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Designed to Fail: Modeling Terrorism's Losing Battle

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Abstract

Terrorism is costly and unlikely to survive any selection process that favors behaviors with higher payoffs. Only those displaying the fittest strategy choices will thrive and multiply. Fitness reducing strategies fail to pass on to the new generation. Our evolutionary game model and agent-based computer simulations show that group benefits offset the within-group behavioral selection against terrorism. By increasing the number of alliances and the size of their membership, terror groups can contribute to their longevity. We conclude that costly terror campaigns may reduce popular support among terror organizations' potential constituency and thus, hasten the demise of terror groups.

Why do terror groups fail? The prevailing view is that terrorism is a form of costly signaling that works (Pape, 2003, 2005), can hurt governments to make concessions (Thomas, 2014, 807–9), serves as a spur to mobilization (DeNardo, 2014), and while it can potentially backfire with nonlinear impact, it is overall effective (Bueno de Mesquita and Dickson, 2007; Gould and Klor, 2010). Much attention has been given to the root causes of terrorism (Piazza, 2006; Berrebi, 2007; Zahedzadeh, 2015). Terror campaigns' impact on public opinion within targeted population has also been largely addressed (Canetti-Nisim et al., 2009; Huddy et al., 2005; Sharvit et al., 2010). However, studies on terrorism's impact on their own communities are limited in number and scope. Sharvit et al. (2015) investigated the relationship between terrorism and public opinion. But they only addressed the relationship between Palestinian public opinion and activities by Palestinian groups. Few scholars have highlighted the failure to transit to the next generation and undermining of popular support as important explanatory variables contributing to the terror organizations' demise (Cronin, 2006). Thus far, this research program suffers from the impeding analytical clarity to address the important role of public backing within terrorist's own constituency who could potentially support them.

Most analysis study factors that shape Muslim public opinion on violence against the West (Mostafa and Al-Hamdi, 2007; Davis et al., 2012; Berger, 2014). However, terrorism creates immense human and economic costs on the communities they claim to represent. According to the Institute for Economics and Peace Report's Global Terrorism Index (GTI), Boko Haram and the Islamic State of Iraq and Syria (ISIS) were jointly responsible for 51% of all claimed global fatalities in 2014. In fact, the global economic cost of terrorism reached an all-time peak at US$52.9 billion in 2014 (GTI, 2015; see Figure 1). According to GTI, the ten countries most affected by terrorism have experienced decreased GDP growth rates of between 0.51 and 0.8%.

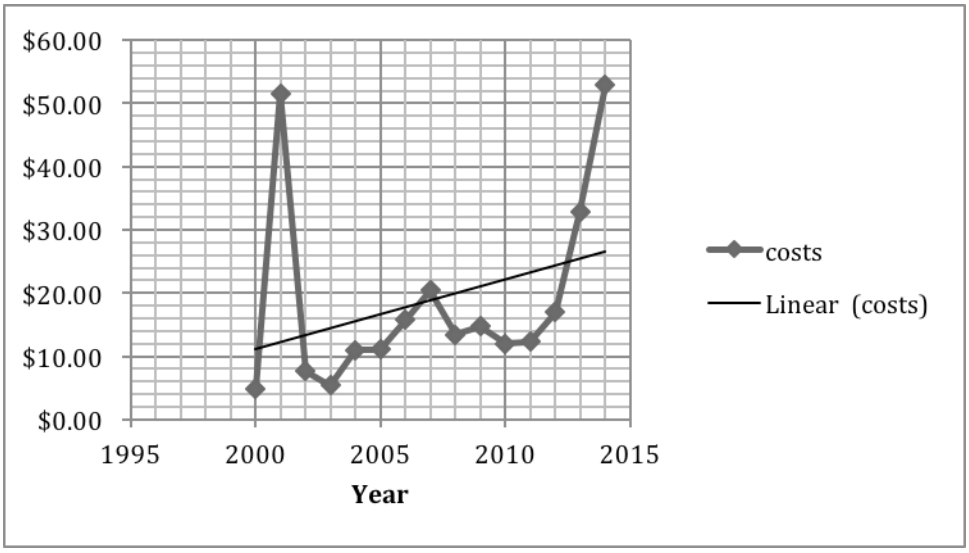

Figure 1. *The global costs of terrorism US $ Billions 2000-2014.*

The global cost of terrorism reached its highest value in 2014 ($52.9 billion). While compared to other type of conflicts, the costs of terrorism is smaller, the countries most affected by terrorism have their economic growth and FDI negatively affected. The methodology involves counting the lost wages of the injured and deceased and the immediate flow on effects on family and friends (Source: Global Terrorism Index 2015, p-62).

Community support can provide terrorists with logistical backing such as funding, transportation, safe housing, intelligence and technical expertise (Saggar, 2009), legitimacy and creation of an environment that valorizes sacrifice for the community's collective causes (Kimhi and Even, 2004; Krueger and Malečková, 2009), thereby, increasing the odds of its members joining terror groups (McCauley, 2004). While many studies point to the important role public opinion plays in creating an environment in which terror groups can flourish, relatively little research has been conducted to study the role of public support among communities, terrorists resurrect from and/or claim to fight for. According to GTI, the majority of deaths from terrorism in 2014 were concentrated in Iraq, Nigeria, and Syria. According to the report, ISIS has economically exploited the 10 million people and resources in the areas it controls leading to an increase in economic costs of terror activity. Thus, countries most affected by terrorism have their economic growth and foreign direct investment (FDI) negatively affected. For example in Nigeria, FDI decreased by 30% due to increased terrorism in 2010 (Economics and Peace Report 2015). Findings from Pew Global Attitudes survey (2005) on attitudes toward suicide bombing and other measures of support for terrorism finds that support has generally declined since 2002. In countries with significant Muslim populations, people overwhelmingly express negative views of ISIS (Pew 2015) (see Figure 2 and Table 1).

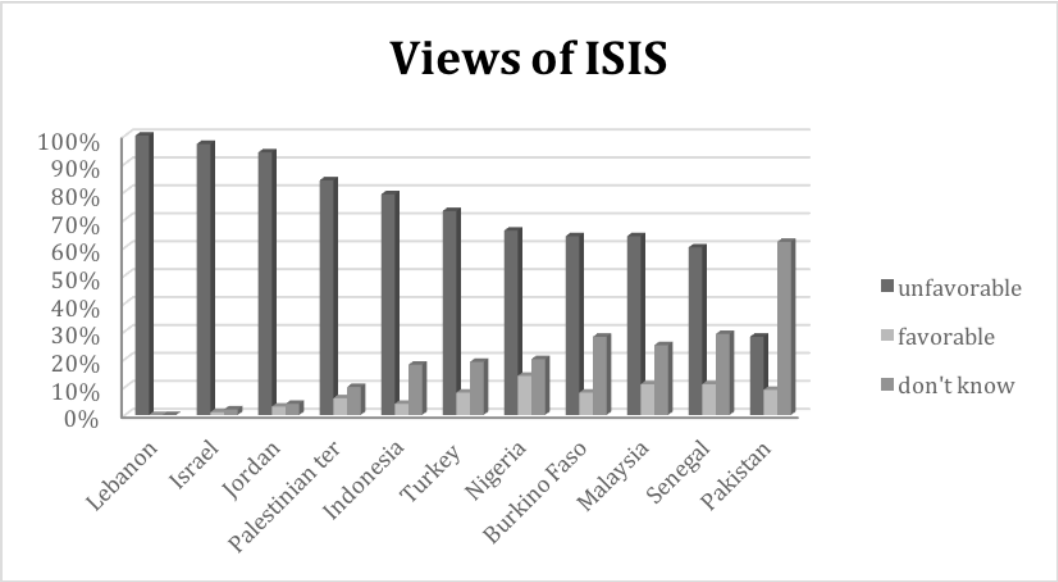

Figure 2. *Views of ISIS Overwhelmingly Negative.*

Do you have a ----- opinion of the Islamic militant group in Iraq and Syria known as ISIS? Source Pew Research Center (Spring 2015 Global Attitudes Survey)

Country	Group	Unfavorable	Favorable	Don't Know
Lebanon	-Christian	100%	0%	0%
	-Shia	100	0	0
	-Sunni	98	1	2
Israel	-Jewish	98	0	2
	-Arab	91	4	5
Palestinian	-Gaza	92	5	3
Territories	-West Bank	79	8	13
Burkina Faso	-Christian	66	5	29
	-Muslim	64	9	26
Nigeria	-Christian	71	7	22
	-Muslim	61	20	19
Malaysia	-Muslim	67	12	21
	-Buddhist	65	6	29

Table 1. *Views of ISIS by Religion, Ethnicity and Region. Do you have a ----- opinion of the Islamic militant group in Iraq and Syria known as ISIS? Source Pew Research Center (Spring 2015 Global Attitudes Survey).*

Many researchers view reduced public support for terrorism as a central measure of successful US counterterrorism efforts (Byman, 2003; Simon and Martini, 2004; Cronin, 2006). In fact, the most long-lived terror groups are the ones that have secured a considerable degree of public support (Crenshaw, 1981). Cronin (2006) notes that support for terror groups can dissipate for several reasons: i) the constituency's fear of government counteraction such as counterterrorism laws, regulations, sanctions, and raids; ii) terror group's aims may become outdated; and iii) terror group operations can cause revulsion among its claimed constituency. Herein, our focus is on terrorism's impact on own communities, which serves as a lifeline for its longevity. Terrorism is unlikely to survive any selection process that favors behaviors with higher payoffs. Thus, we expect the group benefits to offset the within-group behavioral selection against terrorism. Communities that avoid hostile interactions benefit from greater access to resources, which would otherwise be detrimental and costly. All terror groups end. But why do they? Our evolutionary game-theoretic analysis and agent-based simulations show that under conditions likely to be experienced by members of a community, terrorism cannot survive because it creates long-term costs. Therefore, we argue that costly terror campaigns can reduce popular support among terror groups' constituency and thus, hasten its demise. This article proceeds in five sections. Section I provides a brief review of the literature; in section II, we introduce an evolutionary model of terrorism and conduct computer simulations of the model; section III offers the results; section IV analyzes a historical case study; and finally we conclude. We will now proceed with a brief review of literature.

A Brief Review of Literature

Abrahms (2005, 2010, 2012) shows that the prevailing view of terrorism as a potent coercive strategy rests on scant empirical footing, and suggests that campaigns of violence that primarily target civilians almost never succeed. In fact, terrorism's poor success rate is inherent to the nature of its tactic (Abrahms, 2006). Other scholars have joined in to show the limited historical examples of clear victories of terror organizations (Neumann and Smith, 2007; Cronin, 2009; Dannenbaum, 2011). Rapoport (1992) contends that 90% of terror groups have a life span of less than a year and of those reaching a year mark, more than half disappear within a decade. It is argued that terror groups motivated by ethnonationalist causes have had the longest average life span; their greater longevity seems to result, at least partly, from support among the local population of the same ethnicity (Crenshaw, 1991, 69–87). Research has shown that larger memberships make terror groups resilient to alternative ways of ending (Gaibulloev and Sandler, 2013).

It has been suggested that failure is inherent to terrorism itself (Abrahms, 2006). Heightening the pain to civilians tends to backfire on the goals of terrorists by hardening the stance of populations (Gould and Klor, 2010, 1507); thus, consistently reducing their odds of success. Terrorism has many repercussions for the community it resurrects from, such as sociological outcomes dictated by losses (e.g. human life, property), economic consequences because of possible effects resulting from the reallocation of resources (Gupta et al., 2004), tourism flow biases, industrial moves, brain drain outflows, and emigration (Bassil, 2014). Laqueur (1976, 105) argues that terrorism creates tremendous noise; it is destructive and leads to the loss of human life while politically it is ineffective. In addition, their potential constituency can suffer backlash and discrimination. Evidence for a backlash after 9/11 is supported by data on hate crimes against Muslims (Gould and Klor, 2015); similar backlash took place across Europe (Aslund and Rooth, 2005; Hanes and Machin, 2012; Schuller, 2012). Cronin (2006) argues that terror attacks can undermine the group's cause by plummeting popular support and lead to the demise of the organization. If inherently a failure then one

may question why individuals engage in terrorism? Abrahams (2010) notes that terrorists overestimate the effectiveness of their actions when employing this tactic.

We argue that terrorism undermines rather than enhances success by creating community costs. From an individual perspective, participation in terrorism is fitness reducing. The cost of participation (death, injury) is high, the effect it can have on the conflict's outcome is negligible, and, if one's group does in fact win, the benefits are public goods shared by all group members regardless of whether they have contributed or not (Bornstein, 1992, 2003). Herein, we use an evolutionary game model and simulations to show that terrorism is unlikely to survive any selection process that favors behaviors with higher payoffs. The model predicts that those displaying the fittest strategy choices will survive, and multiply. We hypothesize that terrorism fails because of its inherent deficiency to manufacture sustainable benefits for the community it arises from and aims to recruit from.

Method

Evolution supports behavior that is individually beneficial but socially costly (Friedman and Singh, 2004). The basic viability problem is that while the fitness benefits of terrorism often do not cover personal costs, at the community level, it has a negative fitness gradient. We model the evolution of genetically transmitted behavioral types in a population where decisions are repeated across time. Strategies that increase fitness by the current population will be played by a larger fraction of the population in the next period. The empirical importance of altruism and hostility towards members of other groups is well established (Choi and Bowles, 2007). Choi and Bowles (2007) argue that intergroup hostility and aggression are similar to altruism in that an individual adopting these behaviors incurs mortal risks or foregoes beneficial opportunities, therefore, contracting a fitness loss. Suicide terrorism can be defined as an altruistic behavior (Riemer, 1998), or even a combination of altruistic and fatalistic behavior (Pedahzur et al., 2003). When the members of an individual's group benefit as a result of one's hostile actions toward other groups, Choi and Bowles (2007), term the behavior *parochial altruism*. We will apply this definition throughout this paper. Next we introduce the model.

The Model

The model is implemented in Netlogo (5.3.1).[1] Agents of an evolutionary game occupy a lattice, which is fixed for the duration of the evolutionary dynamics. Norms emerge through within group interactions (Bornstein, 2003). Like multilevel selection models, we assume group conflict exists (Guzmán et al., 2007). All agents in our world (Θ)(are identifiable by heritable alleles. We represent their behaviors as the expression of two hypothetical alleles at each of two loci. Consider a population of N individuals consisting of parochials and altruists.[2] Hence, there are four types of heritable alleles and the probability of inheriting each is set at $p = ¼$. These are *parochial altruists* (*PA*, that is bearers of the *P* and *A* alleles), *altruists* (*A*), *parochials* (*P*), and non-parochial-non-altruists (Φ). Several authors have discussed the evolution of individual traits whose fitness depends on their prevalence in the group (Wilson and Sober, 1998); while others have discussed the evolution of conventions (Young, 1993). Individuals of various types may grow or shrink; over time a particular group's trait may drift or occasionally change abruptly as the members' common understanding reacts to experience (Friedman and Singh 2004).

Let K denote the set of all possible alleles: $K = \{PA,P,A, \Phi\}$, then $\lambda = \{P, A, \Phi\} \therefore \lambda \subset K$. M denotes all

members of the community. All λ are considered tolerant. There is no evidence that the hypothetical alleles in our model exist. For example, Choi and Bowles (2007) did not show that a warlike genetic predisposition exists, but only that one should exist; and that it may have coevolved with altruism and warfare. Individual values for terrorism converge to the level that maximizes one's fitness but then adjusts to the level that maximizes the group's average fitness; importantly a detailed micro-dynamic evolutionary model for a group trait needs to consider the joint time path of the traits across groups and the group size (Friedman and Singh, 2004). We are interested to know whether group traits will displace others, however, it does not matter whether the displacement occurs through changes in size or the number of groups; it is sufficient to use aggregate dynamics that track the population shares for each trait (Friedman and Singh, 2004).

We incorporate cost-benefit calculations in the model; the benefit of the act *(b)* is divided by its cost *(c)* $\therefore {}^{b}/_{c}$(Ohtsuki et al., 2006). Every generation produces offspring and each member *(i)* extracts benefits from the environment. Each *i* collects benefits from the environment (E_b) if available, and to which every *i* can contribute $\therefore$ *b(b + Eb)*but not if benefits become scarce resources where *b(b-x)* .[3] Members die if $b < 0$. Agents can build networks but who-meets-whom is not random, but determined by spatial relationships or social networks (Lieberman, 2005; cited in Ohtsuki et al., 2006). We incorporate Ohtsuki et al.'s (2006) finding who suggest natural selection favors cooperation, if the benefit of the altruistic act divided by the cost exceeds the average number of neighbors, *k*; thus, cooperation can evolve as a consequence of social viscosity even in the absence of reputation effects or strategic complexity. Thus, we assume *PAs* can build alliances if $({}^{b}/_{c} > k)$.Alliances can be built with a benchmark probability of ¼.

The fitness of an individual is given by the baseline fitness plus the payoff that arises during her lifetime. Strong selection means that the payoff is large relative to the baseline fitness; weak selection indicates a smaller payoff compared to the baseline (Ohtsuki et al., 2006). The expected payoff to the community who adopts terrorism is $PT = [(\delta\eta({}^{b}/_{c}) + \delta\iota({}^{b'}/_{c'}]$, or not $P'T = [(\gamma\eta({}^{b}/_{c}) + \gamma\iota({}^{b'}/_{c'})]$ (Anderton, 2014).[4]δη, δι, γη and γιare probabilities and can be manipulated by the user at each simulation run.[5] The average community fitness is $U = [PT + P'T]$. The evolutionary replicator dynamics (Nowak, 2006; Anderton, 2014) is $\therefore \eta_{PA}{}^{\tau+1} = (\eta_{PA}{}^{\tau})(PT - \bar{U}) + \eta_{PA}{}^{\tau}$ Thus, evolutionary success depends on leaving behind the maximum number of copies of itself in Θ . We present the following update rule (*Rule M*) for evolutionary dynamics. Terrorism could be wiped out if $PT < \bar{U}$ (*Rule M*) If $PT > \bar{U}$ then selection favors this behavior (Figure 3). Next, we study graphical results of our simulations.

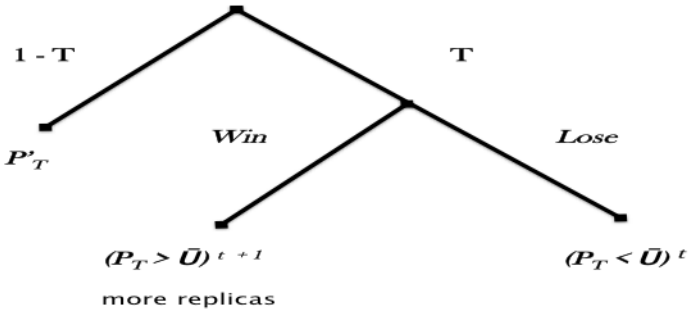

Figure 3. *The rules of the game.*

Each individual in the community occupies the lattice and derives a payoff from interactions with the environment, which is influenced by the behavior of all members. T denotes terrorism.

Results

The simulation begins by generating a random world. Starting from the center, the algorithm selects a pre-defined number of agents (Figure 4). Events transpire on a lattice and agents move around this space, where they act in accordance with (*Rule M*) . To explore the robustness of the model, 1000 simulation runs are executed—each initialized using the same set of standard values. The sequence of events in each generation is as follows: interaction occurs, followed by repopulation; members interact in public goods games, and they reproduce in proportion to their share of the group's total payoffs.

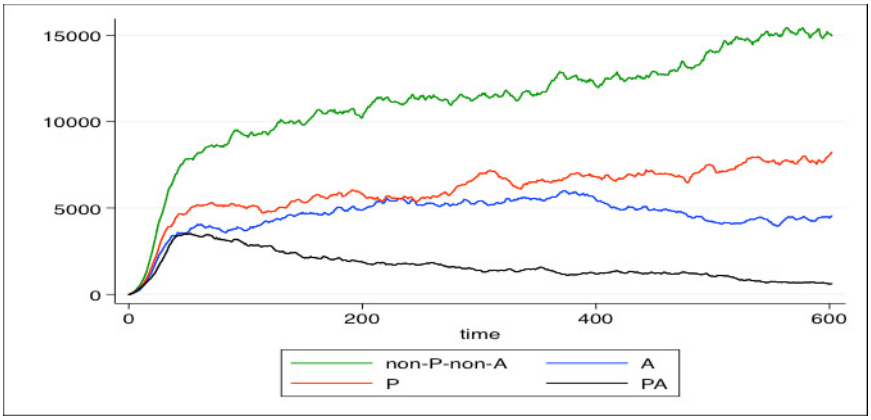

Figure 4. *This illustrates the number of hypothetical alleles inherited over time. Importantly we observe the number of PAs decline over time. Average values are the following for all traits: (non-P-non-A M = 11208.27, SD = 3015.73; A M = 4561.32, SD = 1057.68; P M = 6044.31, SD = 1488.16; PA M = 1638.30, SD = 791.62).*

We find that the number of tolerant individuals increases over time unlike the number of *PAs,* which seems to be in decline across time (Figure 5). *PA's* use of terrorism as a tactic is probabilistic; if employed it can create costs for the community. Figure 5 shows the cost-benefit calculations for the community over time. *PAs* who employ terrorism accrue costs and contribute less to the collective good. We fit the simulation results in an ordinary least square model and use robust standard errors (Table 2). The increasing number of *PAs* employing terrorism tactic inflate community costs ($p < 0.001$) and reduce collective goods ($p < 0.001$). A decline in the number of alliances is also observed with increasing community costs ($p < 0.001$). We find terrorism unsustainable as a tactic, and groups that utilize it will largely fail to transit to the next generation. Thus, failure to pass the legacy to next generations can explain why terror groups end.

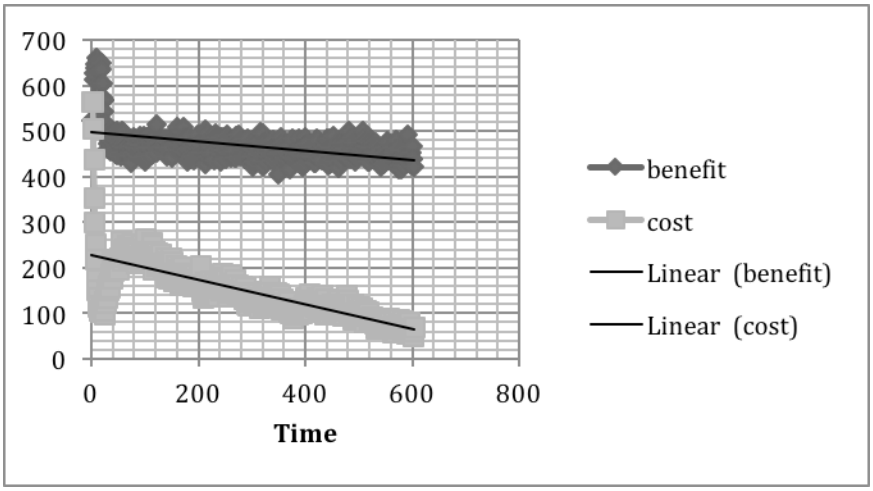

Figure 5. *This illustrates community benefits and costs over time. Terrorism produces costs and thus, this behavior is driven out. Average values are the following: (Benefits M = 466.34, SD = 35.97; Costs M = 146.34, SD = 59.76).*

Predictor	***Coefficient (SE)***	***p value***
Alliances	-1.82	<0.001
	(0.22)	
PA	0.04	<0.001
	(0.003)	
Tolerant	-0.02	<0.001
	(0.003)	
Benefit	-0.39	<0.001
	(0.10)	
R2	0.81	
Root MSE	25.75	

Table 2. *We use robust standard errors. Dependant variable is cost.*

Case Study

Our model and simulations show that costly terror activity can reduce popular support over time and facilitate the demise of terror groups. Cronin (2006) notes that support for a terror group can diminish for several reasons such as government engagement in strong repressive measures, loss of population interest in the ideology of the group, and revulsion in reaction to the group's operations. The lack of public support can drain the group of recruits and financial backing, and pave the path for its demise (Becker, 2015). Given this sensitivity to public support, terror groups may modulate their actions in order to avoid backlash (Bloom and Horgan, 2008). Civilian disenchantment with the group's operations can divest it of public backing, which is its lifeline (Becker, 2015). Becker (2015) argues that in order for terror groups to scale back attacks deliberately, two conditions need to be satisfied: first, the group's natural constituency must be negatively affected by the group's operations, and second, it must be reliant on—and therefore receptive to—its claimed

constituency.

The case of the IRA (Irish Republican Army) is often cited as an example of public disillusionment with a terror group (Cronin, 2006). Our study rests on a systematic analysis of the IRA's terror operations in order to evaluate our model's proposition. The IRA conducted a significant number of terror campaigns with the aim of driving out the British and aimed to animate the local population to back Irish unity (Hewitt, 1990). We choose to reflect on the IRA's operations for several reasons: i) repression was great in Northern Ireland since paramilitary feuding and sectarianism reigned (Curran, 1998); Catholics constituted a permanent minority in a system dominated by Protestants and characterized by elements of political discrimination (gerrymandering, disenfranchisement) (Sànchez-Cuenca, 2007), ii) the British army was heavily involved in Northern Ireland (the presence of the army is associated with more severe anti-terror methods);[6] the British response frequently involved punishing the wider population for IRA activities (English, 2003), iii) the conflict was a major source of social and economic dislocation (Besley and Mueller, 2012), iv) the IRA campaign took place in the context of an ethnic conflict between two communities divided by religion and many killings of civilians and paramilitaries were the result of retaliation and sectarian warfare (Sànchez-Cuenca, 2007), and v) the IRA abandoned the use of terror and joined the political process. Thus, the case of IRA is not only relevant to our model, but also feasible given the vast amount of scholarly information available on the group.

The IRA

The IRA was created in 1919; its primary goal was to reunify Ireland through the incorporation of the six counties of Northern Ireland, which had a Protestant majority (Sànchez-Cuenca, 2007). From the late 1960s a violent conflict flared up (Besley and Mueller, 2012); in 1968, the IRA mobilized to protect Catholics from police and Protestant harassment (Sànchez-Cuenca, 2007). Dissatisfied with the IRA's strategy, nationalist members of the Republican movement, split in 1969, and created the Provisional IRA (PIRA). PIRA killed around 1,640 people between 1969 and 2001(Sànchez-Cuenca, 2007). Over the past 35 years, the conflict in Northern Ireland caused more than 3,700 deaths and more than 40,000 injuries, with civilians bearing the burden of all deaths (53%) and injuries (68%) (Smyth, 1998; Smyth and Hamilton, 2004; cited in Ferguson and Burgess, 2008). It is estimated that 10% of the population has had relatives killed as a result of the conflict (whereas 50% of the population knows someone who was killed) (Smith, 1987). Over time, a series of important events effectively drove a wedge between the IRA and the very public it purported to represent. These are famously, the IRA's *proxy bombs* and the *Omagh bombing*. Bloom and Horgan (2008) argue that the proxy bombings may in fact have been the very incident that caused IRA to lose support once and for all. Cronin (2006) highlights the Omagh bombing to have caused colossal revulsion; Omagh reduced support for militant Republicanism, exhausting IRA's public backing. Next, we analyze both events in detail.

Proxy Bombs

In 1980s, the IRA would send a civilian with a bomb on a vehicle to detonate the target while his family was held hostage to ensure compliance; only after the civilian followed instructions, the IRA would release him and his family (Bloom and Horgan, 2008). In 1990s, the IRA changed tactics by introducing its proxy bomb. Bloom and Horgan (2008) note that the proxy bomb refers to the vehicle-borne delivery of an explosive in a manner that the driver-customarily a civilian- has been coerced into cooperating. The proxy bomb utilized the used of the civilian to deliver the bomb, while his family was held hostage, however, the

driver would not have the opportunity to get away (Bloom and Horgan, 2008). The new tactic involved the kidnapping of Catholic civilians who were not IRA members; these civilians were coerced to drive vehicle-borne improvised explosive devices (Bloom and Horgan, 2008). In 1990, the IRA executed simultaneous car bomb attacks at Londonderry (Derry), Newry, and a failed attack at Omagh (Coogan, 2002, 248). The two bombs that successfully detonated resulted in unprecedented outrage within both the Protestant and Catholic communities (Dettmer and Gorman, 1990). The devastation to mixed working-class neighborhood united many Catholics and Protestants in outrage and the Catholic clergy voiced its opposition (Bloom and Horgan, 2008). In the poor Catholic neighborhoods where support for the IRA was the strongest, the proxy bombs caused backlash against the group (Prokesch, 1990). In fact, the public opinion against the IRA became so negative that the group abandoned the tactic (Bloom and Horgan, 2008). The outrage caused by the civilian deaths exacerbated divisions within the group's leadership and the broad public repulsion strengthened the position of the doves in the group, particularly Gerry Adams, who was largely responsible for considering how the movement could effectively abandon violence (Bloom and Horgan, 2008). There is no doubt that the significance of the events of 1990 and the shift in tactics due to public disapproval were instrumental in shaping the future of the group. The public disapproval was echoed in reactions to Omagh in 1998, which finally entrusted the reign of terror to a historical footnote (Bloom and Horgan, 2008).

Omagh Bombing

The peace process proceeded in Northern Ireland in the late 1990s. Opposing the peace process, a dissident group, the Real Irish Republican Army (RIRA), was formed to continue the armed struggle for a unified Ireland (Becker, 2015). The group conducted the Omagh car bombing in 1998.[7] Omagh represented the largest loss of life in any single incident of the Irish troubles since 1969 (Johnson, 2012). It underlined the fragility of the peace process as it was developing through the 1990s and proved to be a debacle for the RIRA, eliciting vehement revulsion among the population (Becker, 2015). Ironically, it also served as a catalyst to the peace-making process, as Catholics and Protestants shared the grief of communal loss and trauma (Johnson, 2012). In contrast to the scarce attention paid by the republican publications to previous atrocities like Bloody Friday (1972), the Birmingham bombs (1974), the Enniskillen bomb (1987), and the Shankill Road bomb (1993), Omagh was largely covered (Alonso, 2001). Condemnation of the bombing came from a variety of sources including leaders on both sides of the conflict, signifying a watershed that distinguished this bombing from earlier acts of violence (Johnson, 2012). Denunciation of Omagh marked a historic transformation in the movement's thinking; it sidelined militarism that had obscured the political interests of the group (Alonso, 2001). Omagh not only failed to even rally tepid Irish support for RIRA's platform (Becker, 2015), but rather the Irish community reacted with such outrage that the group declared a cease-fire (Cronin, 2006, 21). The implementation of the Belfast Agreement in 1998 established a structure for governance, which installed the framework for a new power sharing (Johnson, 2012). In 2005, the IRA made a public statement ordering an end to the armed campaign and instructing its members to seek nonviolent political means (Besley and Mueller, 2012).

Conclusion

Herein, we utilized an evolutionary model to show that terrorism is unlikely to survive any selection process that favors behaviors with higher payoffs. Our simulations show an approximation of the explicit dynamics of the underlying Markov process. Terrorism fails due its inherent deficiency to manufacture sustainable

benefits for its potential constituency. We observe that the dynamics of the model favors behavior that inflates collective good and deflates costs over time. Therefore behavior that reduces the fitness of the community will be forced out. The concept of failure to transit to the next generation is closely related to our model and to the theories, which posit that terrorist violence is associated with the rise and fall of generations (Cronin, 2006).

Cronin (2006) notes that popular support for a terror group can dissipate for a number of reasons such as the loss of population interest in the ideology of a terror group or revulsion among its claimed constituency. Extreme violence can lead to civilian disenchantment with the terror group's operations. Conflict in Northern Ireland was a major source of social and economic dislocation since paramilitary feuding and sectarianism reigned. Over time, a series of important events effectively drove a wedge between the IRA and the very public it purported to represent. The IRA operations caused the group to lose public support by generating colossal revulsion among its constituency. Finally, the IRA abandoned the use of terror and joined the political process. The case of the IRA shows that costly terror campaigns can diminish popular support among terror group's potential constituency and facilitate its demise.

Why terror groups decline is an important question to inform counterterrorism agencies. Counterterrorism measures should not ignore the capabilities and the dynamics of the terror groups' constituency. A number of policy conclusions follow from our results. First, terror group's size matters for survival and sustainment of terror campaigns. Second, there is immense media attention spurred by terror groups; and the need to analyze and profile the perpetuators when targets are in the West is considerable. However, the plight of terrorism largely impacts and is deeply felt in countries where terror groups maintain control, claim territory, or conduct attacks regularly. It is important to note that terror groups present an ongoing threat to these communities. Reflecting the hardship imposed on such communities and highlighting their plight can help reduce support from terror group's potential constituency; this can be an effective mean of hastening terror groups' demise (Cronin, 2006). Third, it is important to take measures to counter the alienation of communities whose help are vital to counterterrorism agencies. Importantly, it is essential to curb discrimination against communities who share common religion and ethnicity with terror groups but live in targeted countries. For example, Gould and Klor (2014) investigated whether the 9/11 attacks affected the assimilation rate of Muslims in the U.S. They found that attacks by Islamic groups are likely to induce a backlash against Muslims, thereby raising the costs of assimilation. Further, Muslim immigrants living in states with the sharpest increase in hate crimes exhibit the following: a greater likelihood of marrying within their own ethnic group, higher fertility, lower female labor force participation, and lower English proficiency (Gould and Klor, 2012). These factors can further alienate communities and create vulnerable populations susceptible to terrorist recruitment within societies. Cooperation with communities where terrorists may tap into in order to recruit is essential to fight terrorism.

While our study was theoretically motivated, our model and simulations contribute to the emerging evolutionary explanation of why groups collectively and powerfully influence human behavior (Axtell et al., 2001; Hammond and Axelrod, 2006; Choi et al., 2007). In future research the genetic transmission process in the model could be modified via mutations, learning, and influential contagions. There is evidence that human parochialism can be redirected and even overridden by deliberate teaching, exposure, and indeed by other aspects of socialization (Choi and Bowles, 2007). While our aim is not to trivialize the potential of terror groups to cause harm, we argue that the burden of terrorism on its potential constituency is very high, making the tactic a failure by design. In future studies, we hope to use complementary data to test our model quantitatively, and compare it with alternative models.

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Notes

[1] The following link explains the Netlogo programming language in detail: https://ccl.northwestern.edu/netlogo/docs/programming.html

[2] We use Choi and Bowles' (2007) hypothetical alleles; our population can inherit a combination of these alleles. Terrorism is arguably a form of war; however, terrorists use asymmetrical violence because they are unable or unwilling to meet a status quo government on the battlefield (Cronin 2006).

[3]In our model, the benchmark for x is 2 ($x = 2$).

[4]Note that unlike Anderton's model (2014) we incorporate the cost-benefit calculations in our analysis.

[5] Our benchmark values were the following: $\delta\eta = 0.9$, $\delta\iota = 0.1$, $\gamma\eta = 0.2$, and $\gamma\iota = 0.8$ However, the user can manipulate these values using the model's slider.

[6] On Bloody Sunday (1972), British troops killed 13 unarmed civilians in Derry; this fueled a massive influx of recruits into the IRA (see Sànchez-Cuenca 2007).

[7] See "Omagh Bombing Kills 28," BBC News, August 16, 1998, http://news.bbc.co.uk/2/ hi/events/northern_ireland/latest_news/152156.stm.