</td>
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Notes:
Dependent Variable: Years to Suicide
Ordered logistical regression estimations
Standard errors in parentheses
*** $p < .001$     ** $p < .01$     * $p < .05$
Table 5. Logit Analysis Marginal Effects

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Notes:
Dependent variable: % Suicide
Ordered Marginal Effects estimations
Model Number labels correspond with model numbers in Table 4.
Standard errors in parentheses
*** p < .001     ** p < .01     * p < .05

Chapter 6 Conclusion

As we can see from the analyses listed in Table 3, the results pertaining to the main independent variable, Hardened Target Environment, are quite conclusive and support the hypothesis made in Hypothesis 1. The data shows a strong, positive relationship between the percentage of attacks against hardened targets and the percentage of suicide terrorism used by that group in that year. At the least, it indicates a 25.7% increase in the percentage of suicide terrorism used, and at the most, it suggests a 44.2% increase in percentages of suicide terrorism used, a significant figure. The major variations in the models displayed in Table 3 come in the
analysis of the additional control variables. There is little consistency in the significance and sign of most of the control variables with the exception of Group Size and Opponent Strength. Group Size is a significant negative predictor in Models 1-3 but is not significant at all in Models 4 and 5. Opponent Strength is a significant positive predictor in Models 2-4 but is not significant in Model 5. These results bear out part, but not all of the hypotheses made in Hypothesis 2. Recall that Hypothesis 2 states, “Smaller, younger groups fighting against militarily and economically stronger opponents will use a higher percentage of suicide terrorism.” The results of my analysis in Models 1-3 support the idea that smaller groups are more likely to use suicide terrorism. For every year older a group got, coefficients varied between 13.7% and 20.7% less suicide terrorism used by that group. In terms of Opponent Strength, Models 2-4 indicate large increases in suicide terrorism use against strong opponents: 365%, 238% and 360% respectively.

Interestingly, although the Pseudo R² value for Model 5 would indicate that it is the most explanatory of the five models, none of the independent variables are significant, save Hardened Target Environment. I would attribute this variability primarily to the relatively small sample size used in this study. Each model in Table 3 only includes 344 observations from 12 groups. Subsequent research should seek to increase the sample size by increasing the number of groups sampled and potentially adding additional controls. This will increase the robustness of the analysis and likely produce more accurate and consistent results.

Results of the logistic regression analysis in Table 4 and the marginal effects analysis in Table 5 are far less conclusive. After the marginal effects analysis that allows us to interpret a logit model, Hardened Target Environment was only significant in Model 9. Due to the large variability in significance of the variables tested in Tables 4 and 5, I would not feel confident making the conclusion hypothesized in Hypothesis 3. In terms of further testing of this concept, I
would again urge researchers to collect a larger sample, as the sample for this analysis only included 343 observations per model. Additionally, I would suggest that they try to create a better measure for when a group switched to the use of suicide terrorism than the one used in this study. I do believe that there is an importance to how long a group attempted conventional military tactics before switching to unconventional ones (e.g. suicide terrorism), however my analysis simply does not support that conclusion. This could partially be due to using a poor measure for the dependent variable.

While only preliminary, the results of this study do suggest a strong relationship between the presence of hardened targets and the use of suicide terrorism. This finding holds potential implications for further research and policy. In terms of avenues for further research, this study paves the way for future researchers to attempt to discover other factors that combine with the hardening of targets to increase the use of suicide terrorism, or take a more narrow approach and break down the idea of hardened targets further. It is possible that there are some types of hardened targets that experience more suicide terrorism than others do, or that there are particular characteristics of specific hardened targets that make them more vulnerable to suicide terrorism.

Regarding the policy implications of this study, it would seem that suggests that simply increasing security around a building may not actually be the most effective way to protect that building from attack. Unfortunately, the converse of increasing security, leaving buildings unsecure (or soft), is unacceptable as well because soft targets are more vulnerable to conventional attacks. This suggests that we need to devise alternative ways to prevent suicide terrorism, perhaps better early warning techniques for spotting suicide bombers before they detonate. Further research into the types of hardened targets that experience the highest amounts
of suicide terrorism would be very helpful in this regard. Knowing what types of targets experience the most suicide terrorism would allow us to structure our defenses in such a way to minimize the quantity targets we are presenting that are more vulnerable to suicide terrorism.
Bibliography


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