



UNIVERSITÄT
BAYREUTH

Terrorism: game theory and other explanations

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Bayreuth, May 2004



This paper **Terrorism: game theory and other explanations**
was written for the seminar **Issues in Social Policy**
by **Prof.Dr. Sebastiano Bavetta**
Wintersemester 2003/2004

Words: 14155

Characters: 78830

21.05.2004

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Introduction¹

The topic of terrorism has received considerable attention in the last decade, notwithstanding terrorism being a method of political conflict since millennia². Aspects of terrorism are discussed in all fields of social science, from anthropology to economics, from philosophy to sociology. Paradoxically individuals in society (and even more individuals in the science community) are fascinated by the mechanisms and effects of terrorism, even though most people nowadays live in a world completely safe of violence, given the amount of daily violence that our ancestors experienced throughout the centuries. Provoked by the sheer arbitrarily and disastrously violent nature of terrorism, we steer our attention to the cause of terrorism and wonder: "Why?"³

Both scientists and politicians are puzzled by the questions: "Why do certain groups solve their political problems through terrorism while others do not?", "Why is the rate of terrorism in some countries higher than in other countries?" and "Why are some countries targets of terrorism while others are not?"

Answers are given by a number of theories and this essay does not provide enough space to illustrate all theories in detail. In the first part, I focus on the definition, impact and dimension of terrorism. In the second part, I discuss various ways of game-theoretical explanations of terrorism. In the third part, I link the discussion of game theory with other theories rooting terrorism in the macro-context of terrorism, such as a terrorists' culture, religion, economic status or political situation.

1. Definition and Impact of Terrorism

Definition

There are numerous definitions of terrorism, due to the different approaches taken from the different sciences and scholars⁴. But some common features surface in all definitions:

First, terrorism involves aggression against non-combatants. It can be directed against civilians, government officials, politicians, companies, institutions, or infrastructure. Unlike aggression in war, the main targets are not military objects and the aim is not a military defeat of the enemy.

¹ Terrorism is normally not a topic of philosophy, but Dr. Sebastiano Bavetta of the London School of Economics, who served as Adam-Smith-Professor at the University Bayreuth, steered my attention to the many philosophical and economical aspects of this interesting topic. I would like to thank him and his successor in Bayreuth, Dr. Matthew Braham from University of Hamburg, who both convinced me, that game theory is not about number juggling and graphs, but about a certain intellectual approach when discussing social phenomena. I would also like to thank family and friends for valuable comments on the paper.

² Merari, Friedland (1985)

³ The fear of terrorism sometimes takes ridiculous turns: In the Map of Terrorism Risk for 2003, among the countries where the terrorism risk is negligible (the lowest risk category on that map) are Greenland, Mongolia, New Zealand, Panama and surprisingly Libya. Almost all of Western Europe, the USA and a considerable large number of countries in Asia are placed in the "High Risk" and "Extreme Risk". It seems that the drawers of the map want to suggest that living in any country with economic activity or dense population, terrorism risk is high, neglecting the fact that the risk of being victim of a terrorist attack depends not only on nationality, but maybe also on place of residence and profession. Aon Crisis Management (2003)

⁴ Schmid, Jongman (1983)

Second, terrorist acts alone do not accomplish the political goal of the terrorist. The political goal is accomplished if the action influences a target audience and changes the audience's behaviour and opinions. It is necessary to distinguish between the actual targets of the violence and the targets of terror. The change in behaviour of the terror target group causes fear and undermines the sense of security of the terror target group, even though they not necessarily belong to the group targeted by the violence.⁵

The expression of a diminished sense of security motivates the government of the target group to adopt new policies, which (as hoped for by the terrorists) are beneficial for accomplishing the political goal of the terrorists. Consequently, the creation of fear is only means to achieve a political goal - it is not an unintentional consequence of the violence.⁶

Since the governments are the recipients of the political message of terrorism, while the target groups are only the messengers, some scholars consider terrorism to be a strategy of political communication.⁷

Table 1: Dimensions of Terrorism⁸

Variable	Classification
Perpetrator number	Individual vs. group
Sponsorship	State vs. sub-state vs. individual
Relation to authority	Anti-state/anti-establishment/separatist vs. pro-state/pro-establishment
Locale	Intrastate vs. transnational
Military status	Civilian vs. paramilitary or military
Spiritual motivation	Secular vs. religious
Financial motivation	Idealistic vs. entrepreneurial
Political ideology	Leftist/socialist vs. rightist/fascist vs. anarchist
Hierarchical role	Sponsor vs. leader versus middle management vs. follower
Willingness to die	Suicidal vs. non-suicidal
Target	Property (including data) vs. individuals vs. masses of people
Methodology	Bombing, assassination, kidnapping/hostage taking, mass poisoning, rape, other (e.g., bioterrorism, cyber-terrorism)

Most scholars accept and use the following definition of terrorism: Terrorism is the premeditated or threatened use of extra-normal violence or force to obtain a political, religious or ideological objective through the intimidation of a large audience⁹.

The difficulties of analysing the roots, goals, strategies of terrorism are due to different dimensions of terrorism. Each

dimension marks specific characteristics of terrorism (see Table 1), which begs the question: Can we really speak of 'the terrorist'? Would it not be better to analyse certain types of terrorists?

To distinguish different kinds of terrorism, first and foremost we must ask who perpetrates terrorism: the state, sub-state groups, or individuals?

In this paper I focus on non-state terrorism, and especially on sub-state group terrorism.¹⁰ However the border between state and sub-state terrorism is far from drawn clearly. The

⁵ Schmid, Jongman (1988a); Badey (1998); Laqueur (1999); Smith (2004)

⁶ Jenkins (1975); Schmid, Jongman (1988a); Wilkinson (1990); Smith (2004)

⁷ Barth (2002); Frey, Luchinger (2003)

⁸ Victoroff (2005)

⁹ Enders and Sandler (1993), (1999), (2000); Li, Schaub (2004)

¹⁰ Two reasons for neglecting inter-state terrorism and individual terrorism:

- First, *state* terrorism is difficult to distinguish from other methods of warfare, except that war at least involves the declaration of war. But other than that, all other methods (like destruction of military and civil targets, sabotage, espionage and gathering of intelligence, symbolic attacks to undermine sense of security, propaganda) can be found both in inter-state terrorism and inter-state war. Modeling of these interactions in game theory would only result in vague description. I personally think that methods of political science and historical science are better suited to discuss these phenomena.

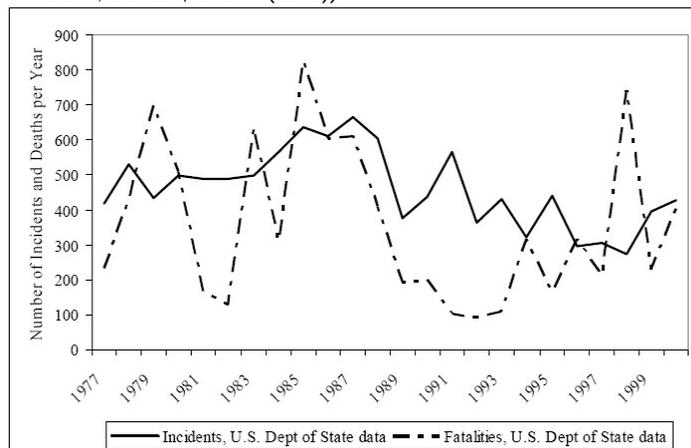
pro-government paramilitary death squads in South Africa or Columbia are an example of terrorism that encompasses both state and sub-state actors. Nor is the border between individual and sub-state terrorism drawn clearly, especially when we look at suicide terrorism.¹¹

Political sub-state group terrorism can be divided into five categories: (1) social revolutionary terrorism, (2) right-wing terrorism, (3) nationalist-separatist terrorism, (4) religious extremist terrorism, and (5) single-issue (e.g. animal rights) terrorism¹². For most parts of this essay, I concentrate on the fourth category, religious extremist terrorism. The other categories are still very relevant and often underestimated by media and academia, but at the moment the fourth category seems to be responsible for a special kind of terrorism: transnational terrorism. Transnational terrorism receives most of the media attention and is often connected with tightening security policies or increased military spending. Also, transnational terrorism is a reason given for military actions and threats from the West against other countries which are alleged of hosting or supporting terrorism. Besides its importance for politics and society, transnational terrorism is simply interesting to model in game theory since it involves a multitude of different actors and strategies.¹³

Impact

The definition of terrorism is broad enough to encompass different manifestations of terrorism. Yet researchers have to face the problem of terrorism statistics that do not distinguish between different kinds of terrorism. Thus it is very difficult to assess general tendencies in the impact of terrorism.

Image 1: Transnational Terrorism, 1977-2000, Number of events and person killed (U.S. Department of State, Patterns of Global Terrorism; Sandler, Enders (2002))



The number of terrorist acts and the amount of fatalities is considerably fluctuating over the last forty years. Ignoring different national situations and types of terrorism, we can see that the amount of incidents has generally decreased, while especially in the last ten years the fatalities have increased. In other words: terrorism became more lethal.¹⁴

- Second, a discussion of *individual* terrorism often needs to involve a discussion on the motivations of individual terrorism; however this would extend to far into the field of psychology and psycho analysis. Individual terrorism is not necessarily related to political goals and I personally think it is only safe to assume political goals, on which the analysis of terrorism in this essay partially rests, when speaking of sub-state *group* terrorism.

¹¹ Hoffman (1998); Stern (1999); Victoroff (2005)

¹² Post (2004); Victoroff (2005)

¹³ The focus on trans-national sub-state terrorism by religiously motivated groups is not proportional to threat: I believe that violence sponsored or carried out by the state or government-linked organizations is threatening more people on this planet than transnational sub-state religious extremist terrorism. The total amount of people fearing torture, discrimination, and arbitrary prosecution by their governments is probably substantially higher than the total amount of people that have reasons to be afraid of transnational sub-state terrorism. The main difference is: the first group lives in underdeveloped countries in Africa, South-East Asia, or South America, while the second group lives in Europe and in the US. It is no surprise that Western media focuses on the perceived threat to the West, even though the threat to the first group would deserve equal or even more attention.

¹⁴ Sandler, Enders (2002); Pape (2003); Kristoff (2002): „Terrorist incidents in the 1970s (such as at the Munich Olympics) had maximum death tolls of about a dozen; attacks in the 1980s and 1990s raised the scale (as in the Air

The impact of terrorism can also be viewed in economic terms. The damages resulting from the attacks of 9/11 are estimated at 80 to 90 billion US-\$, which is more damage than caused by most natural catastrophic disasters. But what does this number tell us? Not much, since natural catastrophes are singular events, but as said before the aim of terrorism is a procedural one: undermining the sense of security. But how is the sense of security related to our economic situation? How does it impact on economic growth? We can only estimate by looking at indirect effects of terrorism, such as a decrease in tourism or housing prices, or an increase in security spending of individuals, but most of these figures are also shaped by other factors and it is quite difficult to single out terrorism as cause for those indirect effects.¹⁵ In general, the economic costs of terrorism beyond the immediate damages are very difficult to measure and compare with economic costs of other activities – maybe we can only safely say that terrorism has an economic impact.

Let us look at the political impacts of terrorism. Terrorism draws attention to the vulnerability of modern societies. The governments respond with tighter security measures and more spending on military and homeland security issues. Since most budgets of governments are finite, the increased spending on military and homeland security needs to be taken out of other policy areas.¹⁶ Governments have to justify the shifts in their budgets and these shifts might be support or opposed by the constituents of the governments. Terrorism has political ramifications in societies, including the elections of governments (as can be seen in the Spanish elections of 2004). In short, terrorism significantly shapes the set-up of and the political relations within societies.

The terrorist attacks occur not only in one country, but several countries are target countries. Even though countries decide their counterterrorism activities independently, the outcomes of these decisions are interdependent¹⁷, as will be discussed in the chapter on games between target states. Terrorism introduces a new trend of supra-nationalism: it gives incentive for the governments to coordinate their activities. In short, terrorism shapes the set-up between and the political relations of societies across the globe.

Three interlocking trends have accompanied the changed nature and degree of the terrorism.¹⁸

The first trend, the globalization of commerce, travel, and information transfer, has brought worldwide attention to economic disparities and differences in cultures. The global communication technology (maybe) facilitated a co-operation of sub-state terrorist actors living in various parts of the world sharing similar aims.

India and Pan Am 103 bombings) to the hundreds; 9/11 lifted the toll into the thousands; and terrorists are now nosing around weapons of mass destruction that could kill hundreds of thousands."

¹⁵ Frey, Lüchinger (2003); Goldsmith (2003); Kunreuther, Michel-Kerjan (2004); Sandler, Rosendorff (2005)

¹⁶ Office of Management and Budget (2003); Sandler, Arce (2005) "Since 2002, the budget supporting the newly created U.S. Department of Homeland Security grew by more than 60 percent to \$36.2 billion for fiscal year 2004."

¹⁷ Enders, Sandler (1993); Sandler, Enders (2004); Sandler, Rosendorff (2005); Arc, Sandler (2005)

¹⁸ Hoffman (1998); Laqueur (1999); Enders, Sandler (2000); Victoroff (2005)

The second trend, the rise of religious fundamentalism, as a counterweight to the market-economic, democratic, and secular trends of modernity, (maybe) added to the change of threat. Religious fundamentalism gives a deceptively moral dimension to terrorism – political and religious motivations intertwine.

The third trend, the privatization of weapons of mass destruction, puts the potential of large-scale terrorist acts into the hands of small groups or even individuals.

These three trends along with the transformation of terrorism occurred simultaneously. But did they cause this transformation? I would like to raise three doubts:

First, because of the globalisation of communication and information technology surely the creation of fear works better: the media attention contributes to the spread of the terrorist message. However, it is not at all clear that the recent terrorist acts in New York, Madrid, or London (to name those that are most vivid in Western minds) needed globalisation; they were still logistically possible without the globalisation of information technology, commerce and travel.¹⁹

Second, while religious fundamentalism maybe increased the attraction of terrorism and sharpened observations on conflicting values and religions, the trends of modernity, globalisation on the one hand, and religious fundamentalism on the other hand were not created in the last 15 years, but are existing for decades. We have to ask ourselves: why are these two trends *now* important for the transformation of terrorism and not already *15 or 25 years ago*?

Third, none of the recent terrorist acts in New York, Madrid, and London used weapons of mass destructions. Of course, it is speculation whether some terrorist groups have those weapons, but if they do, why did they not use it?

To speak in the language of game theory, maybe these combined trends changed the set up of the terrorism game, has opened new strategies that were not available before. However we have to acknowledge that these trends by themselves do not sufficiently explain the changed nature of terrorism. Still, before discussing the causes of terrorism's changed nature, we first need to discuss in detail the nature of terrorism, which is done in the next chapter.

¹⁹ As an historical example, think of the Vikings: for most of the people in Western Europe of the Early Middle Ages, the continuing yet random attacks by the people of Scandinavia resembled much what we think of terrorism, except that the activities of the Vikings were not intended to serve a political goal, but a economical one. However, the creation of fear worked equally well.

2. Terrorism and Game Theory

Rationality and Terrorism

The inhumanity and cruelty of terrorist acts, the attacks on innocent people, and the incoherent motivations suggests that most terrorists are not rational from our point of view.²⁰ On the other hand, often terrorists achieve their political goals quite well²¹, their strategies seem to have success and their behaviour seems rational if seen from their point of view.

Rationality implies that terrorists are goal oriented and rank their strategies according to their goals and their preferences. They maximize their utility within budgetary constraints because their actions depend on the relative costs of legal and illegal activities, the relative gains between these two types of activities and their total resources available. Terrorists consider their costs including risk, time and likelihood of confrontation with the authorities or their supporters. Terrorists change their strategies when the constraints are changed and they refrain from behaviour that prohibits the fulfilment of their goals.²² Even if their goals are intolerable from a 'rational' point of view, the combination of resources in order to reach their goals is rational.

Difficulties of modelling terrorism in game theory

If we assume rationality of the terrorists, we can use game theory to identify the strategic interactions, such as dominant strategies and the issue of threats. Most 'irrational' notions of terrorism can be incorporated in the framework of game theory by adjusting strategies and pay-offs in the game. Game theory also allows uncertainty and behaviour under risk. And finally, it explains changes of behaviour when the rules of the game are changed.²³

Modelling terrorism in game theory is complicated. Terrorism is a complex social phenomenon, which makes it hard to identify the set-up the game. The political and economical implications are difficult to measure and therefore the pay-offs are difficult to state. The terrorism game involves decisions by different kinds of actors on multiple stages of the game, therefore the strategies are also difficult to assess. To come to terms with these difficulties, it is reasonable to look at the each sub-game of the whole game separately, identifying the different sub-games by the different participating players.

There are at least five different groups of players: (1) terrorist groups, (2) civil supporters of terrorism, (3) states where terrorism originates and which choose to either support

²⁰ Crenshaw(2000); Brannan, Eslerm, Anders Strindberg (2001); Victoroff (2005)

²¹ Laqueur (1987); Hoffman (1998), (1999); Whittaker (2001); Sandler, Enders (2004); Victoroff (2005), p.15: "Irgun's bombings were a major factor in securing the independence of Eretz Israel from the British; terrorism by the Irish Republican Army (IRA) precipitated accommodations leading to the Irish Free State; Shi'ite Muslim terrorists provided key assistance in the ouster of the Shah of Iran; Hezbollah's suicide bombing campaign of 1983-1985 directly led to the American, French, and Israeli withdrawal and establishment of a Shi'a-controlled society in major parts of Lebanon; and the African National Congress (ANC) used terrorism as part of its remarkably successful strategy to overthrow the apartheid government of South Africa. More recently, al Qaeda's brutal transnational campaign, including the mass murders at New York's World Trade Center in 2001, may have not only rapidly advanced Usama bin Laden's stated goal of removing the large U.S. military presence from Saudi Arabia but also served as an extremely potent recruiting tool."

²² Sandler, Tschirhart and Cauley (1983); Mickolus (1987); Li, Schaub (2004)

²³ Sandler, Arce (2003); Victoroff (2005)

or combat terrorism, (4) states which are targets of terrorism, (5) the civil society of target states. We could easily identify further groups of players, such as international governmental or non-governmental organisations or corporations, but I believe that these five groups capture the most relevant groups in the terrorism game.²⁴

Subsequently, I will discuss some specific games of terrorism, distinguishable by the different players participating in the game.

Games between terrorists

The first game to discuss is between different terrorist groups. Surprisingly, the literature on game theory and terrorism often ignores this problem. Maybe most scholars think that the game between terrorist is not particular interesting, because of a lack of conflicting interests between terrorists groups. Therefore I try to develop my own model for the interaction between terrorists to show that indeed there are conflicting interests in this game, which shape the outcome of this game.

The effectiveness of a terrorist act to reach an audience depends on the time, place and scale of the terrorist act. Large-scale terrorism acts in foreign countries with heavy protection (like the U.S.) are more difficult to plan and execute than small-scale terrorism acts in countries with little protection (like Iraq). The choice of strategy is a question of available resources because trivially more resources are needed for larger terrorism acts.

Then again, the support and the media attention towards the terrorists increase with the scale of the terrorist acts. Hence, terrorists have to find an optimal strategy to reach a maximum audience while using a minimal amount of resources.

A simple model of this game is given in Tables 2 and 3. The terrorist groups are modelled as two independent players. Both have a choice between targeting either country A or

Table 2: Terrorist games on resources

Targets Group 1	Group 2 Period	A		B	
		T1	T2	T1	T2
		A	T1	-r	-r
	T2	-2r	-r	-1.5 r	-r
B	T1	-R	-R	-R	-R
	T2	-1.5 R	-R	-2R	-R

B, both have a choice between executing the attack in period T1 or period T2. The pay-offs are given only for group 1, but group 2 has corresponding pay-offs.

In Table 2 the game on resources is modelled. I assume that country A is an easy target that needs only resources r , while B needs resources R , with $r < R$. If the groups are either both first-movers or both second-movers, then they both have to pay either r or R (depending on their target) in order to perform the terrorist act. If group 2 moves first, and group 1 moves second, the targets improve their security systems in period 2. Consequently more resources have to be invested by group 1 if they strike in period 2.

If group 2 in period 1 targets the same country as group 1 in period 2, then group 1 has to invest doubled resources (either $2r$ or $2R$). If group 2 in period 1 targets a different country than group 1 in period 2, group 1 has to invest resources between $1r$ and $2r$ (or between $1R$ and $2R$). I choose arbitrarily $1.5r$ ($1.5R$).

²⁴ E.g. different strategies and aims of political and militant wings within a terrorist organisation. Siqueira (2005)

The reason is: if a country experienced a terrorist attack in period 1 in their own country, they will spend more on increased security in period 2, resulting in higher costs for the group attacking in period 2. On the other hand, if a country *observed* a terrorist act in period 1 in *another* country, they will increase their security, but not as much as if they had *experienced* a terrorist attack in their *own* country. Obviously, if group 1 chooses period 1, it does not matter for the resources if group 2 chooses period 1 or 2.

Note that in the game on resources, the strategy of choosing period 1 is dominant for target A and target B. Even more, since $r > R$, the strategy of choosing A in T1 is dominant to choose B in T1.

Table 3: Terrorist games on media attention

In Table 3, the pay-offs for media attention is given. The available media attention in country A is m , while in country B the media attention is M , with $m < M$.²⁵

Targets	Group 1	Group 2		A		B	
		Period		T1	T2	T1	T2
A	T1			.5m	m	.5m+.5M	m
	T2			2m	.5m	m	.5m+.5M
B	T1			.5m+.5M	M	.5M	M
	T2			M	.5m+.5M	2M	.5M

If one group strikes first in either country A or B, this group receives a payoff m or M respectively, since the media attention focuses the first time on this terrorist group. If both groups strike the same target in the same period, they have to share the media attention of the country - to keep it simple, I assume that they receive exactly $0.5m$ (or $0.5M$). If both groups strike different targets in the same period, they have to share the media attention of both countries ($0.5m+0.5M$). If one group attacks a country in period 1 and the other group attacks the same country in period 2, the second mover receives doubled media attention ($2m$ or $2M$).

Note that there are no dominant strategies and no Nash-equilibria, unless $m=M$ (which results in all strategy combination of both groups attacking in period 2 being Nash-equilibria).

Table 4: Example of a game between terrorists

What happens if both games are combined? For better understanding of the mechanics of the combined game, I choose a concrete example and set $r=2$, $R=6$, $m=4$, $M=8$. In Table 4, the payoffs are given for group 1 and for group 2, and for clarity the strategies are grouped by periods in the upper half of the table and by targets in the lower half of the table.

Settings		$r=2$	$R=6$	$m=4$	$M=8$		
Targets	Group 1	Group 2		A		B	
		Period		T1	T2	T1	T2
A	T1			0,0	2,4	4,0	2,-1
	T2			4,2	0,0	1,2	4,0
B	T1			0,4	2,1	-2,-2	2,4
	T2			-1,2	0,4	4,2	-2,-2
Period	Group 1	Group 2		T1		T2	
		Targets		A	B	A	B
T1	A			0,0	4,0	2,4	2,-1
	B			0,4	-2,-2	2,1	2,4
T2	A			4,2	1,2	0,0	4,0
	B			-1,2	4,2	0,4	-2,-2

Note that in the combined game, the only dominant strategy is to choose target A in

²⁵ At this point, a clarification is useful: Country A resembles in my model Iraq (or any other Arab country) with comparatively little defense possibilities and comparatively little media attention in the Western countries, which is the target audience of the terrorist. Country B resembles the U.S.A., with comparatively large defense possibilities and a comparatively huge media attention in the West.

period one, however if they both choose their dominant strategy in period 1, they end up with no pay-off. There is no motivation to choose B in period 1: the other group would immediately exploit such behaviour by choosing A in period 1. Even if by chance the other group chooses also B, the outcome is disastrous since they have to share the media-attention of target B while investing high amount of resources.

The sub-game of period 1 shows strong incentives for both groups to coordinate their efforts. If group 1 subsidises the efforts of group 2 to attack B, they can benefit from attacking A in period 1 or also attacking B in period 2.

Quite contrary to belief, it is wise for terrorist groups not to act independently, but to coordinate strategies. Both groups (regardless whether they are first- or second-movers) have incentives to stick to their strategy, which generates trust among the groups and opens the floor for enhanced cooperation. Cooperation and dependency is the nature of the game between terrorists.

This essay does not provide the space, but it can be shown that in terrorist games with more than two players (and the payoff scheme of Table 2 and 3), the establishment of networks of cooperation is a beneficial strategy for all involved players.

Additionally it can be shown that establishment of networks is not a random process that could happen by chance. Cooperative strategies by chance are more likely to happen if Nash-equilibria exist and dominant strategies point towards cooperation. Nash equilibria and dominant strategies surface in this game only in some specific set-ups of the game, one instance being shown in the example of Table 4. In all other games, there has to be an active redistribution of payments between the terrorist groups in order to establish cooperation, but in the end this cooperation always pays off.

This example explains to some extent the possibility of terrorist networks - without suggesting that terrorist networks necessarily arise. Since the setting of the games is also dependent on the actions of the targets (a game that is discussed later in this chapter), the idea of a counterterrorism strategy that does not combat *terrorist groups*, but the *establishment and continuation of terrorism networks*, is something to be thought of.

Games between terrorists and their origin society

In the discussion on games between terrorist groups, I already mentioned that terrorist groups are competitors in the game of support by their society. In this part, I want to discuss more detailed the nature of the game between terrorists and their origin society. I reflect on two special aspects: the game between terrorists and the terrorist community, and the game between terrorists and their origin state.

Why can we think of terrorist groups and their supporters as participants in a game even on opposed sides? Both share the same political goals. Naïvely assumed, they ought to participate 'on the same side' of the game.

The supporters and the terrorists might share the same political goals, but most certainly have conflicting views on the methods of terrorism. For sure, they will diverge on who has to bear the external costs of terrorism.

The terrorists offer to fulfil the aims of their supporters, but the terrorist groups differ in their methods (e.g. the amount of violence used against a target group), and these methods differ in the risk of externalities that 'fire back' against the host society. If the target group (e.g. the US-government) decides to increase security measures against members of a certain nationality (e.g. citizens from Arab countries) because of terrorism from Arab countries, these tightened security measures have to be endured by all members of the terrorists' origin society. For the supporters, the question of who to support depends on whose methods bear the lowest risks of 'backfiring' at the supporters while achieving most of their political goals.

The terrorist groups also have to find a strategy that maximises the fulfilment of their aims, minimizes their costs and ensures the support from their constituents.²⁶ Their choice is not only the scale, time and place of the terrorist act as discussed in the previous section. How much of their resources they spend on disclosing or revealing their identity is relevant for the success and the 'backfiring'-risk of the terrorists' actions. A terrorist group often faces two opposing strategies: revealing their identity to advance their own and their supporters' political goals (if the target audience does not know the political background of the terrorists, it can not push the government towards policies that are beneficial for the terrorist) or disclosing their identity in order to protect their supporters and prevent them from bearing the indirect costs of terrorism.

The sub-game between terrorists and their supporters is characterized by the interdependency of players with conflicting interests. The fact of terrorists and their supporters not always being 'on the same side' of the game does not constitute a latent rivalry between supporters and terrorists. Yet an often neglected discussion in the literature on counterterrorism strategies is the question on how counterterrorism divides or unites supporters and terrorists.

Two games from the category of games between terrorist and their supporters are those between terrorism and terrorist community, and between terrorism and origin state.

Terrorism and the terrorist community

A special game is suicide terrorism: normally rational players would not engage in a game that involves their own termination, unless the sum of all future pay-offs is less than the expected pay-off of the game. Some scholars²⁷ argue that suicide terrorism resembles such a game. It can be seen as a three-party contract between an individual, his community and a terrorist group. According to these scholars, the community needs to be involved in a power struggle with the political aim to overcome this power struggle. The act of the suicide terrorists helps to fulfil that aim. The community values the martyrdom of suicide terrorism in order for the individual to receive a beneficial 'collective identity' from his community. The immediate

²⁶ Sandler, Tschirhart, Cauley (1983); Sandler, Lapan (1988); Crenshaw (1992); Wilson (2000); Victoroff (2005)

²⁷ Brooks (2002); Harrison (2003), Azam (forthcoming)

family of the suicide terrorist sometimes receives financial support after the terrorist act - a further step towards the 'collective identity' of the individual. The individual who commits suicide terrorism, according to these scholars, has a predisposition to receive a higher value from his 'collective identity' than from his life, but it is the terrorist group who converts this predisposition into action.

I do not go deeply into the discussion of this model. From my point of view, many assumptions about the psychological nature of terrorism, and especially of suicide terrorism, are very speculative. It is almost impossible to comprehensively research the psychology of suicide terrorists: if successful they are dead; if not successful yet they do not reveal themselves to researchers; or if unsuccessful and arrested their psychological nature has most likely changed from the failed attempt at suicide terrorism.

More fruitful is the discussion on the actions of terrorists and their origin states, since it is easier to discuss the strategies without assuming certain psychological traits of the terrorists.

Terrorism and the terrorists' origin states

The nature of the game between the origin state and the terrorists is far from obvious: assuming that the origin state is not as well a target state, why should it care about the activities of its citizens? States choose whether they combat, ignore or support terrorist groups within their boundaries. Reasons for supporting terrorism are not only ideological – if the constituents of terrorism are relatively great in numbers within a country, they also constitute an important political factor. On the other side, the pressure of target states on origin states to combat terrorism exists as well. For states (like Pakistan) is not easy to find the optimal strategy between combating terrorism and not irritating the supporters, if an important fraction of society supports the terrorists' goals.

For the terrorists the support by governments is essential. Especially the long-term survival of terrorist groups depends on government support because often they can not generate enough own resources.²⁸ Even if terrorist groups do not depend on direct support by governments and can rely on other external support, they depend on the inattention of their government when receiving this external support. To some extent, they have to spend resources on receiving support and their terrorism methods might determine whether a government is likely to ignore or even support them.

To model the specific game between terrorist and their origin states is very difficult because of the range of government support. Government support can be divided into five categories with increasing degree of support: support by terrorism-intimidated governments (e.g. granting terrorism demands or refusing to sign anti-terror treaties); ideologically supportive governments (propaganda support to terrorist groups or early release of incarcerated terrorists); generally facilitating terrorism (allowing terrorists to reside in the country or training to terrorism groups); incident-specific support (providing false documents or financing specific

²⁸ Schmid (1988b); Mickolus (1989)

terrorist actions); and jointly supportive governments (providing intelligence to terrorists, joining of government personnel to the terrorist group, incarcerating hostages).²⁹ Each of these categories and types of support involve different strategies of both the terrorist and the origin state.

Table 5: Strategies of Terrorists and Origin State without cooperation

A simple model of the game is given in Table 5. The model significantly reduces the strategies available to the terrorists and the origin state. As indicated in Table 5, the terrorists can choose

		State	
		Punish	Not punish
Terrorists	Terror	2,-2	3,-3
	No Terror	-1,-1	0,0

between terror and not committing terrorist acts. Assume that terror gives a utility of 3, while the other strategy gives no utility. It is sensible to assume a zero-sum game, in other word the terror strategy gives equal negative utility to the state (-3). The state can choose between investing resources to combat terrorism and punish terrorists. Assume that a punish strategy diminishes the terrorists utility by one. The state has to spend resources equal to one utility unit in order to find the terrorist. Note that there are two Nash-equilibria at the strategy combinations "terror-punish" and "no terror- not punish", but for the terrorists the strategy "terror" is dominant.

Table 6: Strategies of Terrorists and Origin State with cooperation

The obvious result is that the terrorists chose to terrorise, while the state is forced to combat terrorism. The state could enter a binding agreement: the state agrees not to punish the terrorists, the terrorists agree not to attack within the state. Such an agreement avoids the zero-sum-nature of the game (see Table 6) and changes the utility of the state in case of the "terror"-strategy into zero, which makes the "not-punish" strategy the dominant strategy. In short, in the game between origin states and terrorist, there are incentives to enter binding agreements.

		State	
		Punish	Not Punish
Terrorists	Terror	2,-1	3,0
	No Terror	-1,-1	0,0

In order to discuss counterterrorism strategies, one has to specify the strategies of both terrorists and origin state in more detail. Yet even this simple analysis offers insights into possible counterterrorism strategies of target states: either make agreements between origin states and terrorists impossible, or support the origin state in combating terrorism in order to make him indifferent or even inclined to the "punish"-strategy.

²⁹ Mickolus (1989) identifies thirty-two measures of government support distinguishable in five degrees of support. Of those thirty-two possibilities in his eyes only twelve can be considered state support (providing of false identification, financing, training, provisions of weapon, participation with intelligence material in the planning of operation, joining terrorist attack squad, incarcerating hostages, shooting at hostage rescue squads).

Games between terrorist and target society

In the previous part the games between terrorists and their origin society were discussed. The last part of this chapter focuses on terrorism and games played with and within target societies. I reflect on three specific games: games among target states, games between target governments and target citizens, and finally games between terrorists and target states.

Counterterrorism and target states

As mentioned before, many counterterrorism strategies not only shape the game between the target states and the terrorists, but also the game between the several target states. Some target states are more likely targeted than others; some target states have more resources to combat terrorism. A country's decision to implement a specific counterterrorism strategy has effects on the counterterrorism strategies of other countries. All countries can free-ride on one country's efforts to combat terrorism, and at the same time a target country has to bear higher risks of attacks if other target countries increase their security measures.³⁰

Sandler and Arce³¹ distinguish two categories of counterterrorism strategies: Pro-active and defensive policies. Pro-active policies (or pre-emption) take direct action against terrorists or their sponsors and include destroying terrorist training camps, retaliating against a state sponsor, infiltrating terrorist groups, gathering intelligence, or freezing terrorist assets. Defensive policies (or deterrence) are intended to make terrorist acts more difficult and include erecting technological barriers (e.g., metal detectors or bomb-sniffing equipment at airports), fortifying potential targets, and securing borders.

Table 7: Counterterrorism Strategies: Pro-Active versus Defensive Policies

A simple model can be seen in Table 7. The two target states are the European Union and the United States and they have a choice of three strategies (pro-active, status quo

EU \ US	Pro-Active	Status Quo	Defensive
Pro-Active	2,2	-2,4	-6,6
Status Quo	4,-2	0,0	-4,2
Defensive	6,-6	2,-4	-2,-2

and defensive). As can be seen, benefits and costs are symmetric and the payoff-matrix resembles a two-fold prisoner-dilemma, resulting in the strategy "defensive-defensive" being a Nash-Equilibrium. The scholars argue that pro-active policies encourage free riding on behalf of the other countries since the benefits of these strategies are purely public. The defensive policies on the other hand yield private benefits and public costs. Hence the countries compete in increasing their defensive policies and not drawing the attack. Target states are more likely to engage in defensive policies than in pro-active policies, but it would be better if they engage in pro-active policies and the international community fosters these pro-active responses through subsidies or other supports.

³⁰ Drakos, Kutan (2003); Enders, Sandler (1993); Sandler (2003); Sandler, Enders (2004); Sandler, Arce (2005)

³¹ Sandler and Arce (2005)

Having in mind target states' inclination towards defensive policies and their need to justify these strategies before their citizens, I turn to the game between target states and citizens in the next section.

Counterterrorism and citizens of target states

As said in the definition, the aim of terrorism is to create fear and a diminished sense of security. Obviously, this is not in the interest of those living with that fear. But the question is: does the government of the target state have an incentive for promoting this sense of insecurity among their citizens?

Some scholars argue that this sense of insecurity allows the government to combine defensive counterterrorism strategies with a reduction of civil liberty of their citizens, such as stricter border controls and a control of movement. Terrorist acts make citizens more deferential to the demands of their governments. If the citizens criticize their government's action, they are reproached for being insufficiently patriotic. Even courts are reluctant to oppose reductions in civil liberties in times of war or war-like emergencies³².

There are reasonable incentives for the government to use defensive strategies and reduce civil liberties. Often defensive strategies are less cost-intensive, less risky and easier to employ. Defensive strategies can include restrictions on individual freedom of assembly, religion, speech, and the right to privacy. Governments justify these measures as being necessary to increase their counterterrorist and security capabilities.³³

In order to implement defensive counterterrorism strategies that include reduced civil liberties, a government needs support from a majority of its citizens. While some citizens are indifferent to a limitation of civil liberties, most citizens will only support the government initiative if they think this will result in better security for them. They are willing to trade civil liberties for an enhanced sense of security. The question then is: How does terrorism change the nature of the game between those citizens in favour of extending citizens' rights and those citizens in favour of limiting citizens' rights?

A simple model is offered by Waldroff, on which my own extended version is based. Waldroff suggests that the maximisation of liberty and the maximisation of security are opposing trends. He assumes that for an individual at time x and at time y both the gains from a certain level of liberty 'L' and the level of security costs 'S' can be quantitatively assessed. 'S' is calculated by multiplying possible harm and the probability of terrorist attacks. The utility of an individual i is calculated as such: $U_i = L_i - S_i$. Thus the utility can be maximised by increasing the level of liberty (maximisation of liberty) or by decreasing the risk costs of terrorism (maximisation of security), but at the same time one has to keep in mind that an increase of liberty proportionally increases the level of risk costs, and a decrease in the level of risk costs is only achieved by a proportional decrease of liberty.

Waldroff assumes a balance between the level of liberty and the level of risk before the

³² Kristoff (2002); Waldron (2003); Meisels (2005)

³³ Haubrich (2003)

terrorist incident. After the terrorist incident, the higher level of risk costs makes it necessary to adjust the level of liberty. If x and y denote the time before and after the terrorist incident, then $L_i(x) > L_i(y)$ and $S_i(x) > S_i(y)$ reflect the fact of increased security measures that diminish individual liberty.

Table 8: Different impacts of terrorism on certain groups in society

Now imagine a society with four groups of people grouped by two factors: first, the probability of bearing the risk costs of terrorism; second, the probability of being affected by a diminishment of civil liberties. The first dimension depends

	High probability of bearing costs of terrorism	Low probability of bearing costs of terrorism
High probability of being affected by diminishment of civil liberties	(A) [Example: Immigrant groups from origin states of terrorism in urban areas]	(B) [Example: Immigrant groups from origin states of terrorism in rural areas]
Low probability of being affected by diminishment of civil liberties	(C) [Example: Citizens in urban areas]	(D) [Example: Citizens in rural areas]

on where a person lives (e.g. urban vs. rural), what lifestyle she has (e.g. mobile vs. immobile) or in which sectors she works (e.g. airline companies vs. supermarket). The second dimension depends on the status of a person in society (e.g. citizen status vs. immigrant status) or her inclination towards civil rights (e.g. liberal vs. authoritarian). In Table 8 some examples are given for the four categories. Let us assume that all four groups are of similar size, therefore their weight in elections is equal. Let us further assume that they assess whether to support or oppose a government policy based on their utility.

Table 9: Scenario 1, Equal Distribution of Liberties and Terrorism Costs

In Table 9 we can see how the utility for each group is calculated. Assume that the level of liberty before the application of policies by the government is 30 for each group, while the level of risk is 5 before the

Government strategies	Before Terrorist Incident	After Terrorist Incident	Policy I	Policy II
			High level of security, low level of liberty	Low level of security, high level of liberty
Groups	$U(x)=L(x)-S(x)$		$U(y)=L(y)-S(y)$	
A	25=30-5	10=30-20	12.5=20-7.5	12.5=25-12.5
B	25=30-5	10=30-20	12.5=20-7.5	12.5=25-12.5
C	25=30-5	10=30-20	12.5=20-7.5	12.5=25-12.5
D	25=30-5	10=30-20	12.5=20-7.5	12.5=25-12.5
Σ	100	40	50	50

terrorist incident and 20 after the terrorist incident. In Scenario 1 all groups are similarly affected by the terrorism. The government proposes two strategies: Policy I involves a diminishment of the level of liberty to 20 and a diminishment of the level of risk to 7.5, Policy II only diminishes the level of risk to 12.5, but leaves the level of liberty at 25. Call Policy I the hawk-strategy and Policy II the dove-strategy. In scenario 1, all groups are equally affected by the two policies. Since the overall utility and the individual utility after the terrorist incident decrease but with any policy increase again, all groups would favour government action and are also indifferent between the hawk- and the dove-strategy.

Table 10: Scenario 2, Unequal Distribution of Liberties and Terrorism Costs

In Scenario 2 (Table 10), the level of risk and the level of liberties are different for each group (as indicated in Table 8). Assume that after the terrorist incident, group A and C have an increased risk of terrorism of

Government strategies \ Groups	Before Terrorist Incident	After Terrorist Incident	Policy I High level of security, low level of liberty	Policy II Low level of security, high level of liberty
	$U(x)=L(x)-S(x)$		$U(y)=L(y)-S(y)$	
A	25=30-5	10=30-20	12.5=20-7.5	12.5=25-12.5
B	25=30-5	25=30-5	15=20-5	20=25-5
C	25=30-5	10=30-20	22.5=30-7.5	17.5=30-12.5
D	25=30-5	25=30-5	25=30-5	25=30-5
Σ	100	40	75	75

20, while B and D remain at 5. Policy I cuts back the terrorism risk to 7.5, while Policy II cuts back the terrorism risk to 12.5 (just as in Scenario I, but the policies only work for A and C since B and D already only face a risk of 5). However, group A and B are highly affected by the diminishment of liberty, while group C and D remain on their old level of liberty.

Three observations: First, A and C are in favour of government action, while B is opposed and D is indifferent. Remember that in Scenario 1 all groups supported government action, which one could link to the fact that all were equally affected by the terrorist actions and the government policy. However, in Scenario 2 with unequal distribution of liberties and terrorism cost, there is still a simple majority for government action. Terrorism gives an incentive for government to take action, even if not all groups would benefit from such action.

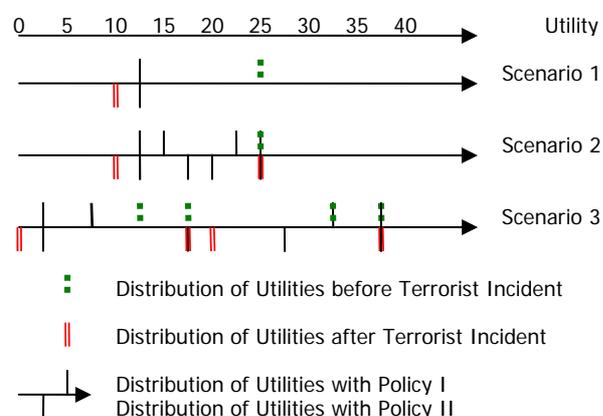
Second observation: unlike Scenario 1, in Scenario 2 not all groups are indifferent between both policies. B favours Policy II, C favours Policy I, A and D are indifferent. Such a scenario opens the space for

Table 11: Scenario 3, Different Distribution before Terrorist Incident

Government strategies \ Groups	Before Terrorist Incident	After Terrorist Incident	Policy I High level of security, low level of liberty	Policy II Low level of security, high level of liberty
	$U(x)=L(x)-R(x)$		$U(y)=L(y)-R(y)$	
A	12.5=20-7.5	0=20-20	2.5=10-7.5	2.5=15-12.5
B	17.5=20-2.5	17.5=20-2.5	7.5=10-2.5	12.5=15-2.5
C	32.5=40-7.5	20=40-20	32.5=40-7.5	27.5=40-12.5
D	37.5=40-2.5	37.5=40-2.5	37.5=40-2.5	37.5=40-2.5
Σ	100	75	80	80

a political debate between the groups. If one thinks of other scenarios with different degrees of unequal distribution (e.g. a Scenario 2b with equal distribution of liberties and unequal distribution of terrorism costs, or a Scenario 2c with unequal distribution of liberties and equal distribution of terrorism costs), it will become obvious that the preference patterns become quite vivid

Image 2: Distribution Patterns of the three scenarios



and might even result in a preference for one policy. However it will never happen that all

groups favour one policy. In short, terrorism splits society.

Third observation: The utility patterns of both policies are not similar, quite the contrary: the utility pattern of Policy I is more spread than the utility pattern of Policy II. If the level of liberty and the levels of bearing the costs of terrorists are unequally distributed even before the terrorist incident, the tendency of spreading utility patterns becomes more obvious. All observations concerning Scenario 2 are equally true in Scenario 3 (Table 11), but as can be seen in Image 2 the utility patterns not only spread out compared to Scenario 2, but also policy I (the hawk-strategy) causes a more polarized society than Policy II (the dove strategy). Both policies reinforce the unequal distribution of utility, but Policy I pushes the groups B and C in the middle of the utility scale to both ends. The two groups A and D at the end of the utility scale (those who are heavily affected by limitation of liberty and bear high terrorism costs and those that are not affected by limitation of liberty and bear very little terrorism costs) are not affected by either policy. In short, if a society is already split, terrorism pushes the split even further.

This polarisation is even stronger if we no longer assume that all groups know what they will gain and lose with both policies. In Scenario 4 (Table 12) utilities before and after the terrorist incident are as in Scenario 3, but all groups calculate their possible utility interval. The upper level is calculated by assuming the highest level of liberty the group can gain and subtracting the lowest terrorist cost, the lower level is calculated by assuming the lowest level of liberty and subtracting the highest level of terrorist cost.

Table 12: Scenario 4, Utility Intervals and Government Action

One can observe that B clearly prefers no government action compared to his utility interval from the policies. C clearly prefers the utility interval

Government strategies Groups	Before Terrorist Incident	After Terrorist Incident	Effects of Policy I and Policy combined	
			Lower Level	Upper Level
A	12.5	0	-2.5=10-12.5	7.5=15-7.5
B	17.5	17.5	7.5=10-2.5	12.5=15-2.5
C	32.5	20	27.5=40-12.5	32.5=40-7.5
D	37.5	37.5	37.5=40-2.5	37.5=40-2.5

of the policies to no action. D is indifferent between no action and government action. The crucial group is A: depending on their risk affinity they will prefer government action or inaction. Both B and C can arrange side payments to increase or decrease A's risk affinity, yet they can also make side payments to D to overcome D's indifference. In short: terrorism gives incentives to redistribute utility to different groups in society.

The aim of these lengthy discussions was to show the different effects of terrorism on a society's decision to implement certain counterterrorism strategies: it gives incentive to government action; it splits a society and encourages strategic redistribution of utility.

In the first parts of the second chapter, the terrorists' choices and its implications for their own supporters were discussed. The following parts considered the implications of target governments' counterterrorism choices on other governments and on citizens. The last part of this chapter reflects the implication of counterterrorism on the behaviour of the terrorists.

Counterterrorism and terrorists

The game between target states and terrorists is the most essential game, but the literature on terrorism does not give many models. The nature of the game between terrorists and target states is similar to the game between terrorists and their origin states, yet their possibilities to enter a binding agreement with the terrorists is less likely.

Still, target states have a variety of counterstrategies. In the previous section, counterterrorism strategies were categorized by the type of strategy, in this section counterterrorism strategies are categorized by the strategies' effect. Frey³⁴ distinguishes between strategies that (1) increase the costs of terrorism (2) reduce the benefits of terrorism for the terrorists, thus reducing the utility of the "terror"-strategy; (3) increase the utility of the "non-terror" strategy.

In Frey's decision calculus terrorists have a choice between the "Terror"-strategy (labelled 'T') and the "No-Terror" strategy (labelled 'O' = Other legal activities). The budget line represents the available resources of terrorist and the indifference curve represents a certain political goal of the terrorists. The goal can be reached by a combination of O and T, which are substitutable for each other. 'T*' represents the amount of terrorism and 'O*' represents the amount of other legal activities committed by the terrorists for a given budget curve and given political goal (see Image 3).

Image 3: Decision Calculus of Terrorists

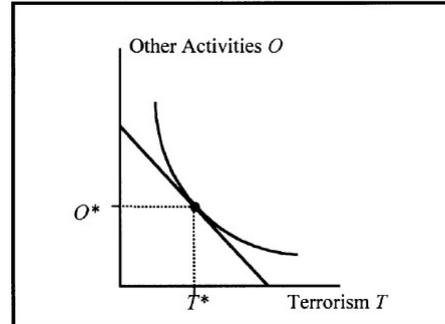
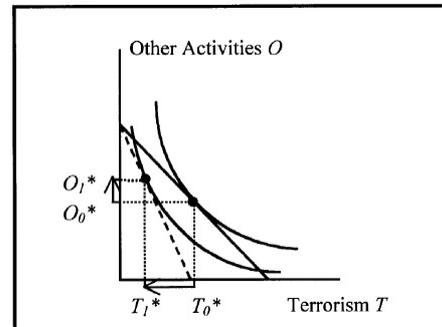


Image 4: Increasing Costs of Terrorism



The first strategy of a state consists of increasing the costs of terrorism by a higher risk of apprehension and improved security measures. Both activities turn the budget line clockwise. Considering all things previously said about the relative importance of terrorism cost in the strategy calculus of terrorists, this strategy would result in a lower level of terrorism (see Image 4). Is that realistic? Since in Frey's decision calculus, the two activities are only partially substitutable, the costs have to be increased infinitely. Maybe a certain amount of terrorism we cannot avoid.

The second strategy of the state decreases the benefits of terrorism by diminishing the damage of terrorism. This strategy results in a shift of the indifference curve (see Image 5). Keep in mind that terrorism uses violence to attract attention. The state could foster a decentralized, economic structure that suffers less severe effects. Even in a decentralized economy like the United States the impacts of economic terrorism were enormous, this strategy seems hardly viable.

³⁴ Frey (2003)

Another option is to inform the citizens that terrorism should not be seen as immanent threat, given the unlikely chance of an ordinary citizens being a victim of terrorism. However, this option is unlikely given the nature of the game between target states and their citizens.

The third category consists of actions that increase the utility of the “non-terror” strategy, such as convincing the moderate leaders in terrorist groups to participate in the political process. The general idea is to shift the indifference curve (see again Image 5) and to decrease the costs of the other legal activities, thus shifting the budget curve counter-clockwise (see Image &).

Some scholars discuss this part of the game in detail. They try to model the game between governments, moderate leaders of terrorist groups (who are willing to give up terrorism for political concessions) and other more radical terrorist groups (who are against giving up terrorism). Two aspects are particularly important: the level of violence chosen by terrorists may signal information to the government about the strength of various factions within the terrorist organization³⁵; and governments often try to hold the moderate leaders responsible for the violence of the radical terrorists, threatening to withhold concessions and even to end negotiations until new negotiating partners can be found.

In the model of Kydd and Walter³⁶ radical terrorist groups undermine peace negotiations between moderate terrorists and a government by suggesting to the government that the current moderates are weak and it is better to negotiate with the (then moderate but now still radical leaders) in future periods of the game. They signal that in future periods strong moderates will be able to suppress extremist violence. For the government such a strategy is risky, since new radicals might arise, but also beneficial, since it allows to put pressure on the moderate leaders.

Bueno de Mesquita³⁷ models the link between concessions and the suppression of extremist violence. In his model, governments and former terrorists ensure the credibility of government concessions and former terrorists’ promises of counterterrorism aid through punishment strategies in a repeated game. The government can choose to blame the continuing violence on the inability or unwillingness of the former terrorists to prevent attacks. He shows that the threat of replacement, in addition to concessions, motivates the former terrorists to

Image 5: Reducing Benefits of Terrorism

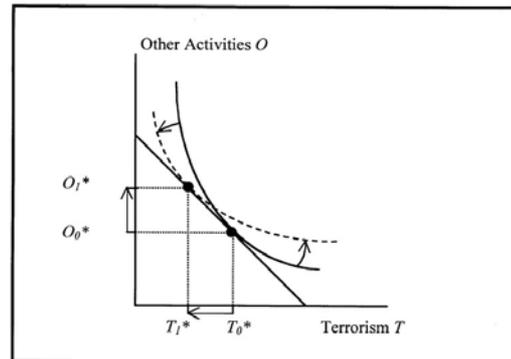
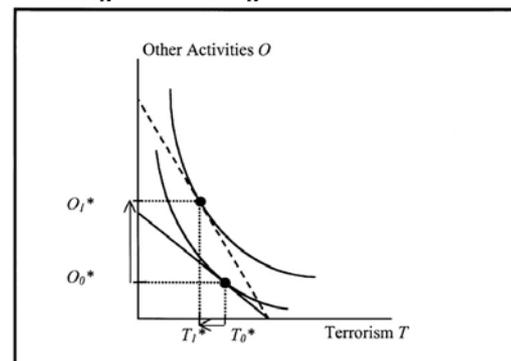


Image 6: Reducing Costs of Other Activities



³⁵ Sandler, Lapan (1993); Kydd, Walter (2002)

³⁶ Kydd, Walter (2002)

³⁷ Bueno de Mesquita (2005a)

increase their effort to discontinue the violence and influence the radical groups. However, if the potential replacements are clearly better or clearly worse than the current moderate terrorists, then they believe that their efforts have no effect on the government's replacement decisions.

This essay does not allow the space to discuss these two models in detail, but it can be seen that the strategy of decreasing the costs and raising the utility of the "non-terror" strategy has many important aspects for which the decision calculus of Frey is not sufficient enough. And it is not complete: Frey does not consider two further options in the decision calculus. One could also cut the terrorists financial support (resulting in moving the budget line left closer to the zero point) by closing terrorists' and supporters bank accounts. One could also fight a 'war on terrorism' in the origin states of terrorism (result in a clockwise shift of the indifference curve, which leads to even more terrorism).

Is game theory relevant for understanding terrorism?

The previous sections showed the diversified approaches to model terrorism with the tools of game theory. Although the analysis is far from complete, we can see that:

- terrorist have incentives to form networks
- origin states have incentives to enter binding agreements with terrorists
- counterterrorism efforts are more likely to be defensive
- defensive counterterrorism efforts increase the tension in target societies
- pro-active counterterrorism efforts only work if terrorism is fully substitutable by other political activities, but involve a complicated mechanism of threats and counter-threats between former terrorist leaders and governments.

Although these findings will sound trivial to a political scientists or a historian, the merit of game theory is the formulation of the different relations in the game theoretical set-up. If game theory explains the characteristics of terrorism assuming rationality of terrorist, we can at least hope to find rational counterterrorism strategies. We can also hope to predict further developments.

These and other findings are often challenged on a methodological base: "Game theory claims predictive power for future events, extrapolating both from laboratory experiments of the behaviour of nonterrorists playing nonnaturalistic games and from post hoc analysis of real-world incidents."³⁸ An idealised rationality is applied to analysis in which such rationality might not hold.³⁹

I have said already that the assumption of rationality yields realistic explanations of the terrorism game, so we have no evidence to believe that terrorists are irrational. Even if they were, this is not a problem. Already Max Weber⁴⁰ said that the assumption of rationality in social sciences does not imply that actors are rational or aware of rational choices. Instead they

³⁸ Victoroff (2005)

³⁹ Bowen et al. (1985); Merari, Friedland (1985); Wieviorka (1993); Merari (2002); Wieviorka (2004); Victoroff (2005)

⁴⁰ Weber (1921)

might be totally unaware of any rational principles governing their behaviour. Yet the assumption of rational behaviour allows understanding more clearly how much allegedly irrational deviates from rational behaviour. The discussion in this chapter has hopefully shown that the deviation is often not that great.

Game theory explains results, mechanisms and strategies in the game, but it does not explain why some people enter the game. Obviously, on the side of the target states, this is not a voluntary decision. But on the side of the terrorists, game theory offers no explanation on the motives of the terrorists. These will be discussed in the third chapter of this essay.

3. Roots of Terrorism

Values and terrorism

A theory on terrorism has to explain why some groups and individuals commit terrorism, while other similar groups or individuals from similar backgrounds refrain from terrorism. Rational choice theory might give the following answer: specific utility functions of terrorists, restrictions in the terrorist game, and strategies of supporters and counterstrategies of targets make terrorism more or less likely. The decision calculus of Bruno Frey discussed in the previous chapter should serve as a good example.

Yet for political analysts, the question “Why do terrorists commit terrorist acts?” cannot be satisfactorily answered by a reference to utility functions and restrictions only. The question remains: why do terrorists have different utility functions and why are certain restrictions relevant for the terrorists?

Game theory is not the only theory advanced in the context of terrorism. Some theories explain terrorism through psychology, economic status or political aims of the terrorist. Some explain terrorism through the culture, religion, or the history of the terrorist's group. If one of these conditions would be a necessary and sufficient for terrorism, all terrorist groups (and only terrorist groups) should show this condition. So far this condition is not found. All theories interpreting individual or collective conditions as cause of terrorism have to explain why these conditions are necessary, but not sufficient conditions for motivating terrorism.

In this chapter, I focus on two different kinds of explanations: culture and religion as intrinsic motivations, economical disparities and political oppression as extrinsic motivations of terrorism. Both of these are characteristics of a group and these characteristics shape the utility functions of individuals.

Why do I omit characteristics of individuals (like individual psychological traits) when discussing terrorism? For sure, individual characteristics shape individual utility functions equally well. Why not discuss abnormal psychology as a necessary and sufficient condition of terrorism?

First of all, many surveys show that for individual terrorists an abnormal psychology is not the main source of motivation, which is even truer for sub-state group terrorism. Quite

contrary: terrorists seem to have a normal psychological disposition.⁴¹

Secondly, I have given quite a few reasons why I think that terrorists are rational, thus normal actors. For discussing terrorism in the context of game theory, assuming rationality is absolutely crucial, but even in the context of the following theories, rationality is not an unrealistic assumption.

Thirdly, even though I might focus on group characteristics, individual characteristics are also involved. Especially values of individuals are relevant because religions, culture, economical and political situation shape the values of an individual. Values are relevant for developing and maintaining positive attitudes towards terrorist action and a negative attitude towards the targets. They can serve as criteria for guiding terrorist action, and for justifying one's own and other's actions. Values reflect a moral judgement and a comparison between the terrorist group and other groups.⁴² Values are the means to shape the utility function of individuals.

Assessing values can only be done indirectly. No individual is able to give a coherent and complete account of his or her system of values. The indirect observation of individuals can be done by comparing actions and artefacts, in which individuals express their values.

Alison Smith⁴³ compares documents (pamphlets, propaganda brochures, internal communication messages) of sub-state terrorist-groups and non-terrorist groups. The survey controlled for culture because groups from the same political background and with the same political aim were compared. Her results show that both terrorist and non-terrorist groups considered the political enemy as aggressive and lacking morality. The language used to indicate the dominance and iniquity of the political opponent was slightly but not significantly stronger in the terrorist groups. A strong difference showed in the values that the groups attributed to themselves. Both groups gave themselves a higher morality, but the terrorist groups attributed a higher morality to themselves than non-terrorist groups. Also both groups indicated that their own group has a right to dominate the political enemy, but terrorist groups attributed higher dominance to themselves than non-terrorist groups.

This finding will direct our search in the last chapter of this essay. The difference between violent and non-violent political activists is not so much the attitude towards the opponents, but the attitude towards themselves. Terrorists can be characterized by a strong initial sense of inferiority with regard to the opponent, which provokes a reaction of superiority. In the following parts I discuss how culture and religion, economic and political situation foster this sense of superiority.

⁴¹ Victoroff (2005)

⁴² Rokeach (1970); Smith (2004)

⁴³ Smith (2004)

Economic and Political Relations and Terrorism

Values, culture and religion are characteristics of groups that motivate individual behaviour 'from the inside'. The individual adopts beliefs, attitudes, goals and self-image from the group which in the end motivates individual behaviour. Other group characteristics are for instance the economic and political situation and the economic and political history of groups. In these cases, the individual personalizes the groups' situation and history which then motivates behaviour. Group characteristics are linked, the political and economical situation can influence values, religions and culture and vice versa.

The naive theory⁴⁵ that economic disparities cause terrorism is not upheld in the academic community anymore. But many scholars claim a sociological link between poverty and terrorism⁴⁶. The differences between the material welfare of those profiting from globalisation and those left behind in the globalisation process supposedly leads to political violence because "globalization creates foci of poverty and facilitates communication between those who perceive themselves to be globalization's victims"⁴⁷, a thought that was already mentioned in the first chapter where I discussed trends of terrorism: either absolute deprivation of wealth or relative economic disparities, according to these scholars, promotes terrorist acts.

Table 13: Social Class of Terrorists⁴⁴

Source	Subjects	Social Class
Russell / Miller (1983)	350 members of eighteen European, Middle Eastern, South American, and Japanese groups, 1966- 1976	more than two third members of middle or upper middle class
Clark (1983)	48 ETA members, 1970s	28 % lower class; 30 % middle class
Weinberg / Eubank (1987)	451 Italian women terrorists	35 % students, 43 % white-collar workers or teachers, 7 % "workers"
Strentz (1988)	U.S. domestic terrorists: 1960s-70s leftist groups	Middle class
Strentz (1988)	1980s Middle Eastern terrorists	"Unskilled and unemployable"
Handler (1990)	161 right-wing and 119 leftwing terrorists active in United States, 1960s-1970s	Right wing: 74.8 % blue-collar workers, 18.3 % white-collar workers; Left wing: 24.3 % blue-collar workers, 15 % white-collar workers
Hassan (2001)	"Nearly 250" Hamas or Islamic Jihad members, 1996-1999	"Many" middle class
Pedahzur et al. (2003)	80 Palestinian suicide terrorists	Mean socioeconomic status (SES) = 5.97 (high SES = 1; low = 10)
Sageman (2004)	102 Salafi Muslim terrorists from Saudi Arabia, Egypt, France, Algeria, Morocco, and Indonesia	18 % upper class, 55 % middle class, 27 % lower class

There are however two doubts⁴⁸: first, the social class of terrorists is not necessarily the lowest one. Many comparative studies show that terrorist groups recruit their followers often from middle classes and from educated families. Especially a study by Pedahzur, Perliger, and Weinberg⁴⁹, shows that transnational sub-state terrorism with religious motivation can not be directly linked to the social class of the terrorists.

This is not to say that economic disparities do not play a role at all: maybe the terrorists maximise their support by playing on political issues of their constituents,⁵⁰ but then the

⁴⁴ Victoroff (2005)

⁴⁵ Gurr (1970)

⁴⁶ Schmid, Jongman (1983); Harmon (2000); Hasisi, Pedahzur (2000); Krueger, Maleckova (2002); Victoroff (2005)

⁴⁷ Maya, Lander, Ungar (2002); Victoroff (2005)

⁴⁸ Krueger, Maleckova (2002); Victoroff (2005)

⁴⁹ Pedahzur et al. (2003)

⁵⁰ Victoroff (2005), p. 20 refers to Bennet (2004) and says: "Given the 70 percent adult unemployment rate in Gaza, the gross domestic product of less than \$1,000 throughout the Palestinian Territories, the severely constrained economic opportunities despite educational achievement due to the unresolved Israeli-Palestinian conflict, and the cultural

economic situation is not the cause of terrorism, but only the political vehicle. We have to ask ourselves, what cultural or religious context allows using this political vehicle for conducting terrorism?

Secondly, if economic disparities play a role in fostering terrorism, then strong or weak economic relations should show in the number of terrorist incidents in a country or initiated by a terrorist from a country. But as a study by Li and Schaub shows, the amount of trade, foreign direct investments or financial capital flows (as indicators of economic relations of a country) are not positively or negatively correlated with the number of transnational terrorist incidents initiated within the country. They show however, that the economic development of a country and its top economics partners reduces the number of transnational terrorist incidents within the country. If trade and foreign direct investments promote economic development, economic globalisation has a direct negative effect on transnational terrorism.⁵¹

Some authors see the root of terrorism in the political sphere. They argue that terrorism is caused by oppression of either a minority group within a country, especially in the case of nationalist-separatist or ethnic-sectarian terrorism (e.g., ETA, PIRA, Hamas).⁵² As discussed earlier, also in the case of suicide terrorism, such a theory of oppression is advanced. However, there is not much empirical evidence to support the theory that oppression or its perception motivates the behavior of terrorists⁵³: "Very few individuals of aggrieved minorities go on to become active terrorists. The question has always been, why did these particular individuals engage in terrorism when most of their compatriots did not?"⁵⁴

Both types of theories, economic and political reasons, fail to explain terrorism sufficiently. If the economic situation is involved in motivating terrorism, other group characteristics are necessary to explain why the economic situation can be used as a political vehicle for gathering support for the terrorists. In the next section, I discuss if religion and culture have this task in motivating terrorism.

Religion and Terrorism

There is strong evidence that terrorist behaviour is affected by religious considerations. Certain religious beliefs provide a compelling rationale for carrying out terrorist attacks. Religious terrorism is characterized by the legitimization of violence based on religious precepts, a sense of alienation, and the preoccupation with the elimination of broadly defined 'enemies'. Terrorist organisation often use religious motives to claim a stronger sense of superiority, de-

importance of the male breadwinner role, it is premature to rule out the possibility that diminished economic prospects have helped provoke Palestinian terrorism." Yet, this is not an economical issue but a group identity issue. Terrorism on behalf of the economic situation of supporters "may be a pro-social activity ostensibly undertaken on behalf of all classes. If the entire in-group (that of the political actor) faces economic disparities relative to an out-group (that of the privileged target), participation in political violence would not be expected to be an economic class phenomenon but a group-of-identity phenomenon."

⁵¹ Li, Schaub (2004)

⁵² Whitaker (1972); Schmid, Jongman (1983); Crenshaw (1986); Taylor, Quayle (1994); Post, Sprinzak, Denny (2003)

⁵³ Victoroff (2005)

⁵⁴ Silke (2003), p. 33

crease the resistance towards violence in their followers and increase the allegiance with the terrorist group. Terrorist organisations that claim religious inspiration are far more lethal than groups based on secular motives.⁵⁵

How does religious sub-state terrorism differ from other kinds of sub-state terrorism? Bruce Hoffmann explains the difference between religious fundamentalism and political secular terrorism (such as social revolutionary terrorism, right-wing terrorism, nationalist-separatist terrorism or single-issue terrorism) through the trade-off between effect and sacrifice.

I already mentioned the game between terrorists and their supporters in the previous chapter. Hoffmann also believes that terrorism wants to gain the maximum effect with minimum sacrifice. The actions of terrorists are guided by the values of the supporting group, but there is a payoff between violence and loss of support by the constituents. Hoffmann claims that religious terrorists seek elimination of the broadly defined enemies and have no problem with high sacrifices, while political secular groups are much more sensitive to losing the support of their constituents.⁵⁶ Hoffmann reasons that political secular terrorists are far more likely to use methods that are accepted by their supporters, such as attacks on individuals and government buildings, while religious terrorists use methods that are not necessarily accepted with their supporters, such as mass killings.

Amir Taheri⁵⁷ focuses on Islamic terrorism and compares it with other forms of terrorism. His analysis offers insights into the choice of targets by the terrorists. Why are some countries more targeted than others? Taheri claims a strong difference between Islamic terrorists and terrorists from other religions. Islamic terrorism rejects contemporary ideologies and is conceived and conducted as a Holy War. The division between religion and state is not very sharp in Islamic countries, the Islam forms a basis for a whole theory of both individual conduct and state policy – therefore political differences between Islamic countries and the West are directly translated into individual behaviour, according to Taheri.

According to these two (and other) scholars, religious fundamentalism explains the methods of terrorism, and Islam explains the goals of terrorism. I want to mention doubts that both Taheri and Hoffmann also consider. First, the characteristics of religious fundamentalism, given at the beginning of this section, also apply for white supremacists in the United States and many other non-religious groups across the globe. Secondly, most political secular terrorists (IRA in Northern-Ireland, Sikhs in India, or the PLO in Israel) have a strong religious element in their motivation. Both arguments cast doubt on the claim that there is a strong difference between political and religious fundamentalists.

Thirdly, the Islamic world is much diversified: from multicultural and multiethnic countries like Indonesia and Malaysia to countries with strong ethnic conflicts like Pakistan. Not in all countries, Islam translates political differences into individual behaviour.

⁵⁵ Hoffmann (1989); Weinberg, Eubank (1994)

⁵⁶ Hoffmann (1989)

⁵⁷ Taheri (1987)

The question though is: does Islam promote a latent sense of superiority that significantly promotes a reaction of violence when threatened by a sense of inferiority? I believe so. Islam might not always promote religiously motivated violence. It depends on how Islam is lived and how the Koran is interpreted. It is possible to extract a feeling of superiority of Muslims over Non-Muslims from the Koran, but other passages give a different perspective. In those cultures which accept religiously motivated violence to some extent, Islam pushes religious extremism even further because only certain aspects of the Koran are highlighted in the public discourse (those that support the sense of superiority). This leads us to the question: which culture promotes such an understanding of the Koran, of the Islam religion, of religion in general?

Culture and Terrorism

It is not easy to define culture, since culture is reflected in values and traditions, artefacts, customs, institutions and norms. The innumerable ways of culture influencing terrorism cannot be listed in this essay - therefore I focus on how culture influences the relations between individual and groups. I think that the relation between individuals and groups is particularly important for discussing the sense of superiority raised in the previous section.

Leonard Weinberg and William Lee Eubank⁵⁸ distinguish individualist and collectivist cultures. In individualist cultures, the individual behaviour is determined by personal goals, in collectivist cultures the individual behaviour is determined by group goals. In collectivist cultures, personal and group goals merge.

It is clear that this distinction is purely theoretical. There are no clear cut individualist societies and no clear cut collectivist societies. Often the East-Asian cultures are given as examples of collectivist cultures and the Western cultures are given as examples of individualist cultures. But without effort we can see that even in the West, individuals adjust their behaviour to group goals: if people grow up in a society that advocates material wealth as desirable goal in life, it is no surprise that the individuals feel a strong inclination to fulfil that goal. In other words, also in individualist cultures group goals and personal goals merge. And with similar less effort we can see that the pursuit

Image 7: Ingroup and Outgroup Perspective as a root of terrorism?



⁵⁸ Weinberg, Eubank (1994)

of group goals in a society is in the individualist interest if he lives in a society that distributes wealth within close relations of families and friends. In conclusion: Individualists' societies have collective characteristics, collective societies have individualistic characteristics.

Even if we accept the two types of societies for the sake of the argument, keeping in mind that both types of cultures have individualist and collectivist characteristics, we have to admit that national cultures are no more than a blurred description. Individual behaviour can be influenced by national culture, but is not determined by it.⁵⁹ We have to accept that the relation between individual behaviour, especially in those extreme cases of terrorist acts, and group culture is a fragile one, but the relation is existent.

Harry Triandis⁶⁰ lists possibilities how an individualist or collectivist culture could influence terrorism or the tendency to commit terrorist behaviour.

First, collectivist cultures are more likely to notice the distinction between these two cultures, individualist cultures are more likely to underestimate the influence of group goals. Second, collectivists develop strong emotional attachments to few in-groups and express equally strong concerns with preserving them, while people living in individualist cultures are more detached from their groups. Third, collectivists hold all members of a group accountable for the actions of any individual belonging to that group; individualists assign responsibility for human actions to the persons who perform them. Fourth, the morality of collectivist cultures is absolute, the norms of in-groups are seen as correct and truthful, while individualists tend to emphasize the choice of individuals and regard this principle as end in its own right. Fifth, in collectivist cultures two different standards of morality exist, a moral standard concerning members of the in-group, another one concerning the members of the out-group. The in-group's aim of social harmony is emphasized, therefore mediation and bargaining are the common method of conflict settlement. Conduct that would not be allowed inside the in-group is regarded with indifference or actually wins approval if practiced against outsiders. The morality of collectivists only exists inside the group. In individualist cultures, the same standards of moral are valid in- and outside of their group. All of these five mechanisms are needed to develop a sense of superiority.

Again, many comments can be made on the validity of these arguments. For any of the claims given above, we can find counterexamples in both cultures. Weinberg and Eubank clearly state that terrorism occurs in individualist and collectivist societies; terrorism is carried out by individualists and collectivists. However, these broad and unclear differences result in different manifestations of terrorism.⁶¹

The two scholars use Hofstede's⁶² research on national culture (specifically the

⁵⁹ Weinberg, Eubank (1994), comment by Martha Crenshaw

⁶⁰ Triandis (1989)

⁶¹ Weinberg, Eubank (1994)

⁶² Hofstede (1980)

individualism-collectivism dimension) and compare them with data from the ITERATE⁶³ database on terrorism. They show that collectivist terrorists attack out-groups or foreign targets, while individualist terrorist strike targets in both in-groups and out-groups. Also collectivists seem to perform terrorist acts indiscriminately, individualist terrorist search for specific targets. Collectivists kill more people in greater numbers, the violence of individualists is more focused on individuals. The number of individualist attacks is higher than the number of collectivist attacks, but the fatalities from collectivist attacks are higher than from individualist attacks. The hypothesis that all terrorist organizations regardless of their cultural background share common moral standards and attack people and property in indiscriminate fashion is not supported by the results of Weinberg and Eubank.

The findings of Weinberg and Eubank, even if they are not fully convincing⁶⁴, somehow sound similar than the findings of Hoffmann and Taheri. It seems that collectivist cultures and Islamic countries in which religiously motivated violence is accepted foster a certain type of terrorism that is characterized by transnational targets, more fatalities and indiscriminate attacks. Also collectivist cultures are more prone to use the economic situation of the whole group as a political vehicle for motivating terrorism, while Islamic countries in religiously motivated violence is accepted, are more prone to use political relations as a vehicle for terrorism.

Conclusion

Comparing the second and the third chapter of this essay, I think it is clear that game theory formalizes and explains many of the characteristics of terrorism that are relevant for understanding terrorism. I think, especially the relations among different terrorist groups, and the relations between terrorist groups and their supporters are relevant to understand the motivations of terrorism.

Game theory shows that often strong ties develop among terrorist groups and between terrorists and their supporters. Collective cultures and Islamic cultures promote these ties – which makes counterterrorism strategies based on weakening these ties very difficult. On the other hand, any counterterrorism strategies that indirectly strengthen these ties might be a waste of resources as well.

The challenge of political advisors and scientists alike is to develop strategies that suppress the ties between terrorists and their supporters and make terrorist networks less likely, but these strategies have to be adapted to the cultural and religious context of the terrorists' origin society.

Cultural and religious sensitivity, paired with an analytical game theoretical approach, could be a useful tool to specify these strategies.

⁶³ Mickolus (1980)

⁶⁴ In Weinberg and Eubank (1994) the limitations of using Hofstede's research to discuss terrorism are clearly identified, such as the bias towards individualists' societies, Joseba Zulaika comments their research and goes as far as calling Hofstede's Research a social science fiction. Clearly also the use of the ITERATE database has its problems, since ITERATE does not count domestic terrorism or incorporates violence or ethnic terrorism that transcends national boundaries.

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