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I. Introduction

Political violence is an incredibly rare occurrence – and understandably so. The vast majority of individuals, if the frequency of politically motivated violent acts can be taken as any sort of reliable metric, do not believe that violence in pursuit of abstract political goals is justifiable or even pragmatic. Why, then, are certain individuals so willing to resort to killing, bombing, and burning as a means of achieving their political objectives? A preliminary look at this question might lead one to believe that the cause is weak political systems that do not allow individuals to air their grievances in an otherwise legitimate manner. However, instances of political violence are found within states that have what are considered to be strong political institutions. In fact, the so-called “paradox of terrorism” begs the question of why “terrorist groups tend to target societies with the greatest number of political alternatives, not the fewest.”¹ One of the more conspicuous exemplars of this behavior is the militant Irish Republican movement.

The Irish Republican Army (IRA) has been active in various incarnations since 1919, when members of the Irish Volunteers, the group responsible for the Easter Rising, began a protracted guerrilla campaign against British troops in Ireland. Since then, they have been performing actions that are widely regarded as terroristic in nature in pursuit of the goal of a unified Ireland. The prominence of this behavior raises the interesting question of why a notably large portion of the Irish population chose to pursue and support militarized action against British troops, Irish citizens loyal to the British crown, and other republican paramilitary groups, and felt that these actions were an appropriate tool in the pursuit of their political goals.

¹ Max Abrahms, “What Terrorists Really Want: Terrorist Motives and Counterterrorism Strategy,” *International Security* 32, no. 4 (April 1, 2008): 84.

The questions of how terrorists operate, why they decide to resort to violent tactics, and what they want are often addressed. Equally important is the question of whether or not terrorism *works*. Answers to this question in the literature are varied. For instance, Andrew H. Kydd and Barbara F. Walter begin their article “The Strategies of Terrorism” with the declarative statement, “Terrorism often works.”² They are not setting out to prove that political violence works; they are operating on the assumption. On the other hand, Max Abrahms wrote an article entitled “Why Terrorism Does Not Work” arguing that the prevailing view in the political science community that politically motivated violence is an effective strategy is not only unfounded, but also harmful to the policymaking community. Seeing as no consensus has been reached on the question of whether or not terrorism is a useful method of political change, it must be concluded that the question has not been decisively settled. In fact, a more prudent question might be “Does terrorism work *for the group in question?*” Terrorism is a notoriously fickle beast, in that there is no consensus on how the academic community should define the term. The problem is not only that terrorism is a politically and emotionally charged term. Even in a more dispassionate sense, terrorism is difficult to define because it is carried out by a variety of actors, in a variety of ways, against a variety of targets. The nebulous quality of this collection of actions makes it difficult to study, and even more difficult to draw any significant conclusions about. However, detailed analyses of terrorist groups themselves, including their political goals, methods, and levels of activity, can help scholars highlight commonalities across terrorist groups in addition to providing important information about groups both active and inactive.

² Andrew H. Kydd & Barbara F. Walter, “The Strategies of Terrorism,” *International Security* 31, no. 1 (July 1, 2006): 49.

This paper seeks to answer the question “How do groups decide between a strategy of escalation versus de-escalation?” In order to address this question, the events of the Troubles, a period of conflict in Northern Ireland that began in late 1969 and ended in 1998 with the signing of the Good Friday Agreement, will be used as a case study. The question will be addressed with the development of two game theoretic models that will be used to analyze the behavior of the actors in the Troubles. These models will be constructed and applied to view the conflict in terms that lend significance and possibly support for the use of violence when considering the alternatives available to both sides. In light of the background from which the conflict surfaced, useful information will be gathered on why violence was ramped up rather than decreased in an effort to breed cooperation. In order to limit the amount of incidents analyzed to one manageable by the scope of this paper, I will focus on a twenty-year slice of the Troubles, from 1969 to 1989, encompassing roughly two-thirds of the conflict as a whole. As a theoretical tool, game theory will shed light on the attractiveness of certain actions and outcomes over others in situations where two or more groups are in conflict with one another.

The aims of this paper are important because they seek useful information and insights into the question “Why do individuals and groups resort to political violence?” The analysis draws on an existing approach to modeling conflict while applying these methods of analysis to a well-known and highly conspicuous real world case. The use of a case study in answering this question may at first seem empirically unsound. However, due to the diversity in the methods and composition of terrorist groups, case studies are useful for highlighting similarities between groups, as well as understanding what makes separate groups unique. Terrorist attacks are by definition irregular. In-depth

understandings of active terrorist groups will prove very useful in predicting future incidents of political violence.

The first section of this paper will provide an overview of existing literature on terrorism, specifically causes of political violence and what motivates terrorists to pursue certain techniques over others. The second section will give a brief introduction to game theory as it is used in political science and briefly discuss its theoretical underpinnings (with more information offered in an appendix at the end of the paper). The third section will provide a brief outline of the historical context from which the Troubles emerged. In this section I will also discuss the goals and methods of the Provisional IRA. The importance of this segment is that it will provide all the relevant information that will allow for an analysis of the conflict. The fourth section will present the unique goal of the paper, which is a synthesis of the previous sections into a coherent whole. The main thrust of this section will be to determine if Irish republican violence, specifically the number of fatalities per year, fluctuated in response to the number of British troops stationed in Northern Ireland during this period. The final section will offer extrapolations from the conclusions drawn in the synthesis section, answer the research question of what caused political violence in the Troubles (more specifically, whether terrorist incidents increased or decreased in response to the number of British troops in Northern Ireland), and discuss possible objections to this approach and further questions for research.

II. Literature Review

This section of the paper will offer a brief overview of the current literature on the common causes of political violence. This phenomenon has a number of causes, and scholars disagree on the clearest political indicators or interactions that seem to predict the occurrence of incidents of terrorism. The papers in this section share a focus on terrorism as a tool for bringing about political change and an interest in determining what drives groups to use political violence as a vehicle for pursuing their goals.

A particularly prominent paper on the topic of political violence is “The Strategies of Terrorism” by Andrew H. Kydd and Barbara F. Walter. Their paper revolves around the assumption that terrorism works. Building on this assumption, they attempt to explain what terrorists want, what methods they use to pursue these goals, why these methods work, and what the best responses of governments are given the methods that terrorist groups employ.³ Their central argument for explaining the existence of terrorist groups “is that terrorist violence is a form of costly signaling.”⁴ They contend that terrorist organizations are often too weak to engage in conventional warfare with their adversaries. As a result, they must resort to dramatic acts of public violence that demonstrate their ability to raise the costs of defying their wishes and indicate their commitment to continuing violent conflict if their demands are not met.

Kydd and Walter delineate five distinct strategic logics that may explain the behavior of terrorist groups. The various explanations are: attrition, intimidation, provocation, spoiling, and outbidding. In short, attrition is the strategy that is adopted when a group wants to inflict heavy costs on a target group. Intimidation is when a group

³ Kydd & Walter, “The Strategies of Terrorism,” 50.

⁴ Ibid.

uses violence in a bid to control a society through fear and punishment. Provocation is an attempt to induce an opponent to retaliate with indiscriminate force, which should engender support for the group. Spoiling is an effort to upset bargaining processes that the group finds unfavorable so that they may continue to better their bargaining position or extract concessions. Finally, outbidding is a strategy undertaken by terrorists when they wish to show that they are the most committed and extreme faction representing a specific issue or population, which helps them garner support amongst those populations who desire hardline groups to represent them in bargaining situations.

Kydd and Walter conclude that closer analyses of each of the strategies that they outline will yield a more helpful conclusion as to the best response to each. They go on to say that the two most important variables in future studies of terrorist strategies are information and regime type. As far as information is concerned, they contend, “terrorism is not a problem of applying force per se, but one of acquiring intelligence and affecting beliefs.”⁵ This assertion underlies their argument that terrorist groups resort to terror tactics in an attempt to communicate their position and readiness to fight. The second variable, regime type, is important in their analysis because they note that democracies are more often the target of attrition campaigns. They hypothesize that democracies have certain features that may encourage terrorist attacks, whereas authoritarian regimes dissuade terrorist attacks due to their ability to respond with unconstrained force. This paper is important because it offers a comprehensive framework of the motivations behind terrorist behavior, but it does so in a generalized way such that these categories could apply to any instance of political violence.

⁵ Ibid., 79.

Another important paper in the analysis of terrorist behavior is “What Terrorists Really Want” by Max Abrahms. This paper presents an analysis of terrorism within a rationalist strategic framework. Abrahms explains that the strategic model views terrorists as “political utility maximizers; people use terrorism when the expected political gains minus the expected costs outweigh the net expected benefits of alternative forms of protest.”⁶ If this is truly the case, Abrahms argues that policymakers can use this information to their advantage in crafting counterterrorism policy; rational agents are, after all, easier to predict. He goes on to detail the three central assumptions of the strategic model that will determine whether or not terrorist activity can be predicted:

“(1) terrorists are motivated by relatively stable and consistent political preferences; (2) terrorists evaluate the expected political payoffs of their available options, or at least the most obvious ones; and (3) terrorism is adopted when the expected political return is superior to those of alternative options.”⁷

These assumptions ensure that terrorists are dealt with as rational agents who know what they want and wish to pursue their goals in the most effective way available to them, even if their goals are antisocial or disruptive.

However, Abrahms does not buy into the strategic model’s predictions. He believes that terrorists often behave in ways that contradict the predictions of the model. For instance, he observes, “terrorist organizations do not achieve their stated political goals by attacking civilians.”⁸ His assertion suggests that terrorism is, for clear reasons, a highly unpopular action that is sure to turn both public opinion and the opinion of policymakers against any cause associated with terrorism. Abrahms notes that it seems unlikely that politically motivated actors would knowingly engage in behavior that

⁶ Abrahms, “What Terrorists Really Want,” 78.

⁷ Ibid., 79.

⁸ Ibid., 82.

hinders the pursuit of their objectives. Another of the alleged contradictions Abrahms highlights is the fact that “terrorist organizations reflexively reject compromise proposals offering significant policy concessions by the target government.”⁹ In short, Abrahms believes that there are enough instances of terrorist groups behaving irrationally or not in accordance with their stated goals that applying the strategic model to terrorism is a foolish endeavor. Instead, he concludes that terrorists are socially alienated individuals who seek to “develop strong affective ties with fellow terrorists.”¹⁰

However, Robert A. Pape wrote a paper entitled “The Strategic Logic of Suicide Terrorism” in which he discusses just that: whether or not the use of suicide attacks as a terrorist tactic is logical and strategically beneficial. He reaches the opposite conclusion of Abrahms. Through an analysis of numerous incidents of suicide bombing, Pape concludes that suicide tactics are indeed strategically logical because they are designed for use in the pursuit of a political end, rather than being driven by pure hatred and fanaticism.¹¹ His analysis yields him five conclusions: first, the reaffirmation that suicide terrorist attacks are strategic; second, the observation that “suicide terrorism is specifically devised to coerce modern democracies to make significant concessions to national self-determination”; third, suicide terrorism is on the rise because terrorists have seen that it is indeed effective; fourth, Pape observes that while moderate terrorist campaigns are effective at eliciting moderate concessions, more ambitious and pervasive campaigns are less likely to gain greater concessions; and finally, Pape believes that the most effective way to reduce the likeliness of suicide attacks is to make terrorists believe

⁹ Ibid.

¹⁰ Ibid., 96.

¹¹ Robert A. Pape, “The Strategic Logic Of Suicide Terrorism,” *American Political Science Review* 97, no. 3 (August 2003), 2.

that they cannot carry out these attacks, through investment in border and homeland security.¹²

Pape's paper is important because it reaffirms the notion that terrorism is a strategic behavior. Indeed, Pape's argument seems to support the notion that terrorism is *by definition* rational, since most scholars hold that terrorism is politically motivated violence. Pape's paper is also important because it analyzes a specific type of terrorism. He uses a database of suicide terrorist attacks to support his conclusions and outlines a fairly extensive theoretical logic for the use of suicide attacks. This sort of in-depth knowledge about types of terrorism is useful to policymakers and academics so that they can inform themselves about why groups prefer certain types of tactics to others, and more effectively understand the logic of these differing tactics, thus allowing them to craft better policy in response. Indeed, his conclusion suggests that governments would be greatly benefitted by trying to remove the incentives to terrorism that certain groups may encounter – namely the ability of groups to carry out attacks that have repercussions far exceeding the amount of planning and materiel that went into their execution. By investing in border and homeland security, governments signal to terrorists that future attacks will be even more costly to carry out due to the additional security measures that these groups must now surmount. However, his paper obviously does not address the best way for governments to combat terrorist action, only the way that he believes is best for preempting.

While an analysis of why certain groups resort to political violence and what tactics they prefer is important, it is equally important to examine the reasons that

¹² Ibid.

nonviolence may also be a viable strategy. Maria J. Stephan and Erica Chenoweth undertook an analysis from this perspective in their paper “Why Civil Resistance Works.” As the title makes clear, Stephan and Chenoweth do not buy into the argument that “opposition movements select violent methods because such means are more effective than nonviolent strategies at achieving policy goals.”¹³ Instead they argue that many groups have adopted nonviolent strategies such as “boycotts, strikes, protests, and organized noncooperation”¹⁴ to great success. If this is true, then it is entirely understandable why their analysis is necessary amidst the literature extolling the effectiveness of violent methods of resistance, not only because it contradicts the traditional knowledge, but also because it indicates that terrorist groups and individuals considering joining these groups need not view violence as the only logical choice available to them.

Stephan and Chenoweth suggest that nonviolent resistance is not only an effective alternative to violent resistance, but that nonviolent methods are actually more effective than their violent alternatives, with nonviolent campaigns ending successfully 53% of the time and violent campaigns ending successfully 26% of the time.¹⁵ They attribute this success to two traits that nonviolent campaigns possess but violent ones lack. First, they note that nonviolent methods of resistance are able to more easily garner international and domestic support. Since violence tends to fall outside the spectrum of acceptable behavior for most people, nonviolent campaigns are able to attract support from individuals who may agree with the objectives of a campaign but may not necessarily

¹³ Maria J. Stephan & Erica Chenoweth, “Why Civil Resistance Works: The Strategic Logic of Nonviolent Conflict,” *International Security* 33, no. 1 (June 26, 2008), 7.

¹⁴ *Ibid.*, 8.

¹⁵ *Ibid.*

agree with the use of violent tactics. Second, they point out that violent resistance on the government's part is justified in response to domestic violence in terms of public opinion, whereas violence in response to a nonviolent campaign is widely unfavorable and may actually hinder the government's campaign. These two observations form the foundation that undergirds the authors' argument that violence need not be the norm in opposing unwanted social structures.

After running a sample of 323 violent and nonviolent campaigns through a statistical model, Stephan and Chenoweth conclude that resistance campaigns that manage to induce loyalty shifts among civilians and security forces are more likely to succeed. These loyalty shifts seem to be an important part of a successful campaign, and they note that none of their violent case studies managed to bring about a loyalty shift, whereas two nonviolent campaigns (East Timor and the Philippines) managed to sway the loyalty of the populace and security forces. Additionally, they conclude, "violent and nonviolent campaigns that fail to achieve widespread, cross-cutting, and decentralized mobilization are unlikely to compel defection or evoke international sanctions in the first place."¹⁶ Essentially, the ability of a campaign to accrue domestic and international support is crucial to its success, and nonviolent campaigns seem to be more adept at garnering support; therefore, it seems that nonviolent campaigns will succeed more often than violent ones. Their theoretical predictions and dataset seem to support their hypothesis that nonviolent resistance is a viable alternative to violence in civil campaigns. This paper is relevant for our purposes because we are looking for an answer to the question "what motivates political violence?" If evidence suggests that political

¹⁶ Ibid., 42.

violence is inefficient in comparison to nonviolent alternatives, then analyzing what causes it takes on a new context, one in which the actions of terrorists must be deemed ineffective and thus irrational.

A paper by Todd Sandler and Walter Enders, entitled “Transnational Terrorism: An Economic Analysis,” looks at terrorism as a phenomenon that can be explained using economic theory and game theory.¹⁷ This paper has subsections that deal with game theory and hostage taking, game theory and governmental response, terrorism in the context of rational choice theory, and a benefit-cost analysis of terrorist-thwarting policies, among other sections. In each section, Sandler and Enders briefly recap the previous literature on each of these topics. What this paper lacks is a section on the game theoretic or economic logic of resorting to political violence in the initial stages of a conflict. It is only natural to concern ourselves with the potential targets of terrorism, the goals that terrorists seek, and other post hoc considerations after the initiation of a terrorist campaign. However, game theory can also yield helpful insights about the decision to instigate a terrorist campaign against a target government.

Many of these models take the form of a decision tree.¹⁸ The merit of this particular approach is that it considers the uncertainty inherent in interactions between states and terrorists, and it considers the alternatives available to each side in a conflict. At the end of “Terrorism and Game Theory,” Sandler and Arce design a decision tree for two different games between terrorists and states: first, the choice terrorists face regarding whether they should attack tourists or businesses after a state has chosen to try

¹⁷ Todd Sandler & Walter Enders, “Transnational Terrorism: An Economic Analysis,” *European Journal of Political Economy* 20, no. 2 (September 2004): 301-316.

¹⁸ See Sandler & Enders (2004) and Sandler & Arce (2003).

to deter the terrorists; and second, the state's choice to offer concessions to either moderate or hardline factions of a terrorist group, and the resultant choice that these factions are faced with regarding whether or not they should accept or reject these concessions.¹⁹ These models implicitly assume that the actors are indeed faced with choices, and that they deliberate based on probability and reasoning. Accepting these premises leads to the conclusion that decision trees are effective models for simplifying the decision making process and modeling games between terrorists and states.

Harvey E. Lapan and Todd Sandler also use game theory to model the decision of states to pre-commit to a non-negotiation position, in which they publicly declare their unwillingness to grant terrorists any concessions. At the same time, terrorists are faced with the decision of whether or not to initiate a campaign of violence or kidnapping. It is apparent that these two decisions interact with the likelihood of one another. For example, a state would be more likely to improve its internal security if the likelihood of a terrorist attack was higher. On the other hand, a terrorist group is less likely to attack if they see that their target state has been beefing up security, which may lead them to then switch targets. In the current stage, which in this case operates on the assumption that the terrorists have succeeded in kidnapping one or more individuals, the government must decide whether or not to negotiate with the terrorists. Obviously this decision will be affected by whether or not the state has publicly committed itself to a non-negotiation position ahead of time. Lapan and Sandler's model suggests that terrorists will conclude that governments whose declarations are shrouded in uncertainty are more willing to negotiate than they initially seem, as never negotiating becomes a problematic strategy

¹⁹ Sandler & Arce, "Terrorism and Game Theory," 326 & 332.

for governments to adopt in the face of a successful terrorist campaign. In this sense, the decision to commit to a strategy of never negotiating is more an attempt to improve the relative bargaining position of the state vis-à-vis the terrorists rather than a genuine political position.²⁰ This paper is noteworthy because it parallels the decision terrorists face between escalation and de-escalation in response to some government behavior, which is a relationship that will be analyzed later in this paper.

Despite the lack of a definitive answer to the question of what causes political violence to be an attractive option for groups, the literature on the interplay of campaigns between governments and insurgent groups is rich. For instance, “The Repression of Dissent: A Substitution Model of Government Coercion” by Will H. Moore uses a statistical model to analyze the response of states to the behaviors of dissident groups. Indeed, his approach holds similar assumptions to game theory, as he expects that the behavior of the state can be predicted based on the most recent behavior undertaken by the dissident group. That is, the state chooses between repression and accommodation when deciding how to respond to dissident groups by first looking at whether or not these groups have cooperated or protested most recently. Since the players have two choices available to them, this scenario could easily be modeled using a 2x2 game.

Moore implies that dissidents and governments are both actors who are responsive to costs imposed on them from the outside. Additionally, he says that his model views the state as an actor who takes a retrospective rather than a prospective approach; the state takes its behavior cues from the past behavior of dissident groups

²⁰ Harvey E. Lapan & Todd Sandler, "To Bargain or Not To Bargain: That is the Question," *The American Economic Review* 78, no. 2 (1988): 16-17.

rather than looking to the future to predict what they may do.²¹ In a game theoretic model, we would call this behavior a “tit-for-tat” strategy; this is a strategy predicated on the notion that rounds of a game will reoccur so that both actors will have the knowledge that they must interact again in the future hanging over them. This strategy proposes that an actor should take note of the most recent behavior of an opponent actor and essentially “repay the favor” by responding in kind. So if during the last round of negotiations a dissident group defected from the bargaining process, tit-for-tat would suggest that the state should defect this time. The logic behind this strategy holds that actors should use their knowledge of the shadow of the future (the knowledge that they must continue to interact indefinitely) in order to commit themselves to credible bargaining positions.

After running the data through his model, Moore concludes that the “states tended to substitute accommodation for repression and repression for accommodation whenever either tactic was met with dissent.”²² This outcome indicates that his hypothesis was correct: states will switch strategies whenever the ones they are currently employing are met with a strategy of dissent by outside groups. He concludes that states and dissenting groups are both responsive to costs being imposed upon them and are willing to inflict costs in order to try to bring policy in line with their vision of how it should be. Furthermore, he argues that his findings support the conception of states and dissenting groups as rational agents who know what they want and undertake actions that they believe will further the pursuit of their goals.

²¹ W. H. Moore, “The Repression of Dissent: A Substitution Model of Government Coercion,” *Journal of Conflict Resolution* 44, no. 1 (2000), 108.

²² *Ibid.*, 120.

As far as I have found, this paper is only the third time that game theory has been used to analyze the IRA in any detailed way. The first analysis comes from the political scientists Steven J. Brams and Jeffrey M. Togman. The name of their paper is “Deductive Prediction of Conflict: The Northern Ireland Case,” and it presents a brief exploration of the conflict modeled with a 2x2 game, or a game in which each side has two choices available to them.²³ The authors use an approach called the “Theory of Moves” to explain the progression of the conflict over time, and why each side would make decisions based on where the current equilibrium of the game was located. The game takes place between two players: Sinn Féin / IRA and the British government. Although there were other players involved in the conflict, they focus on these two actors in order to “highlight the central conflict.”²⁴ This sort of simplification is often necessary when modeling conflicts using game theory. They ascribe two possible courses of action to each side: a hardline position, and a conciliatory position. In broad terms, these can be viewed as the decision to fight and the decision to bargain, respectively. From their model, the authors conclude that the prolongation of violence was the inevitable result of the game, because Great Britain always has an incentive to resort to violence, and the IRA has an incentive to fight under the logic of the Theory of Moves.²⁵ In other words, the decision to move away from the use of violence by one side would lead to a worse outcome for that side and a better outcome for the other. This means that any efforts to disarm one side unilaterally would be viewed with skepticism and suspicion, since this

²³ Steven J. Brams & Jeffrey M. Togman, "Deductive Prediction of Conflict: The Northern Ireland Case," *C.V. Starr Center for Applied Economics* RR# 97-29 (1997): 1-17.

²⁴ Ibid. 3.

²⁵ Ibid. 5.

would worsen their position relative to that of their adversary. Additionally, the authors conclude that the IRA and Sinn Féin only agreed to a ceasefire after it was clear that Britain would grant significant concessions. Of course, these concessions can only be viewed as significant in relation to the concessions that the IRA had received prior to the election of Tony Blair – that is to say, none.

The second paper is much more comprehensive and is entitled “The IRA's Hunger Game: Game Theory, Political Bargaining and the Management of the 1980-1981 Hunger Strikes in Northern Ireland.” It is a senior undergrad dissertation in seven chapters that analyzes the use of hunger strikes as a political tool in the Northern Ireland conflict. The author, Meghan M. Hussey, states, “The aim of this study is to refute cultural interpretations of the hunger strikes and to show that they were in fact a case of political bargaining.”²⁶ She portrays the hunger strikes as a game of chicken in which both sides try to outlast the other and absorb more costs in an effort to “win” by bettering their bargaining positions. Hussey also uses the Theory of Moves in her analysis, and justifies this decision by explaining that the Theory of Moves considers the possibility (and in reality, the certainty) that actors consider the moves of their opponents before choosing their own move. This means that rational actors may not always choose what appears to be the dominant strategy from the perspective of game theory, because alternative strategies may be more effective down the road after a few rounds of the game.

In both of these instances where game theory is used to analyze the conflict in Northern Ireland, the focus is on the strategies of the actors once the conflict has been

²⁶ Meghan M. Hussey, “The IRA's Hunger Game: Game Theory, Political Bargaining and the Management of the 1980-1981 Hunger Strikes in Northern Ireland,” Senior Honors Thesis, (The University of Pennsylvania: 2012), 17.

initiated. Similarly, this paper analyzes the decision to use violence in response to the choices of the opposing player with a game theoretic model. Because of the emphasis on the ongoing nature of the conflict, this paper will also give a brief overview of the Troubles in Northern Ireland, in order to familiarize the reader with the dynamics of the conflict both before and after the initiation of the conflict. Once the model and the historical context have been established, a synthesis of the two will follow.

III. Underpinnings of Game Theory

This paper will develop two models rooted in game theory in an attempt to glean theoretical insight into the IRA's decision to resort to violence. The first model constructed will be in the form of a 2x2 game, in which the strategies "increase fatalities" and "decrease fatalities" will be available to the IRA, and "increase troops" and "decrease troops" will be available to the British government. The second model will be a decision tree based on the ones Sandler and Arce created to model the options that terrorists face when choosing their targets and the choice governments face between offering concessions to hardline factions and offering concessions to moderate factions. Their model will be adapted to explain the decision both sides faced between escalating and deescalating the conflict. However, because the underlying structure of game theory as a tool is largely secondary to the goals of this paper, the bulk of the information regarding the construction of each model will be placed in an appendix at the end of the paper.

Game theory holds explanatory value because it allows for the construction of models rooted in mathematics that can easily be applied to situations in which two or more actors are in conflict with one another and are both deemed to be rational.²⁷ The term rational in this context simply means that the actions of each side can be predicted under the premises set out by rationalism, namely the idea that actors have preferences and can order those preferences. The laxity of this definition is especially important for explaining violence, because it means that even if an actor is pursuing a morally reprehensible goal (as terrorism is often said to be), that actor may still be considered rational as long as they hold that preference above some other alternative. In addition to

²⁷ Lacramioara Pavel, "Basics of Game Theory" in *Game Theory for Control of Optical Networks* (New York: Birkhäuser, 2012), 11.

actors being able to order their preferences, these preferences must also be transitive. For instance, if a terrorist group prefers a bombing to a kidnapping, and a kidnapping to doing nothing, it must follow that that group prefers a bombing to doing nothing. If this were not the case then there would be no way to logically predict the behavior of this terrorist group, since there would always be some other course of action that they prefer to a given action.

Game theory relies heavily on the use of probabilities and formalization of assumptions.²⁸ Probability is important in a 2x2 game because it allows actors to predict the behavior of their counterparts and choose the best strategy available to them in response to that of the other player. Probability is equally, if not more, integral in a decision tree, where numerical likelihoods are assigned to each branch, and total probabilities are calculated at each terminal node of the game, where the actors are no longer faced with a decision but rather an outcome. However, dealing with probabilities is tricky and finicky business. As this paper will contain no mathematics beyond the basic explanation of game theory, assigning probabilities to the likelihood of outcomes will not fall within the purview of this paper. However, this does not diminish the usefulness of using mathematical predictions in theory. The formulation of equations that could potentially predict the likeliness of a given course of action for a terrorist group or state is helpful in providing a theoretical framework from which policymakers can gain an understanding about how these groups operate. Additionally, these equations would prove useful should a sufficiently knowledgeable individual attempt to approximate probabilities and thus reach conclusions based on the equations.

²⁸ Ibid.

I will begin by explaining the logic and assumptions behind a 2x2 game. The purpose of a 2x2 game is to lay out and simplify the interactions of two actors. An important component of this process is the assignation of utility values to the preferences of the actors. Utility measurements help not only in comparing the preferences of actors with other preferences that they hold, but also in comparing outcomes between two or more actors. Of course, this process is subjective and inexact, a reflection of the uncertainty with which states and nonstate actors interact with one another. This uncertainty is why it is so crucial that the preferences of the actors can be ordered and that they are transitive. Confirming that preferences meet these criteria ensures that there is some logic behind modeling strategic interactions. If actors could not reasonably be deemed rational then there would be no purpose in modeling their interactions.

At the most rudimentary level, strategic interactions between two actors can be depicted in what is referred to as the normal form. The normal form is the most common and simple way to model actor interactions.²⁹ In short, “A game written in this way amounts to a representation of every player’s utility for every state of the world, in the special case where states of the world depend only on the players’ combined actions.”³⁰ Utilities are assigned to outcomes and then displayed in the form of the game, operating on the assumption that the choices of each player are the only variables affecting what happens in the world – or at least the world as it pertains to them. A normal form game assigns utilities to various possible outcomes and thereby ranks those outcomes in order of their desirability to the players. The games modeled for the purposes of interactions

²⁹ Ibid., 16.

³⁰ Yoav Shoham & Kevin Leyton-Brown, "Introduction to Noncooperative Game Theory: Games in Normal Form," *Multiagent Systems: Algorithmic, Game-Theoretic, and Logical Foundations* (New York, NY: Cambridge University Press, 2009): 55.

between states and terrorist groups are considered to be zero-sum, because a strategic gain for one player is a strategic loss for the other. Models that present zero-sum games “represent situations of pure competition,” which is another way of saying that a gain for one player is a loss for another. In other words, the actors in these games have no incentive to cooperate with one another. Depicting a game as zero-sum necessitates that no more than two players be involved in the game.³¹ This particular type of game is very useful in explaining interactions between political entities with conventional military capabilities because the interactions can be simplified to those that occur between two major actors, and they represent actors who have little interest in cooperating with one another, which is unfortunately often the case in violent conflicts.

A specific type of normal form game that takes place between two players is the prisoner’s dilemma – the classic example that comes to mind when people think of game theory. In a prisoner’s dilemma,

“the players of the game are two prisoners suspected of a crime... The prisoners are taken to separate interrogation rooms, and each can either “confess” to the crime or “deny” it (or, alternatively, “cooperate” or “defect”). If the payoff are all nonpositive, their absolute values can be interpreted as the length of jail term each of prisoner gets in each scenario. [sic]”³²

The prisoner’s dilemma has obvious implications for international relations. First, in a scenario of potential conflict, it makes sense that payoffs could be either positive or nonpositive, because outcomes could deviate either way from the status quo (by bettering the position of an actor or worsening their position). Second, in its simplest form the game is played between two actors whose actions affect the outcome of the other.

³¹ For a very brief proof of this, see Shoham & Leyton-Brown, “Introduction to Noncooperative Game Theory: Games in Normal Form,” 58.

³² Ibid., 56.

Additionally, strategies are chosen based on what the other actor is *expected* to do. Third, decisions are made with incomplete information about the preferences of the other actor. In the prisoner's dilemma, it is unclear if the other player will defect since you have no way to speak to them and they have no way to credibly commit to not defecting. Furthermore, since defection is the most attractive option for the other player, it is only rational for one to assume that one's opponent will choose to defect, thus making defection the most attractive strategy as well (this is a situation known as a dominant strategy, which will be explained later).³³ This incentive to defect means that it is logical for both parties in a potential dispute to pursue strategies that lead to a suboptimal outcome for both of them, since they would be worse off by pursuing their alternative strategy if the other player did not reciprocate.

The application of this model to international relations is readily apparent. International relations are characterized by a state of persistent uncertainty. States must make decisions that directly affect their relationship with other states, and often they must make these decisions with incomplete information about what other states prefer. Even if states are overt in naming their preferences, there is always the possibility that they are intentionally misleading other states in order to make their bargaining position more favorable. Prisoner's dilemmas are helpful in modeling bilateral interactions and can help to explain some of the outcomes that arise from these interactions. They ascribe certain traits to each actor and predict the most beneficial course of action for each player in a way that boils interactions down to their core elements – uncertainty, and the desire of each player to better their standing relative to the other.

³³ Pavel, "Basics of Game Theory," 24.

An alternative game theoretic approach to modeling state interactions is the decision tree or game tree. This model is a series of branches, with each node representing a potential decision that an actor can make and each branch leading to a different node that represents a probability. This approach is particularly useful because it can cover more potential outcomes than a 2x2 game can. Whereas 2x2 games must simplify decisions to binary “yes or no” scenarios, decision trees can be more nuanced in their approach. However, game trees make it less clear what the dominant strategy is because it is not as easy to spot dominance. 2x2 games assign utility values to different possible states of the world, whereas game trees assign probabilities. This means that each terminal node (a node that does not branch further) will have a probability equivalent to the value of each branch leading to it multiplied together. However, in spite of the fact that game trees allow for more nuanced analyses, it is important to remember that they are still oversimplified representations. Because all of the end probabilities summed together equal one, using this model tacitly assumes that one of the outcomes listed will be the actual outcome.

Another important aspect of a game tree is that it can represent the actions of one player or the interactions of two players. Each successive layer of decisions can represent the next logical choice a player faces or the decision made in response to a player’s choice by another player.³⁴ For instance, Sandler & Arce use both of these game tree types in their paper “Terrorism and Game Theory.” First, they model the decision terrorists face between choosing businesses or tourists as their targets. They represent the probability of success and failure for these differing campaigns using equations. Next

³⁴ Ibid., 14.

they model the interplay between government concessions and terrorists using a game tree involving more than one player. The model deals with the distinction between moderate and hardline factions within terrorist organizations. The government faces the choice between which faction to offer concessions to, and the terrorist faction then has the choice to either accept or reject the offer.

I will conclude this section by briefly recapping the individual merits of each form of game theoretic modeling. A 2x2 game is useful in highlighting the strategic interplay between two (or sometimes more) actors. Assigning a utility value to each possible outcome of the world is helpful for ordering the preferences of each actor and determining what strategy an actor is likely to play. Additionally, the layout of the game is helpful for spotting potential points of equilibrium and reaching conclusions about behavior that may not otherwise be readily apparent. Spotting these equilibriums can help researchers understand why negotiations may be stalled and why relationships between actors may be violent even when peaceful alternatives that are attractive to both sides exist.

IV. The Troubles and the Emergence of the Provisional IRA

The late 1960s in Ireland were a time of social and political turmoil. After the collapse of the original IRA (itself an offshoot of the Easter Rising), those individuals still interested in pursuing a unified Ireland shifted their focus to nonviolent alternatives, at least for a short time. After the failure of the IRA to realize their agenda through political violence, members of the IRA instigated a civil rights campaign, albeit one contained “within a radical republican ideological framework.”³⁵ The impetus for this movement was the poor treatment of Catholics in the north, who were demanding civil status on par with that which their Protestant counterparts enjoyed. These demands, rooted in the militant republican movement that had collapsed only a few years earlier, were perhaps more contentious than they would have otherwise been, considering that for many Protestants the demand for these rights was tied to a movement that was responsible for the deaths of hundreds of Protestants and British loyalists.³⁶ The perceived intractability of this conflict led each of these two communities to maintain a sense of irreconcilability when thinking about resolving the conflict.

This tension has a noteworthy basis in the theoretical literature on violent conflict. In “Rationalist Explanations for War,” James Fearon argues that one possible cause of conflict between two groups is issue indivisibility, or the idea that “some issues, by their very natures, simply will not admit compromise.”³⁷ The underlying assumption here is that some issues lead to conflict because both sides perceive them as zero-sum in a way

³⁵ Richard English, *Armed Struggle: The History of the IRA* (Oxford: Oxford University Press, 2003), 88.

³⁶ Ibid. 81-82.

³⁷ James D. Fearon, “Rationalist Explanations For War,” *International Organization* 49, no. 3 (1995), 382.

that does not allow for negotiation. In other words, a gain for one side is necessarily a loss for the other. It is important to note that this difficulty is almost never the case in reality, and that this tension is instead brought about by the *perceptions* of each group. Claims such as “We will never negotiate with terrorists,” one often made by governments, highlight that these perceptions are very real. The fact that a group has resorted to violence in order to extract concessions from a government indicates that the issue or issues that drive them are important enough to fight for. On the other hand, the willingness of governments to fight back and their unwillingness to grant the concessions that terrorists are interested in indicates that issue indivisibility is a very real perceptual problem hindering conflict resolution. This problem can also help to explain why the civil rights movement eventually turned violent again – and why another incarnation of the IRA eventually surfaced.

The emergence of the Provisional IRA from the IRA can be explained in a number of ways. Indeed, no one factor can fully encapsulate why the Provisionals decided to split from their parent organization. However, a few different factors taken together can explain this event in a satisfactory way. The first, and probably the most important factor that helps explain the formation of the PIRA³⁸ is the mounting tensions that the civil rights movement caused in the late 1960s. During this period, sectarian friction had been increasing, with people “coming out to defend their homes... so you had then the formation really of the defence, a defence mentality, and everyone was looking for guns to defend their areas.”³⁹ This situation illustrates a small-scale security

³⁸ The abbreviation “PIRA” will be used to refer to the Provisionals to avoid confusion with the IRA, despite the fact that the Provisional IRA is often referred to as the “IRA.”

³⁹ Rogelio Alonso, *The IRA and Armed Struggle* (New York: Routledge, 2003), 42.

dilemma, in which two sides that both have a mutual interest in not fighting one another end up arming anyway, because they cannot credibly commit to refrain from attacking each other. English argues that “the maintenance of internal discipline, of training and of a military sharpness [within the IRA] had seemed important to dissidents before the August 1969 attacks on northern Catholics; after the events of that month, they seemed essential.”⁴⁰ These attacks served to reinforce the notion that the IRA was acting as the necessary defenders of the Catholic community. Liam McAnoy, an ex-IRA soldier, explains how “the police had withdrawn from Catholic communities” in August of 1969, leaving the security vacuum to be filled by Catholic and nationalist paramilitaries.⁴¹ Part of the reason the Provisional IRA formed at the time that it did was the growing sentiment among Catholics that sectarian tension in Northern Ireland mandated a defense force that was capable of holding its own against British forces and its loyalist supporters.

Another factor that helps explain the formation of the Provisional IRA was disagreement over whether Irish nationalists in political positions should boycott parliamentary positions that were being offered to them by the British government. The more hardline Irish republicans believed that sending representatives to parliament would be to “legitimize the illegitimate.” These hardliners believed that to participate in the British government would be to tacitly acknowledge its authority over Ireland. Interestingly, many of these nationalists believed that agreeing to take seats in the British parliament would undermine the military capability and legitimacy of the IRA.⁴² Perhaps their belief was that their fight would be delegitimized even further if they agreed to take

⁴⁰ English, *Armed Struggle*, 107.

⁴¹ Alonso, *The IRA and Armed Struggle*, 47.

⁴² English, *Armed Struggle*, 107.

seats, because the use of violence would be seen as being at odds with their political involvement. By abstaining from participation, they could at least make the claim that they viewed British political institutions as illegitimate and foreign. Those individuals who felt that the nationalist Irish community should abstain completely from political participation with the British were the same individuals responsible for the formation of the Provisional IRA.

A final reason bears mentioning – and it is one that should not be taken lightly. The primary goal of the IRA was to combat the British presence in Ireland. It is only fitting that the subsequent armies that emerged from it would view this as their primary goal as well. That is to say, the perceived need to combat British troops helps explain the emergence of the PIRA. Seamus Lynch, another former member of the IRA, alludes to the idea that the British were seen as “the imperialist enemy”⁴³ by many in Northern Ireland, especially Irish citizens who were actively involved with the IRA. This point is important because it helped to legitimize the conflict for a larger swath of the population. While the number of individuals who believed that terrorism would be acceptable in fighting the British was quite low, the number of citizens who could be persuaded to support violence in opposition to an occupying force was much higher. This distinction in terms was achieved by appealing to notions of nationalism and self-defense. Indeed, IRA propaganda apparatuses found it politically prudent to portray the British as the initiators of the conflict by virtue of their illegitimate occupation of Northern Ireland. Tommy Gorman, an IRA soldier who joined the struggle in 1970, describes the goal of the Provisionals in a way that is both tactical and strategic at once:

⁴³ Alonso, *The IRA and Armed Struggle*, 41.

“We were creating this idea that the British state is not your friend ... and at every twist in the road they were compounding what we were saying, they were doing what we were saying, fulfilling all the propaganda ... the British Army, the British government, were our best recruiting agents.”⁴⁴

Pointing out the acts of violence committed by the British while in Northern Ireland was a powerful strategic decision. By inundating Irish citizens with stories of dead Catholic citizens and families torn apart, the struggle with Britain was thoroughly legitimized in the minds of the Irish citizenry.

In its infancy, the Provisional IRA emphasized the importance of defending the Catholic community. Importantly, though, the perception of the British army that the IRA was working hard to create essentially conflated “defence and anti-imperialist offence,” which helped the IRA to justify the offensive campaign that it was initiating.⁴⁵ By October of 1970, the Provos had begun a new bombing campaign in Ireland. After the leadership of the Provisional IRA sanctioned attacks on the British Army in the early weeks of 1971, the bombing campaign eventually escalated into systematic attacks on military personnel stationed in the north. By February 6th, the British soldier Robert Curtis had become “the first British soldier to be killed in the modern troubles.”⁴⁶ Perhaps counterproductively, these attacks reiterated to the British army that their presence was still needed in Northern Ireland. As the PIRA shored up its forces and strength in relation to the British military, they began to feel more confident in both their attacks on the British and their political goals, eventually “demanding a complete British withdrawal from Ireland and saying that they would replace both states with a 32-county

⁴⁴ English, *Armed Struggle*, 122.

⁴⁵ Ibid. 124.

⁴⁶ Ibid. 137.

socialist republic.”⁴⁷ The rise of the Provisionals saw the beginning of attritional campaigns on both sides of the conflict, with each party “holding that the other’s atrocities demanded a response in kind.”⁴⁸

Hostilities toward the British Army were stoked by these retaliatory shootings, and anger directed at the British eventually led to the introduction of internment without trial in Northern Ireland, a power that the Northern government held and invoked for a period with the permission of the British government. The emphasis of these internments was on Catholics and suspected members of the IRA, although some loyalists were rounded up as well.⁴⁹ The treatment of Catholics by the British military stoked Catholic rage and led to an increase in IRA attacks, with thirty British soldiers being killed in the last few months of 1971.⁵⁰ For many Catholics, this period cemented the idea that the conflict was unequivocally sectarian, with the British Army’s main goal being to repress Catholics and to strengthen the power of the loyalist majority in Northern Ireland. It didn’t help the situation that the Royal Ulster Constabulary, the police force in Northern Ireland, were largely Protestant and worked with the British to hinder the military progress of the PIRA, providing another highly visible target for the Provos. One motive for these attacks was to discourage people from joining organizations with whom the Provisionals disagreed politically, or who actively antagonized the Provisionals, such as the RUC.⁵¹

⁴⁷ Tommy McKearney, *The Provisional IRA: From Insurrection to Parliament* (London: Pluto Press, 2011), 73.

⁴⁸ English, *Armed Struggle*, 137.

⁴⁹ Ibid. 139-142.

⁵⁰ M. L. R. Smith, *Fighting for Ireland? The Military Strategy of the Irish Republican Movement* (London: Routledge, 1995), 101.

⁵¹ Ibid. 99.

By the beginning of 1972, terrorist activity in Northern Ireland had increased to an all-out offensive, with the incidence of the use of car bombs rising. Car bombs were particularly effective because they made the transportation and detonation of explosives much simpler and less suspicious. After three months of bombings, the PIRA offered a brief military truce to the British and offered them terms for an end to the conflict.^{52,53} However, the British, predictably, did not meet the Provisionals' demands to completely remove their military presence in Northern Ireland, abolish the pro-British Stormont government of the north, and grant amnesty to political prisoners.⁵⁴ These clearly contentious demands were hardly even taken seriously by the British government. Indeed, it is difficult to say whether the Provos leadership genuinely believed that they had an appreciable chance to receive these concessions or if they were simply posturing to show that they had a strong set of demands that they were willing to publicly call for. There would be a sort of perverse logic to the PIRA issuing demands that they knew would not be met, as doing so would indicate that they perceived themselves to be in an advantageous bargaining position. However, after 72 hours the two sides could not reach an agreement, and the Provisional IRA resumed its campaign.

Despite the fact that processions were forbidden in the north, the Northern Ireland Civil Rights Association organized an anti-internment march that took place on 30 January. The British decided to deploy troops to contain the march rather than shut it down, possibly because of the fact that several thousand people turned out. An altercation ensued at a barricade, with some of the march participants climbing over and

⁵² Ibid. 103.

⁵³ Edgar O'Ballance, *Terror in Ireland: The Heritage of Hate* (Novato, CA: Presidio Press, 1981), 169.

⁵⁴ Ibid.

allegedly attacking the soldiers with stones.⁵⁵ The British responded by opening fire on the crowd and killing numerous protestors. An inquiry performed four decades later by Lord Saville of Newdigate suggests that the shooting of the unarmed protestors was entirely unjustified, as they were not posing any direct threat to the British Army.⁵⁶ This is not to suggest that the British were entirely at fault for the events of Bloody Sunday. As the report goes on to note, it is unclear if the soldiers thought that perhaps they were addressing a preemptive threat by opening fire. This incident instead shows that, with or without good reason, the pressure on the British soldiers in Northern Ireland had reached a fever pitch, with acts of violence occurring spontaneously and frequently. Thirteen individuals were killed that day, with a fourteenth dying later from fatal injuries.

The other side of this relationship is the British government and Army. With Operation Banner the British government began a campaign to repress dissident and terrorist groups in Northern Ireland. Troops were surged into the North beginning in 1969 in order to supplement the security forces and British troops already operating there. The specifics of the operation are covered in a review conducted by the British military entitled “Operation Banner: An Analysis of Military Operations in Northern Ireland.” The purpose of this report is to discuss the successes and failures of a campaign that was one of “the longest to date; one of the very few waged on British soil; and one of the very few ever brought to a successful conclusion by the armed forces of a developed nation against an irregular force.” Indeed, the Troubles comprised “the largest deployment of

⁵⁵ English, *Armed Struggle*, 149.

⁵⁶ Mark Oliver Saville, William L. Hoyt, and John Toohey, *Report of the Bloody Sunday Inquiry* (London: Stationary Office, 2010), Vol. I, Ch. 3, para. 3.79.

infantry and infantry-rolled troops [by the British Army] since the Second World War.”⁵⁷

The Troubles represented a significant resource sink for the British Army; at the beginning of the campaign only three battalions had been deployed in the North, but by the peak of Operation Banner over 28,000 soldiers were stationed in Northern Ireland.⁵⁸ While the technical military result of the campaign was a stalemate, it is important to note that the operation was a success in that it demonstrated that the IRA could not hope to win its campaign through violent means.⁵⁹ I will give a brief overview of the progression of the operation and then proceed to the next section.

The official British report on Operation Banner divides the campaign against the IRA into four phases that they believe are clearly partitioned in retrospect. The first phase, they claim, was characterized by “wide public disorder” and took place from the beginning of the attacks by the Provisionals until the summer of 1971. During this period, the PIRA seems to have been making their presence known more than anything else with the use of “marches, protests, rioting, and looting.” The second phase can be described best as the beginning of an insurgency. During this period, both the Official IRA and the Provisional IRA engaged in firefights with British troops and Northern Irish security forces. Indeed, both of these organizations were structured in the style of conventional militaries, giving this phase of the conflict the impression of a civil war. The British military launched Operation Motorman in response in an effort to disrupt both campaigns and regain control over the regions. The Official IRA eventually issued

⁵⁷ Ministry of Defense, *Operation Banner: An Analysis of Military Operations in Northern Ireland*, prepared under the direction of the Chief of the General Staff, Army Code 71842, Whitehall, Westminster, London: July 2006, i.

⁵⁸ Ibid., 1 - 2.

⁵⁹ "Army Paper Says IRA Not Defeated," BBC News, July 6, 2007.

a ceasefire, which it has not broken since, while the Provisional IRA took the mid-1970s to begin their transition into a terrorist organization. The third phase encompasses the longest and most successful period for the IRA, with their campaign of terrorist violence in Ireland, Britain, and mainland Europe, in addition to the involvement of Sinn Fein in British and Irish politics, demonstrating the rapid rise of their cause. While neither side won a definitive victory, the British military considers the Provos to be “one of the most effective terrorist organisations in history.” The PIRA declared a ceasefire in 1994, and the Good Friday Agreements of 1998 brought the majority of serious fighting to a definitive close.⁶⁰

⁶⁰ Ministry of Defense, *Operation Banner*, 1 - 3.

V. Model Application

The purpose of this section will be the synthesis of the preceding sections. The brief historical overview of the Troubles will be used as a frame of reference through which to analyze the progression of the conflict from its beginning through the following twenty years. The intention of this section of the paper is not to make the reader an expert on the progression and causes of the Troubles. Rather, we seek herein to offer evidence in our attempt to answer the question “What factors influence a group’s decision to escalate a conflict rather than deescalate?” Tentatively, the answer is because it makes more strategic sense to escalate in pursuit of one’s goals. But this is not in itself an answer; it is simply the identification of a trend. This section, then, will attempt to fill in the gaps that are left after showing that political violence is strategically sensible.

Analyzing the overall trend of escalation versus de-escalation present in the Troubles will be an exercise in finding relevant statistics to compare between the two groups over time. For the sake of simplicity and accuracy, I will use the number of fatalities caused by Provisional Irish Republican Army terrorism every year as a measurement of the level of republican activity. The number of fatalities caused by PIRA attacks per year will be used as a rough proxy for level of activity. Additionally, this analysis operates on the assumption that the behavior of the Provisional IRA (in the form of either increases or decreases in fatalities from year to year) can be predicted by, or at least correlated with, some action undertaken by the British military. The data for this half of the relationship will come from Richard English’s “Armed Struggle: The History of the IRA,” the concluding section of which contains data on the number of

fatalities inflicted every year by the Provisional IRA and overall.⁶¹ The yearly breakdown of the data will allow for the application of a prisoner's dilemma scenario from year to year. Because the conflict was so protracted, the game can be constructed as an iterated one, in which both players know they will have to interact with the other player again in the future. Additionally, the knowledge that the conflict will be continued into the future justifies the Theory of Moves' assumption that actors will consider the choices of their opponents when making decisions. For these reasons, we will take for granted the knowledge that the players are well aware of one another's intentions and consider these when making decisions.

On the other side of the game will be the British military. I will use the number of troops the British government decided to station in Northern Ireland per year as a metric to measure their willingness to fight over time. If the British desired a more active approach in the North, either due to domestic pressure or increased attacks by militant Irish republicans, then this desire would almost inevitably manifest itself in more troops being stationed in Northern Ireland. Similarly, if domestic pressure turned against the campaign, or perhaps if casualties the previous year became too costly, the next year would likely be characterized by a decrease in the number of stationed troops. The data for this portion will come from the University of Ulster's Conflict Archive on the Internet (CAIN), which contains data that relates to the Troubles and conflict in Northern Ireland during this period. The archive compiled a table of the number of troops present in Northern Ireland from year to year, drawing on sources such as Brigid Hadfield's

⁶¹ English, *Armed Struggle*, 379.

Northern Ireland: Politics and the Constitution,⁶² various Irish almanacs and yearbooks spanning the years 1997 to 2000,⁶³ the Northern Ireland Annual Abstract of Statistics (1994),⁶⁴ and what they refer to as “various press reports.” However, because this data is incomplete for some years, I will only use the number of troops that were stationed in the North between 1969 and 1989. A 20-year period should be sufficient in determining whether any cursory relationship exists.

I will use all of this data (the number of fatalities inflicted by the Provisional IRA and the number of troops stationed in Northern Ireland each year) in an attempt to determine if there is a cursory relationship between the number of casualties and the number of troops.

H₁: I predict that an increase in the number of troops in one year will be followed by an increase in the number of casualties inflicted by the Provisionals in the next year.

In other words, I believe that the Provisional IRA will increase casualties in a year preceded by a year wherein the British Army sent more troops to the North. However, the lack of more telling data precludes this analysis from being statistically significant. Therefore, the only relationship this paper will attempt to identify is a tentative correlative one, but certainly not a causal one. If a correlation between these two

⁶² Brigid Hadfield, *Northern Ireland: Politics and the Constitution* (Buckingham: Open University Press, 1992).

⁶³ Pat McArt, *Irish Almanac and Yearbook of Facts 1997: The Ultimate Annual Irish Almanac and Annual Book of Facts* (Derry: Artcam Pub., 1997); Pat McArt, *Irish Almanac and Yearbook of Facts 1998: The Ultimate Irish Reference Book* (Derry: Artcam Pub., 1998); Pat McArt, *Irish Almanac and Yearbook of Facts 1999* (Inishowen, Co. Donegal: Artcam Ireland, 1998); Helen Curley, *Local Ireland Almanac and Yearbook of Facts: 2000* (Millennium ed. Dublin: Dufour Editions, 1999).

⁶⁴ *Northern Ireland Annual Abstract of Statistics*. Belfast: H.M.S.O., 1994.

variables does exist, it is undoubtedly possible that a causal relationship exists. While I will speculate as to the nature of possible relationships between the variables in the concluding section, I will not offer these as findings from the analysis contained here, but rather as mere conjecture.

My second hypothesis is that the leadership of the Provisional IRA will be vocal in their attempt to explain why they chose to utilize violence. The leadership of the Provisional IRA had an incentive to explicitly state their terms and demands in an attempt to bring about the changes they wanted from the conflict.

H₂: The statements of IRA leaders will indicate a willingness to prolong the conflict, and the presence of British troops will be used as a justification for violence.

This could manifest in a few ways. Explicit justifications of violence in response to a British occupation, incursion, or some similar term, would certainly be taken as evidence of this. Similarly, any appeals to self-defense, community defense, or similar explanations would support the hypothesis that IRA leaders were vocal in their blame of the British.

I will begin by applying the relevant labels to the 2x2 game explained more in depth in the appendix. For the sake of simplicity, I will take the British Army and Government to be a monolith, in that the Army obeys the dictates of the Government and can thus be taken as one actor. The reality is of course much more complicated than that. However, as far as troop deployment itself is concerned, it is safe to group the two entities together. I will focus on the fatalities caused by the Provisional IRA, as they were the most active Irish republican group during the Troubles, responsible for nearly

1,800 deaths by the end of the roughly 35-year conflict. Because I am operating on the assumption that the behavior of these actors is interdependent, and because I am specifically looking to see if the number of fatalities caused by the Provisionals during this period is responsive to the number of troops that the British stationed in Northern Ireland each year, the game will be set up in a way that emphasizes the choices available to the Provos in each iteration of the game. For the sake of simplicity, in this game the IRA will have the binary decision between either increasing the number of fatalities they inflict in the coming year or decreasing the number of fatalities. On the other hand, the British will have the choice between increasing the number of troops in the North or decreasing the number of troops. While the specific actions available to each player are different, they each fit the general archetype of escalation (more fatalities and more troops) or de-escalation (fewer fatalities and fewer troops).

Because we are looking to see if IRA behavior is responsive to the actions of the British government, we will set up the game so that the British government is player 1. There are four possible outcomes for each actor: more troops and more fatalities, more troops and fewer fatalities, fewer troops and more fatalities, and fewer troops and fewer fatalities. It is easy enough to spot that fewer troops and fewer fatalities is the ideal outcome for the British, because they achieve their desired result (fewer fatalities) while using less resources on the conflict. Therefore, we will assign this outcome a utility of 4 for the British government. Because preventing fatalities is the foremost priority of the British government in this game, the next most preferable outcome for the British would be more troops and fewer fatalities, because they are achieving their goal, albeit at the cost of more resources in the form of troops. We will assume that the next most

preferable outcome for the British is more fatalities and more troops, since they will be in a better position to combat IRA attacks with more troops stationed in the North. Finally, the least favorable outcome for the British will be fewer troops and more fatalities, since this outcome would signify a beneficial shift of power towards the IRA. The information above can be expressed concisely with the following partially completed game:

		IRA	
		> Fatalities	< Fatalities
BG	> Troops	2	3
	< Troops	1	4

The utility values for the IRA will be similar to those of the British government, although in a symmetric fashion. First, it seems clear that they will prefer to inflict more fatalities while facing fewer British troops in Ireland, since the purpose of their campaign is inflicting enough costs on the British Army to persuade them that the campaign in Northern Ireland is no longer worth pursuing. The next most favorable outcome for the

IRA would be more fatalities and more troops, since more troops would generally offer them more opportunities to inflict fatalities. The next most favorable outcome is fewer fatalities and fewer troops. Should they decide that for whatever reason an escalation of fatalities into the next year is not worth pursuing, it seems apparent that they would prefer that the British also choose a strategy of de-escalation in the form of fewer troops. Finally, the least favorable outcome for the IRA is fewer fatalities and more troops, which signifies a shift in power towards the British. The information above can be expressed in the following completed game:

		IRA	
		> Fatalities	< Fatalities
BG	> Troops	2 , 3	3 , 1
	< Troops	1 , 4	4 , 2

The game illustrates two things of interest. The first, and most noteworthy, conclusion we can reach from analyzing the game is that more troops and more casualties is an equilibrium point for both of the actors. And indeed, in the strategic logic of the

conflict, this outcome makes the most sense, because each side is playing their preferred strategy and neither one seems to have an incentive to change their strategy unilaterally. Notice that the utility value for this outcome in regards to the British government is 2. If the British changed their strategy unilaterally, they would worsen their own outcome by switching to a utility value of 1, while simultaneously bettering the standing of the IRA. Conversely, the IRA obtains a utility of 3 from this outcome. If they were to unilaterally change their strategy, they would also worsen their standing by switching to a utility value of 1 and would better the outcome for the British government. Through these observations we see why this section of the game is a point of equilibrium for the actors involved – because any defection by either side would simply worsen the outcome for that actor and better the standing of their opponent. Interestingly, this game is not a prisoner's dilemma, because there is no outcome that would be better for both parties if only they could cooperate. Fewer fatalities and fewer troops would be an improvement for the British, but a worse position for the IRA. This means that the equilibrium of the game is even “harder,” so to speak, because the IRA has no incentive to cooperate to move away from this outcome.

Because of the underpinnings of the 2x2 game, we may predict that fighting would continue so long as both sides engaged in violence felt that escalation (more troops and more fatalities) would be the best strategy for pursuing their campaign. Additionally, if we operate on the assumptions of the Theory of Moves (as a brief recap, this is the notion that a game can be modeled under the assumption that each player considers the likely choice of their opponent when choosing their own strategy), we can conclude that each party knows that their opponent has an incentive to continue to escalate, a fact that

lends itself to the intractability of such a conflict. This prediction holds out empirically in the case of Northern Ireland, as thirty years of prolonged conflict is no small event. The equilibrium predicted by the game appears to be the one that was resorted to in the real-world conflict as, in the grand scheme of the conflict, each player decided to escalate throughout the decades that the conflict raged, with failed attempts at negotiation abounding until 1998 and the Good Friday Agreement.

However, the purpose of this analysis is to analyze the yearly interactions of the IRA and the British government, rather than the macro-level trend of escalation and strategies of pursuing conflict, and to determine if the decisions of the latter affect the strategy of the former from year to year. Indeed, this is a question for a statistical model just as much as it is one for game theoretic modeling. However, we have one more game theoretic model to outline and apply before we move on to any further analysis. Game trees combine statistics with game theory insofar as they deal with probabilities while at the same time modeling interactions between opposing players. While they are still a simplification of real world interactions and processes (as all models must be), game trees are a bit more comprehensive and lenient in their ability to adequately predict and explain the behavior of players in a game. Because they allow for multiple stages in a dispute (rather than just a one-off, two-strategy-per-player approach as modeled by 2x2 games), game trees allow for more flexibility in modeling.

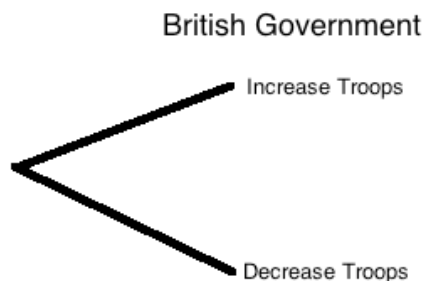
The game tree created earlier in this paper, which modeled a game of rock paper scissors, was one that alternated between the decisions that two players would face in the event of violent conflict, a version of the game that is applicable to the situation that unfolded over the course of the Troubles. In terms of modeling a game, it is necessary to

simplify actions that may have occurred simultaneously into a series of steps that occur one after another. This implies a certain order of events that may not actually exist in reality. However, this simplification is helpful in that it presents those interested in analyzing a conflict with the opportunity to search for trends that may be revealed when the decisions of both actors are laid out in some sequential order, but may otherwise be hidden when viewing both decision-making processes simultaneously. Indeed, one of the benefits of using game theory is that it often reveals conclusions about a situation that may not be readily apparent through simple logical analysis. But can we trust any conclusion reached by analyzing the Troubles with a game tree, since doing so would alter the fundamental interplay between the two actors by separating stages of the conflict that may be decided upon simultaneously? To answer this, we will briefly delve into what makes a simultaneous analysis different from a sequential one, and will then proceed to outline the game and see what it tells us.

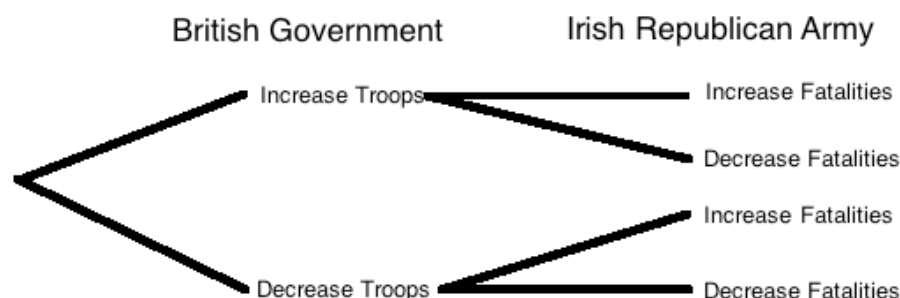
Modeling a situation like the Troubles in a simultaneous manner would entail operating on the assumption that the players make their choices under an absolute lack of information as to what strategies their opponent has favored in the past or will likely favor in the future, or, in another sense, that they make decisions at essentially the same time as each other. While this is incredibly unlikely to bear out in the real world, it has important ramifications for the theoretical realm. By looking at what strategies players prefer with no feasible consideration for what their opponents prefer, one can deduce the ideal strategy for each player and perhaps learn more about the goals and strategies that guide the group in question. However, the structure of a game tree assumes the opposite position – that actors not only know what strategy an opponent will employ, but actually

choose their own strategy based on the choices of their opponent. This interplay between actors mirrors the assumptions made by the Theory of Moves, a fitting basis for modeling something in the vein of an armed conflict. Because of the escalatory nature of prolonged violent conflict, game trees are an intuitive way to model the interplay between two actors who are essentially playing off of each other.

In modeling this conflict with a game tree, the first step is to determine what decision in this scenario is the first choice relevant to the phenomenon that we wish to learn more about. Because we are specifically looking to determine whether the decision the British government made regarding troop numbers in Northern Ireland affected the number of fatalities the IRA chose to inflict in the following year, the first relevant choice in our chain of events is how many troops the British deploy in any given year. Given the escalatory lens through which we will view the conflict, the choice that the British government is faced with will be expressed as “increase troops” or “decrease troops.” While this is a simple logistical choice, it also serves as a stand-in for a more nuanced way of examining the preferences of the government. Whether or not the British choose to increase the number of troops stationed in Northern Ireland indicates a level of willingness to either engage or disengage with the conflict from year to year. The binary choice between increasing and decreasing the number of troops can be expressed with this tree:



The next step in the game is the decision that the IRA faces to either escalate or de-escalate the conflict, as represented by the number of fatalities that they inflict through terrorist attacks in the following year. Because their choice is also a binary one, and because it follows from the decision of the British to either increase or decrease troop levels, the game tree ends up with four terminal nodes:



Each of these nodes represents a mutually exclusive outcome. Additionally, excluding the slim possibility that the IRA and the British choose to keep the level of troops and the level of casualties exactly constant between any two given years, all of these outcomes taken together will sum to 1, indicating a probability space of 1. In other words, one and only one of those outcomes will occur at the end of any given year, because in any given year the two players will each select some combination of escalation and de-escalation. An interesting implication of modeling an interaction with a game tree in this way is that the outcomes will presumably cover all of the possibilities regarding how a game may end. For the sake of clarity, I will briefly note the

comparative likelihood of each outcome. The first, that of escalation by both parties, is equivalent to the probability of the British deciding to station more troops and the probability of the Irish deciding to inflict more fatalities. The second probability, that of escalation by the British and de-escalation by the Irish, is equivalent to the probability of the British deciding to station more troops and the probability of the Irish deciding to inflict less fatalities, and so on.

What insights can one glean from depicting a conflict using a game tree as opposed to depicting it using a 2x2 layout? For one, the game tree makes the linear nature of the conflict come to the fore, whereas the 2x2 game does not depict this aspect as clearly. While the theory of moves may implicitly acknowledge the reality that players in a game will look to one another in order to determine what actions they should undertake in the future, the form of a game tree makes this reality an explicit part of the game. By orienting the scenario from left to right, we see the natural progression of events and can reach some conclusions about the interplay of actions. For one, this format highlights the reality that, in spite of the attractiveness of some strategies over others, the end result can be predicted by tracing the path of most likely outcomes down the tree (similar to how the most likely outcome can be gleaned by analyzing the utility values in a 2x2 game).

In order to see if the game tree accords with the conclusion of the 2x2 game (without resorting to the use of numerical probabilities) we will briefly analyze the likelihood of each outcome. The first relevant question we must resolve is whether the British would prefer more troops or fewer troops. While deploying more troops represents a higher level of resource investment in the conflict, we will assume that this is

nevertheless the preferable outcome for the British independent of any peace agreement or other limiting factor. The fact is that a higher concentration of troops will help the British contain the conflict more easily regardless of what strategy the IRA chooses to implement. We must therefore assume that, in the context of this particular conflict, the British would have preferred a higher level of troops in Northern Ireland until the region had fallen under their control. Of course, as the game tree makes clear, the IRA have the same two options (more fatalities and fewer fatalities) open to them regardless of the path that the British pursue. The only thing that changes for them is the context in which they make their decision. Fewer fatalities would perhaps be a preferable strategy if peace talks were on the table, or if a less aggressive policy of engagement would have otherwise benefitted their campaign. However, under the growing threat of being overrun by the British and ceding territory to their control, the IRA would be faced with no strategically viable choice but to escalate their campaign, resulting in more fatalities. Indeed, with more troops in Ireland the IRA would have more of an opportunity to inflict fatalities upon them. However, an increase in deaths per year would also represent a strategy of increasing control over the population. One of the reasons indiscriminate terrorist attacks are so effective is that they sow distrust and fear within populations, allowing terrorist groups to more effectively affect control over a region. If the terrorists can convince a target population that the government cannot prevent their attacks, they increase the incentive for individuals to side with the terrorists over the government. Thus, in the face of a British troop surge, the IRA has a motivation to increase fatalities in order to balance the scales.

The 2x2 model and the game tree both allow us to predict with a theoretical logic that the IRA will want to increase fatalities in response to a surge in British troops. Of course, theory is only one part of the story. These models may offer insight into why something has happened, but they do not in themselves determine whether a given phenomenon will occur. In other words, they can explain relationships, but they cannot predict them. Prediction is the realm of statistical models. With enough data we could likely determine what the course of a conflict would look like for the remainder of its duration. However, data collection is subject to gaps and human error. This reality means that statistical analysis can be a very precise science, but never an exact one. Additionally, the data that one uses to reach conclusions is just as important as the analysis itself. With this in mind, we are now faced with the task of attempting to find data that represents the measurements of escalation that were selected for use in the game theoretic models. For the IRA, we will need a measurement of fatalities from year to year, a fairly straightforward endeavor. Additionally, the British side of the analysis will necessitate information on their willingness to engage with the conflict in Northern Ireland from year to year. Troop numbers will be used for this analysis as mentioned earlier. This proxy is appropriate because it represents an investment in the conflict that the government would not be able to undertake without significant public support.

In order to determine the nature of the relationship between these variables, and specifically whether the yearly number of troops affects the number of fatalities inflicted by the IRA, the data will first be laid out in tables. Then, the data will be presented graphically. The x-axis will represent the number of troops per year, while the y-axis will represent the number of fatalities per year. This will be helpful in showing the

overall trend and determining whether there is a clear pattern in the changes of the number of fatalities in relation to the troop numbers. For data expressing the number of fatalities caused by the IRA each year, we will look to *Armed Struggle: The History of the IRA* by Richard English, which presents a table of the number of individuals killed during the Troubles by the IRA compared to the number of total fatalities during the Troubles. The data also allows for the calculation of the percentage of people killed each year by the IRA compared to the number of total fatalities. This information is found in the table below:

Deaths During the Troubles, 1969-1989⁶⁵

	<i>Number Killed by the IRA</i>	<i>Total Number Killed</i>
1969	2	19
1970	18	29
1971	86	180
1972	235	497
1973	125	263
1974	130	304
1975	94	267
1976	138	307
1977	68	116
1978	60	88
1979	91	125
1980	45	86
1981	70	118
1982	52	112
1983	50	87
1984	45	71
1985	44	59
1986	37	66
1987	58	106
1988	66	105
1989	53	81

⁶⁵ Reproduced from English, *Armed Struggle*, 379.

For the data regarding the number of troops per year, we will look to the CAIN website's compilation of data pertaining to the Troubles. The Conflict Archive on the Internet (CAIN) is a website that "contains information and source material on 'the Troubles' and politics in Northern Ireland from 1968 to the present."⁶⁶ The data comes from an amalgamation of sources, mostly Irish almanacs from the years following the cessation of hostilities in Northern Ireland. Because the data on the CAIN website is incomplete past 1989, and we need a continuous stretch of time in order to determine if there exists a relationship between the two variables, we will only use data from between the years 1969 and 1989. Additionally, we will use a very simple analytical tool to look for a relationship, namely by designating the change in number of fatalities and troops each year in a binary "yes" or "no" coding. If an increase in troops in one year is followed by an increase in fatalities the next year, then the relationship between the variables for that two-year period will be considered a "yes" in the sense that the number of people killed by the PIRA was influenced by the number of troops stationed in the previous year, whereas if an increase in troops is followed by a decrease in fatalities, the relationship will be considered a "no." If the number of troops decreases, this will likely shed little information on what to expect in the coming year, since the IRA may still choose to escalate when they see that the British are conceding by removing troops, or may just as likely choose to decrease fatalities as an act of conciliation or strategic necessity.

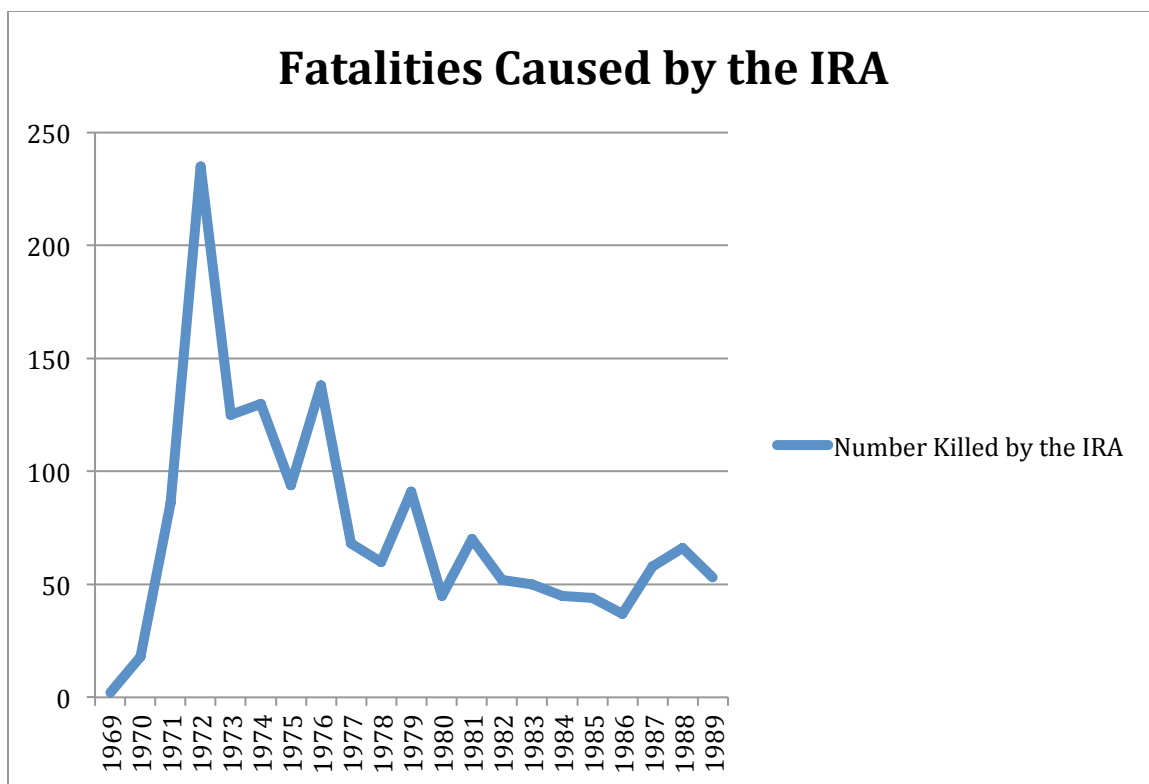
⁶⁶ CAIN Website, <http://cain.ulst.ac.uk/>, accessed January 19th.

British Army Personnel (number) in Northern Ireland, 1969-1989⁶⁷

	<i>British Army Total</i>	<i>British Regiments</i>
1969 (Jun)	2700	2700
1970 (Jan)	8100	6300
1971	11800	7800
1972	22800	14300
1972 (Jul)	30300	21800
1973 (Jan)	26000	16900
1974	23900	16200
1975	22700	15000
1976	22800	15100
1977	21900	14300
1978	22200	14400
1979	21200	13600
1980	19300	11900
1981	19100	11600
1982	18011	10900
1983	17125	10200
1984	16468	10000
1985	16194	9700
1986	16908	10500
1987	17931	11400
1988	17593	11200
1989	17430	11200

The first step will be to lay out each data group graphically, in order to view the changes over time. Both variables will be measured yearly. Besides the fact that this is the smallest time frame available for the data, doing so also helps to avoid overcomplicating the analysis by looking for trends within years.

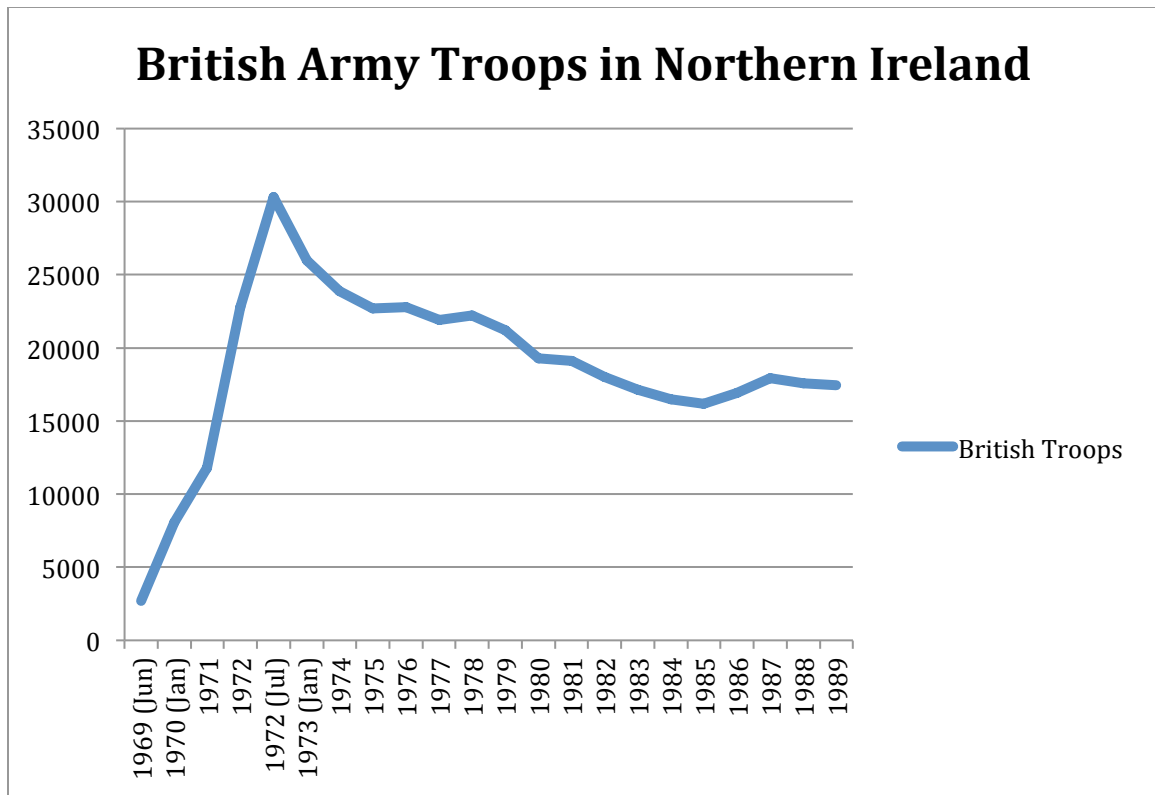
⁶⁷ Reproduced from CAIN, <http://cain.ulst.ac.uk/ni/security.htm>, Table NI-SEC-03, accessed December 30th.



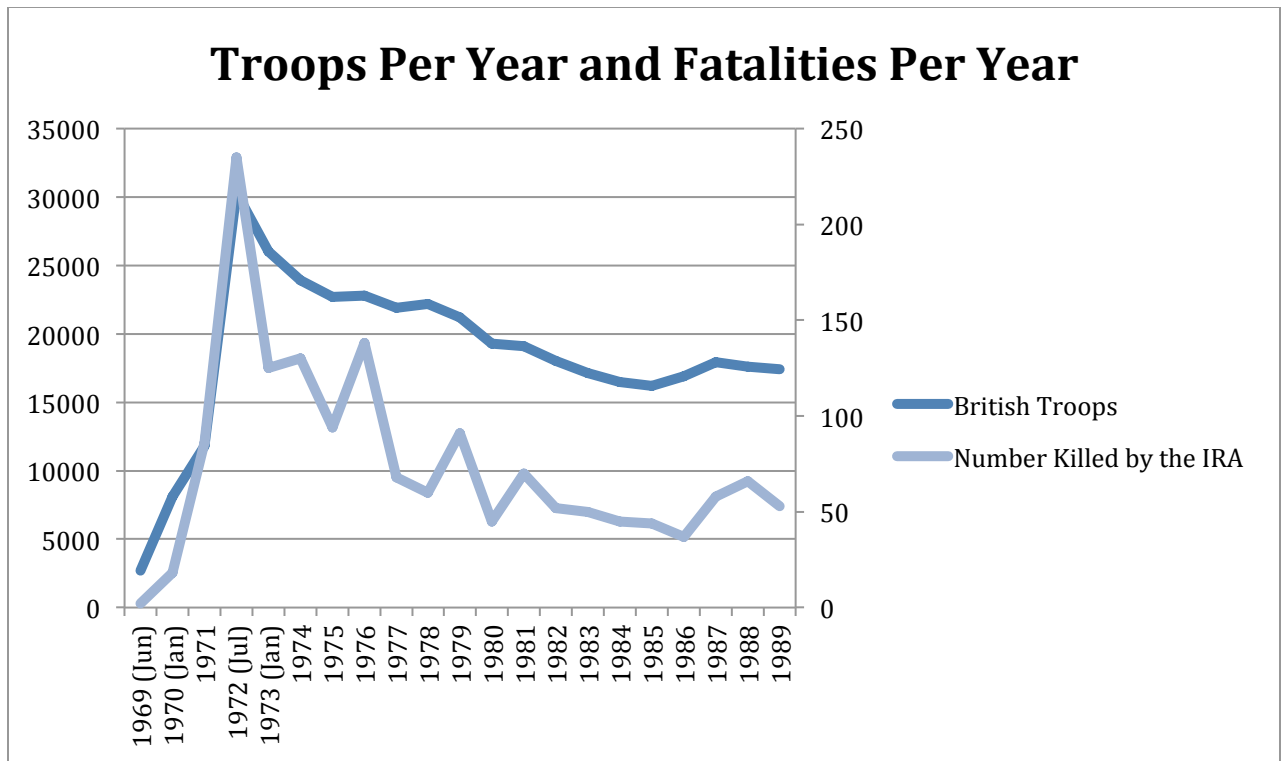
The graph highlights an interesting trend that was not visually apparent when viewing the data in a table. There was a massive spike in fatalities in the first four years of the conflict, but after that the overall trend of the graph is downward. There are five major spikes in the number of fatalities caused by the IRA, but the level of fatalities never reached its previous peak in 1972. This could be indicative of a number of possibilities. First, the IRA may have had more difficulty inflicting fatalities on British troops and Irish rivals and citizens once the British realized they were serious about their campaign and cracked down on IRA actions. Second, perhaps the purpose of the initial surge in fatalities was to demonstrate their seriousness, and all fatalities in subsequent years were merely a reminder to their audience (those members of Irish and British society to whom they wished to signal their intentions and capabilities) that they were still present and still willing to kill in the name of their cause. Third, and rather more farfetched, is the

possibility that the IRA soldiers were losing either their taste for combat or their ability to wage a campaign as time went on. The British government was clearly superior to the IRA in terms of resources and military capabilities. Prolonged combat with such a force would chip away at any organization's ability to fight back adequately. This scenario is possible even if individual IRA leaders had wanted to continue fighting, since they may have been constrained by their budget, command structure, or the willingness of their troops to continue fighting.

While the British were subject to the same constraints, they simultaneously had a much larger budget, a more established and older command structure, and exponentially more troops available to them. Indeed, the British had the advantage in most areas of the conflict, save for familiarity with the urban landscape in which the fighting took place. However, their greatest advantage was their ability to station more and more troops in Northern Ireland, a factor that was constrained mostly by the political feasibility of escalating the conflict.



However, despite the reality of their military advantage, the conflict persisted for decades, and after a peak in 1972 the British decreased the number of troops in the North at essentially the same rate as the IRA decreased fatalities. Indeed, the British de-escalation appears to be a steadier decline than that of the Irish, with less sporadic peaks and a more continuous trend.



In the final section I will speculate as to why this may have been the case, but it is interesting to note that both graphs are visually similar. Perhaps the decision-making processes of each actor were more interconnected than one would have initially suspected.

VI. Analysis

The last remaining step of this analysis is the attempt to determine if the two variables (casualties per year and British troops per year) are explicitly related or just appear correlated. In order to do so, the rise and fall of troop numbers and casualties must be measured in some way. Since it is very easy to determine whether there is an increase or decrease in the number of troops and fatalities, I will add a column outlining the relationship side by side. Additionally, because a causal mechanism can be evidenced by the existence of a time lag (whether an increase in troops in one year led to an increase in fatalities the next year), the first relevant year for troops will be 1969 and the first relevant year for fatalities will be 1970. Presumably there were troops stationed in Northern Ireland before 1969, but this information will be excluded because it does not fall within the twenty-year range and is thus outside the scope of this analysis.

<i>Year</i>	<i>British Troops</i>	<i>British Troops Trend</i>	<i>Year (Staggered)</i>	<i>Number Killed by the IRA</i>	<i>Fatalities Trend</i>	<i>Relationship</i>
			1969 (Jun)	2	Increase	
1969 (Jun)	2700	Increase	1970 (Jan)	18	Increase	Yes
1970 (Jan)	8100	Increase	1971	86	Increase	Yes
1971	11800	Increase	1972 (Jul)	235	Increase	Yes
1972 (Jul)	30300	Increase	1973 (Jan)	125	Decrease	No
1973 (Jan)	26000	Decrease	1974	130	Increase	No
1974	23900	Decrease	1975	94	Decrease	No
1975	22700	Decrease	1976	138	Increase	No
1976	22800	Increase	1977	68	Decrease	No
1977	21900	Decrease	1978	60	Decrease	No
1978	22200	Increase	1979	91	Increase	Yes
1979	21200	Decrease	1980	45	Decrease	No
1980	19300	Decrease	1981	70	Increase	No
1981	19100	Decrease	1982	52	Decrease	No

1982	18011	Decrease	1983	50	Decrease	No
1983	17125	Decrease	1984	45	Decrease	No
1984	16468	Decrease	1985	44	Decrease	No
1985	16194	Decrease	1986	37	Decrease	No
1986	16908	Increase	1987	58	Increase	Yes
1987	17931	Increase	1988	66	Increase	Yes
1988	17593	Decrease	1989	53	Decrease	No
1989	17430	Decrease				

In order for the relationship between two years to be coded as a yes (with yes indicating that the relationship is present, and no indicating that it is absent), the first year must display an increase in troops and the second year must have a subsequent increase in number of fatalities. Any other pairing resulted in a “no” designation. There were a total of eight years that saw an increase in the number of British troops stationed in Northern Ireland. Of these, six were followed by an increase in fatalities by the IRA, resulting in a positive identification of the relationship in question. At first glance, the data seems to support the hypothesis that an increase in British troops will be followed by an increase in fatalities caused by the IRA. Indeed, out of eight years with troop increases over the twenty-year period, six were followed by an increase in fatalities, resulting in an escalation rate of 75%. However, there is more to the data than meets the eye. First and foremost, there are thirteen decreases in troop numbers from 1969 to 1989, two of which were also followed by an increase in fatalities. Certainly this is not as strong a relationship as the one between escalation on the part of both parties, but it bears mentioning as it shows that the lethality of the IRA could not have been predicted entirely by whether or not the British sent more troops overseas.

Another major factor to consider is what all of the years that do not show evidence of this relationship tell us. A year exhibiting a decrease in troops followed by a

decrease in casualties seems to support the strategic logic of tit-for-tat, since both parties may have had just as much incentive to match each other's de-escalation strategies as they did to match the escalation strategies. However, mixed responses are more difficult to explain in the context of this hypothesis. Of course each group engages in a largely independent decision making process, but it seems highly probable that both groups take cues from their opponent when making decisions about their interaction strategies, a possibility that seems to be supported by the limited evidence. Both the IRA and the British government appear to be playing off one another in their decision making processes, as evidenced by the similar trend in both graphs (a sharp spike up until 1972 and then a general declining trend in the years following) and the predictions of both game theoretic models. Specifically, the Theory of Moves suggests that actors who are engaged in a non-cooperative game will take cues from one another when choosing strategies, information that can be used to explain the fact that the dominant strategy is not always chosen. This theory underpins the reality that, for both parties, de-escalation was the favored strategy during this twenty-year period, which can be explained with the inclusion of the Theory of Moves' assumptions.

The Theory of Moves explains many of the observable conclusions that can be drawn from the data. Assuming that each player will look far ahead to determine the consequences of all possible choices and combination of choices explains why each player would not simply escalate every year.⁶⁸ Continuing the conflict from year to year

⁶⁸ It should be noted that there is no evidence that the Irish did not at least try to escalate every year. Indeed, more fatalities may have been their goal every year, and they may simply have failed to see this goal to fruition. However, this seems unlikely given that the IRA showed their willingness to negotiate and agree to ceasefires numerous times over the course of the Troubles. British escalation is a different matter, as stationing

in and of itself signaled a willingness on the part of both parties to remain in a posture of hostility towards one another, but the yearly changes in strategy require a more nuanced explanation. When both players are aware of the fact that they must continue to interact with each other from year to year, an explanation for the de-escalation strategies begins to take shape. Indeed, this phenomenon may be indicative of a game theoretic strategy known as tit-for-tat. In order for tit-for-tat to be a feasible strategy, the game in question must be iterated. In other words, the players must contend with the shadow of the future, or the knowledge that they may have to interact again in the future. If players are knowingly engaged in a one-turn game, they will simply choose the strategy that maximizes their utility in the immediate future (in this case, escalation via more troops and more fatalities). But when they are making decisions with the knowledge that they will have to interact again in the future, they will have more incentive to cooperate. Tit-for-tat suggests that an actor should respond with the strategy that the other player chose in the previous round when choosing a strategy in the current round. So if the British escalated in 1970, tit-for-tat would suggest that the IRA should also have escalated to more fatalities in 1971. Similarly, if the British were to decrease troops, a tit-for-tat strategy would advise that the IRA cause fewer fatalities. The logic behind this strategy is that tit-for-tat breeds a sense of trust between the actors – if you cooperate then I'll cooperate, but if you defect then I'll do the same.

The Theory of Moves and tit-for-tat help us to better understand why the theoretical predictions of the modeled games seem to contradict the actual trends. In fact,

troops is a far simpler matter than successfully eliminating enemy combatants and carrying out terrorist attacks. Thus troop numbers seem to be more likely to express the actual desire of the British government to either escalate or deescalate the conflict.

it may seem to often be the case that the predictions of game theory, while internally logically coherent, appear to contradict the actual course of events in the real world. But this does not mean that game theory is not theoretically or practically useful. The Theory of Moves predicts that the actors in a noncooperative game will consider the most likely strategies of their opponent when choosing their own. Tit-for-tat suggests that actors will use this knowledge to their advantage in order to formulate a strategy that rewards cooperation and punishes unilateral defection. This helps explain why the British government and the IRA tended to deescalate more often than they escalated. In fact, the British decreased troop numbers in 13 out of 21 years, or about 62% of the time. Additionally, the IRA decreased fatalities 11 out of 21 years, or roughly 52% of the time. This indicates that despite the posture of escalation and unwavering hostility that both parties adopted, more often than not they preferred to reduce the amount of resources that they put into the conflict.

Using game theory to model a conflict allows one to view the conflict in an ordered, controlled, and logical way, which allows conclusions that may not be readily apparent from a more straightforward analysis of the conflict to be drawn. This is not to say that the value of game theory is that it presents a conflict in a simpler fashion. Indeed, as far as an analytic tool goes, oversimplification is not inherently useful. But modeling a conflict as a game boils the interactions down to the most integral variables – the combatants or disputants, and their goals – and allows for a more nuanced consideration of their motives and means. Through ordering preferences by utility value, the overlap between the desires of all players becomes apparent. It may become clear that both actors prefer peace, even while a conflict continues to rage on. Of course this is

an inexact science, and assigning utility values is largely an arbitrary practice, but the merit in this approach remains: the simplification of a complex relationship into a more interpretable format helps to clarify what groups want and how they conceivably intend to pursue it.

Without more data to analyze the conflict, the next best resource in determining whether or not this relationship was causal or merely a byproduct of the progression of the conflict is the statements of IRA leaders and members. Thus, this analysis will now present the statements of these individuals which help explain why violence may have been escalated absent an increase in British troops. We should first note that the Provisional IRA is a very furtive and closed organization, even more so than a traditional military. This means that identifying the official military policy of the IRA at any given point in time is a difficult exercise. The IRA's Army Council was in charge of directing the trajectory of the military campaign, and being a terrorist organization, it follows that orders and campaign plans would have been highly secretive. Therefore, the comments of IRA members and leaders after the fact are crucial in determining the goals, intentions and motivations of this organization.

Indeed, the stranglehold that the IRA leadership held on not only the planning of the campaign but the official dictums given to justify that campaign can help explain the use of violence in response to a British presence in Ireland. As is commonly the case with paramilitary organizations, "After recruitment, ... recruits had drilled into them the comforting guarantee that the violence perpetrated was a response to a political need rather than a criminal impulse."⁶⁹ This political need was, of course, the expulsion of the

⁶⁹ Alonso, *The IRA and Armed Struggle*, 4.

British presence in Northern Ireland. Bolstered by the sense of needing to defend their community against encroachment, IRA soldiers were comforted by the knowledge that the use of violence was necessary in response to the occupying presence. Indeed, John Kelly, a major republican leader in the late 1960s and one of the founders of the Provisional IRA, stated, “The traditional republican attitude to Britain's occupation of Ireland was to remove England from Ireland by the use of physical force.”⁷⁰ Particularly telling in this quote is the reference to an “occupation of Ireland,” language that brooks no argument about the status of the British forces in Northern Ireland. While this claim may seem self-evident to Irish republicans, it is, politically, a bit more contentious. Northern Ireland’s status as part of the United Kingdom likely justified a British presence in the minds of the British public, government officials, and even Irish unionists who self-identified as both British and Irish citizens. This fact was an important crux on which the legitimacy of the republican cause hinged. If Northern Ireland was a lawful part of the United Kingdom, or a majority of Irish citizens in the North held some sort of affinity for the British, then the republican campaign of violence to expel the proclaimed occupiers becomes exponentially more difficult to justify.

Indeed, this notion of an occupation going on in Ireland goes a long way towards explaining the decision to escalate the campaign. Members of the IRA, such as Marian Price, state that they “joined the Irish Republican Army to get the British out of Ireland, to establish a thirty-two county socialist republic. ... While there's a British presence here that won't happen.”⁷¹ This sentiment was encouraged by the leadership of the Provos, who “emphasized that republicanism would kill British soldiers while they remained on

⁷⁰ Ibid., 43.

⁷¹ Ibid., 43-44.

Irish soil.”⁷² Indeed, an editorial in the Irish republican newspaper *An Phoblacht* stressed that “republican ideology was used ... as a justification for killing for Ireland...”⁷³ This ideological emphasis on republicanism, nationalism, and community defense created a climate of strong political feeling which fed into the collective desire to strike back against a perceived occupier. Additionally, the ubiquitous presence of such an ideology tacitly supports the notion that the Provisional IRA was inflicting casualties based on the troop presence in Northern Ireland. More troops led to more republican anger, which in turn found an outlet in terms of more fatalities.

With this concern about removing the British presence from Northern Ireland came difficult tactical choices about the most effective way to engage British forces. Despite the IRA’s attempt to present itself as a conventional military, it was waging a guerrilla campaign against the British, in which soldiers could melt back into the population and thus avoid direct confrontation with British and loyalist troops. This is an important distinction because the knowledge that the IRA was drastically outmatched colored every strategic decision that they made as a paramilitary organization. From the outset, the broad strategic goals of the Provisional IRA can be best summarized by the testimonies of Ruairi O’Bradaigh, former Chief of Staff of the original incarnation of the IRA, and Danny Morrison, an influential leader of the IRA and Sinn Féin, who stated,

"At all times the question of outright victory in the sense of physical victory and holding territory and all that kind of thing never happens. It is the case of preventing them ruling. It is a question of continuing and seeing which side is able to wear down the other."

"I know that it will become so costly for them that they will not want to stay here. ... It isn't a question of driving the British army into the sea. It's a question of

⁷² Ibid., 49.

⁷³ Ibid.

breaking the political will of the British government to remain. And that's why ten years ago [in 1977] the IRA stated the theory of the long war."⁷⁴

These quotes both make clear the long-term strategic game that the IRA was playing.

The upper levels of the republican movement never expected to drive the British out through strictly military means, such as “holding territory” and conventional military victories. Instead, they intended to wage a campaign of targeted attacks in order to raise the cost of British operations to a level that was politically unacceptable to the British public.

Sean MacStiofain, an important actor in the formation of the Provisional IRA who also served as the PIRA’s first chief of staff, echoed these sentiments in an interview conducted with Frontline in 1998. When asked about the strategy of the PIRA during its nascent months, MacStiofain commented that “defense for the summer” was the first priority of the group.⁷⁵ The interviewer then asked at what point the Provisionals decided to switch to offensive action, to which MacStiofain replied, “After internment. Before, anything else was a retaliation, because the British army was bad to the people. So we thought retaliatory action and sabotage. But after internment we went to all offensive, all offensive action.”⁷⁶ The retaliatory and escalatory nature of the conflict is vividly portrayed in this quote. Here we see a leader who felt that an escalation in the conflict was necessitated by the internment that suspected IRA members were suffering. Additionally, he directly points to the presence of British troops as a cause for the use of violence by the Provisionals. While less than a direct admission that the number of

⁷⁴ Ibid., 153.

⁷⁵ Sean MacStiofain, "Interview with Sean MacStiofain," interview by Frontline Series (1998).

⁷⁶ Ibid.

troops in Northern Ireland was a factor that influenced the course of the Provisional campaign, it would not be a far cry to say that this is a tacit component of his argument.

MacStiofain reiterated in this interview that the purpose of the campaign was not to pursue any sort of conventional military victory, but rather to inflict enough costs on the British military so that holding on to Northern Ireland became more costly than the British government deemed prudent. He explicitly states that the Provisional IRA wanted to convey the message that if the British “stay in Ireland there’s a price to pay.”⁷⁷ That price, as he went on to say, would be “more soldiers [going] back in coffins.”⁷⁸ In other words, should the British choose to maintain or subsequently increase involvement in Northern Ireland, the IRA leadership promised more attacks and intended fatalities directed against British troops. Towards the end of the interview, MacStiofain vows that the British will see that they must “pay dearly for the north of Ireland.”⁷⁹ His unwavering commitment to armed struggle and ceaseless escalation are evident from his comments and dedication to the use of violence to expel the British from Northern Ireland. As mentioned earlier, the leadership of the Provisional IRA exercised total control over the direction of future actions and the behavior of its members. This totalitarian structure makes it simple enough to determine where doctrine and orders originated. The opinions of the leadership were essentially the official party line of the IRA, and volunteers were expected to follow orders or expect punishment. Thus, it is simple enough to take the opinions expressed by MacStiofain in the above interview and apply them to the strategy of the IRA as a whole. In this vein, it seems prudent to look at the individual who had

⁷⁷ Ibid.

⁷⁸ Ibid.

⁷⁹ Ibid.

more of an influence on the behavior and positions of the Provisionals than anyone else: Gerry Adams.

Gerry Adams was and is a major political leader in Ireland. He was also, to a greater or lesser extent depending on the source in question, involved with the leadership of the Provisional IRA. However, his status as a leader of the Irish republican movement is unquestionable. When asked in an interview with *The Irish Post* whether he believed that violence could have been avoided if the political component of the republican movement had condemned violent attacks, Adams responded, “Were they [the IRA] entitled in the face of a militarised situation living under occupation to respond in an armed way? Yes they were.”⁸⁰ His justification of violence is notably similar to that used by leaders of the IRA such as MacStiofain. The occupation of Northern Ireland by British troops is a self-evident justification for violence to these men. This interview took place in 2013, and Adams seems hesitant to directly admit to any involvement with the IRA during their heyday. Yet he still makes a point of expressly supporting the armed campaign that the Provisionals waged, a drastic and telling move considering the general consensus regarding the actions of the IRA.

The IRA leadership indicated repeatedly that they do not feel that they are to blame for the conflict. In the republican psyche, the British initiated the conflict by occupying and partitioning Ireland, which led to the formation of the republican movement as a necessary unit of self-defense. This narrative has important ramifications for the psychology of the conflict’s participants. By shifting blame onto the British, republicans can validate actions that they would not otherwise be able to justify. Indeed,

⁸⁰ Gerry Adams, "Gerry Adams: ‘Abuse Felt by Irish in Britain during IRA Campaign Was Unavoidable’," interview by *The Irish Post*, October 25, 2013.

many soldiers used this logic in explaining their personal decision to resort to violence.

This reality helps explain the extreme violence utilized by the IRA in their campaign.

Perhaps they even used the presence of the British to help absolve them of guilt from the killing of innocent Irish civilians. The presence of blame shifting patterns of thought is a useful tool in explaining the trend towards escalation inherent in violent conflicts.

Republican soldiers who were inundated with nationalist ideology and discouraged from deviating from the official position of the IRA leadership are consequently much more likely to commit heinous acts of violence, whether explicitly ordered or internally justified.

VII. Conclusion

The data suggests that both parties had an incentive to tend towards deescalating the conflict over the years. What exactly that incentive was remains unclear, but the trend towards a decrease in the number of troops for the British and a decrease in the number of fatalities caused by the IRA stands on its own. However, given the nature of the relationship in the data, we must conclude within the confines of this paper that H_1 is false without further evidence. Of the eight years that the British stationed more troops in the North, six were followed by an increase in the number of fatalities in the next year. Of course, the IRA increased fatalities in ten years during this period, indicating that they were not only responding to the number of troops that the British were sending overseas to maintain control of the region. Because the IRA adopted a strong, zero tolerance position against allowing British troops to maintain a presence in Northern Ireland, it seems that decreases in troop numbers did not affect their yearly strategy in any appreciable way. Instead, they focused on the presence of British troops per se and geared their campaign towards complete removal of these forces. The relationship shown cannot be said to be anything more than coincidence, and there is not enough data to draw any statistically significant conclusions about the relationship between the number of troops stationed in Northern Ireland and the fluctuations in the number of fatalities caused by the IRA.

We have found that a graphical relationship existed between these two variables during this period of time, one that we have not shown to be statistically significant but is nevertheless worthy of comment. The next step in analyzing this conflict would be to determine why this relationship manifested in the way that it did. Gathering more

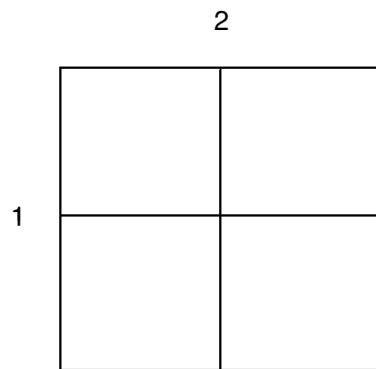
nuanced, fine-tuned data would be the first step in helping to further this analysis. A statistical analysis controlling for outside variables would help us better understand how the Provisionals decided to wage their campaign and what factors on the British side of the equation they were most responsive to. The Troubles were a complicated time for both parties. While these particular games have been constructed to display the conflict between the British government and the Provisional IRA, there were many more actors and groups involved, including other Irish republican groups, loyalist Irish groups that aided the British in combat, and even foreign governments at some points. Perhaps some other party influenced the course of events beyond what is manifestly visible in the data. Future research should examine what other factors may have caused this relationship to manifest itself. Additionally, a more detailed analysis will be required to determine whether the relationship between the variables is causal or merely a correlation.

However, my second hypothesis shows more promise under scrutiny. H_2 predicted that the statements of IRA leaders would show a commitment to the continuation of their campaign based on the presence of British troops in Northern Ireland. And indeed, a level of blame shifting seems to be present in their justifications of violence. This all-or-nothing way of viewing the conflict, coupled with blame-shifting processes, appears to be much more helpful in explaining why the IRA escalated their campaign at certain points during its course than the simple fluctuation of troop numbers. The evidence for this hypothesis seems to indicate that the IRA's commitment to its ideology was stronger than strategic concerns like stemming the flow of troops into the North. That is not to say that they ignored such considerations, but the statements of the Provisional leadership indicate that ideology was a more important motivating factor than

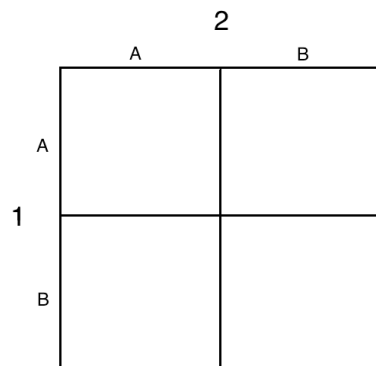
pragmatic concerns. Of course, it is possible that the leaders of the IRA simply touted their ideological dedication to signal a commitment to violence, when they were really responding to strategic concerns. Private communiqués between top-level IRA officials would prove helpful in deducing what really drove the IRA to alter the overall tone of its campaign.

Appendix: More on Game Theoretic Models

I will construct a bare 2x2 game so that the qualities of the game can be further explained. In this game there will be two players, each with two courses of action open to them, and each course of action will be assigned a numerical utility ranging from 1 to 4, with 4 being the outcome most desirous to the player and 1 being the outcome that is least desirous. The simplest way to depict this game is with a square subdivided into four squares:



Conventionally, the side on the left depicts player 1's options, and the side on top represents player 2's options. Each subdivided half of the sides represents a choice available to the game's players:



So in this simplified model, players have two options available to them. The next step is to assign utility values to all of the possible outcomes (AA, AB, BA, and BB) based on their desirability to each player. By convention, the first value in the square is the utility assigned to that outcome by player 1, and the second value is the utility assigned by player 2. For simplicity's sake, we will assign utility values between 1 and 4, first for player 1:

		2	
		A	B
1	A	3	1
	B	4	2

And then for player 2:

		2	
		A	B
1	A	3 , 3	1 , 4
	B	4 , 1	2 , 2

This particular formulation of a 2x2 game is what is known as a prisoner's dilemma, as we will demonstrate later. But first we will discuss the most basic elements of this game. The most preferable outcome for each actor is to play option B while the opponent plays

option A, as indicated by the utility value 4. The second most preferable outcome is for both players to play option A. The third most preferable is for both players to play option B. Finally, the least preferable strategy is to play option A while the opponent plays option B.

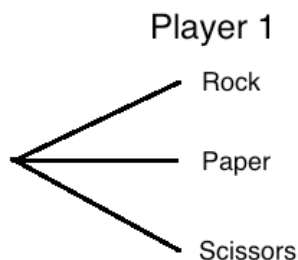
Additionally, each player will prefer option B no matter what the opponent chooses. Note that if player 2 chooses option A, then player 1 benefits more from playing option B, because their payoff will be 4 rather than 3. Similarly, if player 2 chooses option B, then player 1 would also be expected to play option B, because their payoff will be 2 as opposed to 1. This indicates that the game is symmetric, meaning that the same strategy preference holds true for player 2 when responding to player 1's choices.⁸¹ Because B is preferable regardless of what the other player is expected to choose, we call B a dominant strategy. When the two dominant strategies of the players overlap, we have what is called a Nash equilibrium (which is the 2,2 payoff in the lower right square).⁸² A Nash equilibrium occurs when neither player has an incentive to change their strategy from a position without a credible guarantee from the other party, because they will be worsening their utility payoff. The dilemma is made clear when we consider that both players would be better off if they were to play strategy A, since their payoffs would both be 3 rather than 2. But because B is always preferable to A, the equilibrium will hold despite the existence of a better outcome for both parties. This state of the game is called Pareto-inefficient, because there exists an outcome that is more beneficial to both parties, but that cannot realistically be reached without extensive trust between both parties, thus demonstrating the Prisoner's Dilemma.

⁸¹ Pavel, "Basics of Game Theory," 17.

⁸² Ibid., 23.

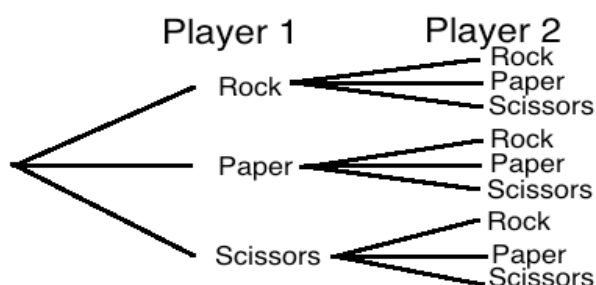
The next model we will outline is the game tree. There are two ways to approach the construction of a game tree from the outset, and we must determine which is more useful in explaining the phenomenon we are choosing to model. Because this paper will analyze violence as a response to certain government spending decisions, it makes more sense to develop a two player game tree. However, first we will construct a simple game tree showing possible interplay between two players. An easy way to model this is to use the game of rock paper scissors. It might be noted that rock paper scissors is a game that is played simultaneously, but modeling it forces the interplay to be divided into steps. Yet the implications remain the same. Each player must make a decision based on the expected behavior of an opponent, and these choices taken together produce distinct outcomes. Oftentimes interactions in the international arena occur simultaneously, or at least without knowledge of what choice the other player will pursue. In this way, interactions are similar in both models. Of course, the decisions being modeled in terms of terrorism are responses rather than predictions, but the logic holds just the same.

In order to model a game of rock paper scissors, we need a starting point. The first relevant decision is the one made by player 1 regarding whether they will throw rock, paper, or scissors. Thus:



Player 1 faces a simple choice. We will assume for simplicity's sake that they will consider choosing each move with a $1/3$ probability. Therefore, if this were the entire

game, player 1 would choose one of rock, paper, or scissors 100% of the time. However, there is a response from player 2 that must also be considered. Because player 2 has the exact same three moves available to them their segment of the tree will simply be a duplicate of player 1's tree branching off of each of player 1's choices, like so:



Above is a completed game tree of one round of rock paper scissors. On the right we see nine terminal nodes, each representing a final state of the game (player 1 playing rock and player 2 playing rock, player 1 playing rock and player 2 playing paper, and so on). Because player 1 will play rock, paper, or scissors with probability $1/3$, if we assign the same stipulation to player 2 we reach the conclusion that each terminal node will occur with probability $1/9$, because each outcome occurs with probability $1/3 * 1/3$.